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## Part 1

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## PREFACE

This Cooperative Research Report (Parts 1 and 2) contains the reports of the Advisory Committee on Fishery Management issued in 1992.

After the May meeting, ICES issued the Report to the International Baltic Sea Fishery Commission (IBSFC), Part I of the Report to the North-East Atlantic Fisheries Commission (NEAFC), and the Report to the North Atlantic Salmon Conservation Organization (NASCO). The second part of the Report to NEAFC was issued after the November meeting. In order to provide the advice to managers as fast as possible, the reports were issued in sections and distributed immediately after they had been completed.

The two reports to NEAFC have been edited into one report, placing the stocks in logical sequence and including all advice on each stock in one place.

The Report to NEAFC is followed by the Reports to IBSFC and NASCO.

In 1991 ACFM adopted a new form of advice and this was described in the ACFM Report for 1991. All of the advice provided by ACFM in 1992 was formulated using the new protocols.

Copenhagen, February 1993  
ICES Fishery Secretary and Secretary to ACFM

**MEMBERS AND ALTERNATE MEMBERS OF  
THE ADVISORY COMMITTEE ON FISHERY MANAGEMENT  
IN 1992<sup>1</sup>**

<b>Affiliation</b>	<b>Member</b>	<b>Alternate</b>
Chairman	Dr F. Serchuk	
Chairman of Demersal Fish Committee	Prof. N. Daan Mr E. Aro (from 1 Nov.)	
Chairman of Pelagic Fish Committee	Mr O. Hagström	
Chairman of Baltic Fish Committee	Dr W. Weber Mr B. Sjöstrand (from 1 Nov.)	
Belgium	Dr R. De Clerck	Dr F. Redant Mr W. Vanhee (from 1 Nov.)
Canada	Mr J.J. Maguire	Mr J.S. Beckett
Denmark	Mr E. Kirkegaard	Mr P. Degnbol
Finland	Mr E. Aro Mr E. Ikonen (from 1 Nov.)	Mr R. Parmanne
France	Mr B. Mesnil	Mr A. Forest
Germany	Mr H.P. Cornus	Mr B. Vaske
Iceland	Dr G. Stefánsson	Dr S. Schopka
Ireland	Mr J. Browne	Mr J. Molloy
Netherlands	Dr R. Boddeke	Mr A. Corten
Norway	Mr T. Jakobsen	Mr I. Røttingen
Poland	Dr J. Netzel	Dr J. Kleniewski
Portugal	Dr C. Sousa Reis	Dr (Ms) M.J. de Figueiredo
Russia	Dr Y. Efimov	Dr V.N. Shleinik
Spain	Mr J.A. Pereiro	Mr F.J. Pereiro
Sweden	Mr B. Sjöstrand Mr J. Modin (from 1 Nov.)	Mr J. Modin (to 31 Oct.)
UK	Dr J.W. Horwood	Dr R.M. Cook
USA	Mr R. Mayo	Mr R.J. Conser

<sup>1</sup>Newly elected chairmen of the Fish Committees take up their posts on 1 November. National membership may be changed at any time of year. This list includes the members and alternates as at the times of the ACFM meetings in spring and autumn.

# ADVISORY COMMITTEE ON FISHERY MANAGEMENT

## Participants

Affiliation	Spring 1992	Autumn 1992
Chairman	Dr F. Serchuk	Dr F. Serchuk
Chairman, Consultative Committee	Prof. C.C.E. Hopkins <sup>1</sup>	
Chairman, Demersal Fish Committee	Prof. N. Daan	Mr E. Aro
Chairman, Pelagic Fish Committee	Mr O. Hagström	Mr O. Hagström
Chairman, Baltic Fish Committee	Dr W. Weber	Dr W. Weber <sup>2</sup>
Chairman, ACMP	Dr G. Topping <sup>1</sup>	
Belgium	Dr R. De Clerck	Dr R. De Clerck
Canada	Mr J.J. Maguire	--- <sup>3</sup>
Denmark	Mr E. Kirkegaard	Mr P. Degnbol (Alternate)
Finland	Mr E. Aro	--- <sup>3</sup>
France	Mr A. Forest (Alternate)	Mr B. Mesnil
Germany	Mr H.P. Cornus <sup>1</sup> Mr B. Vaske <sup>1</sup> (Alternate)	Mr H.P. Cornus
Iceland	Dr G. Stefánsson	Dr G. Stefánsson
Ireland	Mr J. Browne	Mr J. Browne
Netherlands	Mr A. Corten (Alternate)	Dr R. Boddeke
Norway	Mr T. Jakobsen	Mr T. Jakobsen
Poland	Dr J. Netzel	Dr J. Netzel
Portugal	Dr C. Sousa Reis	Dr C. Sousa Reis
Russia	Dr Y. Efimov <sup>1</sup> Dr V.N. Shleinik <sup>1</sup> (Alternate)	Dr Y. Efimov <sup>1</sup> Dr V.N. Shleinik <sup>1</sup> (Alternate)
Spain	Mr F.J. Pereiro (Alternate)	Mr F.J. Pereiro (Alternate)
Sweden	Mr B. Sjöstrand	Mr J. Modin (Alternate)
UK	Dr J.W. Horwood	Dr J.W. Horwood
USA	Dr R. Conser (Alternate)	Mr R. Mayo
Observer, Commission of the EC	Mr A. Astudillo	Mr D.W. Armstrong
Observers, Faroe Islands and Greenland	Mr H. í Jakupsstovu <sup>1</sup> Mr F. Ríget <sup>1</sup>	Mr H. í Jakupsstovu <sup>1</sup> Mr H. Hovgård <sup>1</sup>
Chairman, Working Group on North Atlantic Salmon	Dr K. Friedland <sup>1,4</sup>	
Chairman, Working Group on the Assessment of Mackerel, Horse mackerel, Sardine and Anchovy		Mr A. Eltink <sup>1,4</sup>
ICES Fishery Secretary, Secretary to ACFM	Dr R.J.R. Grainger	Dr R.J.R. Grainger
ICES Fishery Secretary designate		Dr R.S. Bailey <sup>1</sup>
ICES Fisheries Assessment Scientist	Mr H. Sparholt <sup>1</sup>	Mr H. Sparholt <sup>1</sup>
ICES System Analyst	Mr L. Pedersen <sup>1</sup>	Mr L. Pedersen <sup>1</sup>

<sup>1</sup>Participated part time.

<sup>2</sup>Representing new Chairman, Baltic Fish Committee.

<sup>3</sup>Not represented.

<sup>4</sup>Participated by invitation.

## **ACFM ADVICE**

### **1. THE FORM OF ACFM ADVICE**

At its autumn 1991 meeting, ACFM redefined the basis and form of the advice which it would provide, and this was described in the introductory section "ACFM Advice" of the 1991 Reports of ACFM (ICES Cooperative Research Report No. 179). The new Form of ACFM Advice has been formally presented at the annual meetings of NEAFC in 1991, and NASCO and IBSFC in 1992, and has also been discussed within ICES. In addition, comments have been received from some ICES Member Countries. ACFM intends to keep its Form of Advice under constant review and encourages management bodies to comment upon it and suggest how it can be improved.

### **2. REVIEW OF ADVICE FOR 1992**

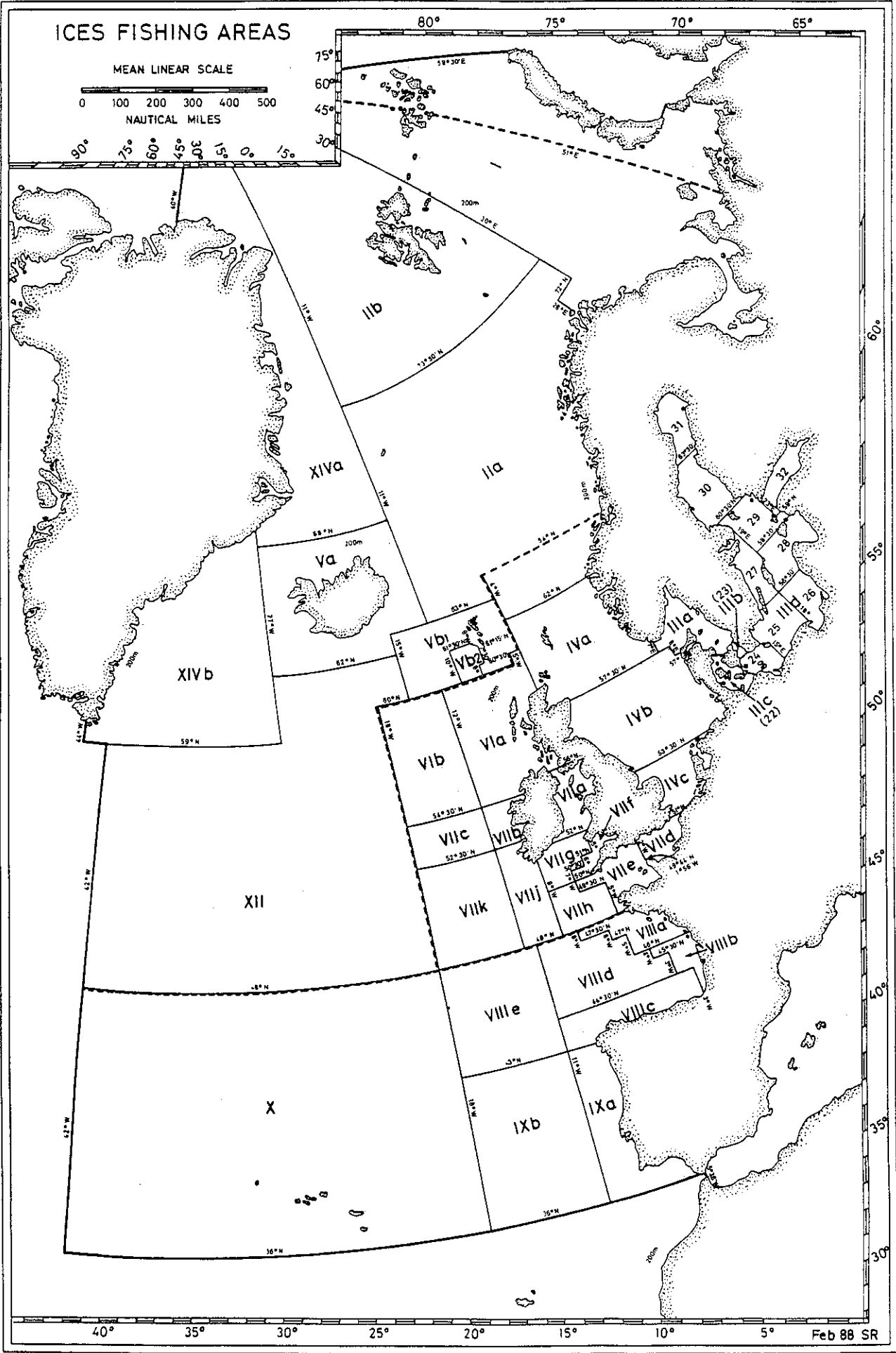
ACFM wishes to stress that its definitive advice on each stock is based on all the data available to ICES, and that the timing of the advice on each stock is determined by the need for that advice to be as accurate as possible.

While new information can be used to redefine the advice, ACFM considers that mid-year revisions are in general unnecessary. The precision of stock size estimates is such that there would need to be quite major changes before any revision in advice was justified. Minor changes would simply serve to create instability in advice.

ACFM nevertheless recognizes that it has a responsibility to draw the attention of managers, as early as possible, to any necessary alteration in scientific advice and to the need for a change in management action.



Note: Dashed lines represent boundaries between NEAFC regions.



# REPORT TO THE NORTH-EAST ATLANTIC FISHERIES COMMISSION

## 1. INTRODUCTORY ITEMS

### 1.1 Review of Nominal Catches in NEAFC Area

The assessments presented in this report are carried out using the best catch data available to the working groups and to ACFM. These data are not necessarily identical with the official statistics but, where appropriate, include estimates of unreported landings as well as corrections for misallocation of catches by area and species. Despite considerable effort exerted to this problem, there is no guarantee that all instances of misreporting were discovered. Often working group catch data are collated on a stock basis rather than an area basis, and so straightforward comparisons between these figures and the official statistics, which are provided on an area basis, are not appropriate.

In the assessments, the working groups try to estimate the total catch taken, including slipped catches, discards, landings which are not officially reported, and the composition of the industrial by-catches. These amounts of different species, which have to be included in the estimates of what has been taken from a given stock in order for the assessments to be correct, thus appear in the tables and figures produced by the working groups. These levels of discards, slipped fish, unreported landings, and industrial by-catches vary considerably between different stocks and fisheries, being negligible in some cases and constituting important parts of the total removal from other stocks.

The catch data used in the assessments are given in the table section. In cases where there might be doubt, it has been indicated if discards, by-catches, and estimates of unreported landings are included in the assessments. Estimates of catches landed as by-catches, especially from the industrial fisheries, are included in the assessments wherever data allow it and are included in the catch options.

It should be noted that, in general, catches in the industrial fisheries of protected species above the minimum landing size which are sorted out and landed for human consumption, are included in the estimates of human consumption landings, both in the catch input data and in the projected catch options. Estimates of industrial by-catches cover, in most cases, that part of the by-catch which is used for reduction purposes.

ACFM in the past has noted the problems associated with discrepancies between the official landing figures reported to ICES by member countries and corresponding catch data used by assessment working groups. ACFM recognizes the need for a clear identification of the categories of the catch data used for assessments. Working groups have been requested to specify the composition of the catch data used to estimate fishing mortalities. It is necessary that the working groups clearly identify factors contributing to the total fishing mortality in the various stocks, e.g.:

- recorded landings,
- discards at sea,
- slipping of unwanted catches,
- losses due to burst nets etc.,
- unreported landings,
- catch reported as other species,
- catch reported as taken in other areas,
- catch taken as by-catch in other fisheries.

It is recognized by ACFM that working groups should not be required to reveal the sources of the data. The groups, should, however, indicate whether the data originate from sampling programmes, field observations, interviews, etc., in order to allow ACFM and other interested parties to evaluate the quality of the data, and hence the basis for the assessment.

The overall responsibility of obtaining reliable, adequate and timely fisheries statistics for publication in *ICES Fisheries Statistics* does not rest with ACFM. It is the opinion of ACFM that national offices for fisheries statistics are responsible for providing the catch data needed for assessments. These offices should ensure that catch statistics are collected on a gear basis and that the species composition of landings is determined in the case where landings are made unsorted by species.

## 2. STOCKS IN NEAFC REGION 1

### 2.1 North-East Arctic Cod

#### 2.1.1 Advice from May 1992 ACFM meeting

ACFM was informed that weights-at-age in the catches in 1992 have been higher than used in the prediction reported by ACFM in 1991. Preliminary data indicate an overall underestimate of about 15%. There is no basis for revising the estimates of stock numbers. ACFM felt that the data presented on the stock weights were more uncertain and that further data are needed to evaluate the effects on the stock biomass.

#### 2.1.2 Advice from October/November 1992 ACFM meeting

**Source of information:** Report of the Arctic Fisheries Working Group, August/September 1992 (C.M.1993/Assess: 1).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC <sup>3</sup>	170	<446	<645	530 <sup>4</sup>	300-370	172	215	- <sup>5</sup>			
Agreed TAC <sup>3</sup>	220	400	560	590 <sup>4</sup>	300	160	215	356 <sup>7</sup>			
Official landings	336	454	552	459	343 <sup>6</sup>	207 <sup>6</sup>	n/a	-			
Catch as used by WG <sup>3</sup>	308	430	523	435	332	187	258	-	1343	187	691
Landings of								-			
Norwegian coastal cod	28	26	31	22	17	24	25	-			
Sp. stock biomass	199	171	149	156	170	347	680	1056 <sup>2</sup>	1526	149	513
Recruitment (age 3)	508	894	282	230	216	140	227	370 <sup>2</sup>	1818	112	604
Mean F(5-10,u)	0.80	0.92	1.02	0.91	0.63	0.24	0.19	-	1.02	0.19	0.64

<sup>1</sup>Over period 1950-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Norwegian coastal cod not included. <sup>4</sup>New advice May 1988: 325,000-363,000 t, agreed TAC reduced to 451,000 t. <sup>5</sup>Within safe biological limits. <sup>6</sup>Preliminary. <sup>7</sup>Revised from 300 due to information on increased individual growth. Weights in '000 t, recruitment in millions.

**Catches:** From a historic low catch of 187,000 t in 1990, the landings in 1991 increased to 258,000 t (Tables 2.1.2.1 and 2.1.2.3). The landings in 1992 are expected to be 376,000 t. This is still well below the historic mean. The landings of Norwegian coastal cod were 25,000 t in 1991, slightly above the level in 1990 (Table 2.1.2.2).

**Data and assessment:** Analytical assessment based on catch-at-age data. VPA tuned using 5 time series of trawl and acoustic surveys. Recruitment estimated by combination of data from 16 index series. Catch-at-age data for Norwegian coastal cod were not available and a SHOT forecast was made for 1993.

**Fishing mortality:** Fishing mortality increased to a record-high level in 1987 (1.02), but has subsequently declined to a record-low of 0.19 in 1991 (Figure 2.1.2).

**Recruitment:** All year classes recruiting to the fishery after 1986 are well below the historic mean and the year classes of 1984-1988 are regarded as poor. The 1989, 1990 and 1991 year classes are estimated to be below average.

**State of stock:** From an average level of about 1 million t in the 1980s, the total stock biomass has increased rapidly to 1.8 million in 1992. The spawning stock estimate, which is considered more uncertain, has increased from a low level of 170,000 t in 1989 to 1,056,000 t in 1992. This is due to low fishing mortality, early maturation, especially of the 1983 year class, and improved individual growth. In 1993, the 1983 year class will represent 34% of the spawning stock biomass.

**Forecast for 1993:**

Assuming  $F(92) = 0.31$ , Basis: TAC/catch estimate, Catch(92) = Not calculated, Landings (92) = 376.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F(91)$	0.19	857	-	256	895	SSB slightly increasing.
B	$F_{\max}$	0.25		-	323	840	SSB stable at 1993 level.
C	$F(92)(\approx F_{\text{low}})$	0.31		-	385	790	SSB decreasing.
D	$F_{\text{med}}$	0.46		-	534	672	SSB decreasing.

Weights in '000 t.

Continued fishing at current (1992) levels of fishing mortality will lead to a decrease in SSB and a slight increase in landings in the short term. A SHOT forecast for Norwegian coastal cod assuming landings of 27,000 t in 1992 gives a prediction of 30,000 t in 1993.

**Management advice:** The assessment confirms that the severe measures taken by management bodies have reduced fishing mortalities to a much lower level than experienced in the 1980s. As a consequence, the stock has been rapidly increasing. High individual growth rates and early maturity have also been important factors in the stock recovery. Recruitment has improved and the stock is within safe biological limits.

Some reduction in spawning stock biomass from the current high level is expected, but it will remain well above the historic mean and the reduction gives no cause for immediate concern. ACFM expects that continued fishing at about current fishing mortalities will help maintain the spawning stock biomass at a healthy level and stabilize the fishery by providing a buffer for the recurring periods when recruitment is reduced as a result of environmental conditions.

Norwegian coastal cod is not included in the assessment or in the projected catches. However, since cod in the North-East Arctic is managed as one unit, the SHOT forecast of 30,000 t for 1993 should be included in a total cod TAC for the area.

**Special comments:** The stock situation has improved considerably compared to last year's assessment. The upward revision of spawning stock biomass in 1992 is the combined result of high growth rates and earlier maturity than predicted and an increase in stock number estimates. Effort data need to be provided to verify the large reduction in estimated fishing mortalities in recent years.

There are several uncertainties in the assessment. Work is underway to resolve some of the problems, especially with regard to age readings and survey methods. Predictions of growth are highly uncertain in the light of age reading problems and environmental fluctuations. The capelin stock is expected to decline in the near future (see Section 2.10.1.2) which might affect both growth and recruitment of the cod. Herring are now abundant in the area and may buffer the effects of a decline in the capelin stock, but the net effects of such changes in the ecosystem are still insufficiently understood.

Substantial revisions of the assessment have occurred in the past and the possibility of an overestimate of the current stock size must be considered. Although there is no doubt that the spawning stock biomass is high at present, the total stock biomass estimate of 1.8 million t is still below the mean level of 2.5 - 3.0 million t experienced for 20 years before catches started to decline in the late 1970s. Bearing in mind the uncertainties concerning the ecosystem effects, continued caution should be exercised in the exploitation of the stock.

## 2.2 North-East Arctic Haddock

**Source of information:** Report of the Arctic Fisheries Working Group, August/September 1992 (C.M.1993/Assess:1).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC <sup>3</sup>	50	100	160	<240	<103	- <sup>4</sup>	- <sup>4</sup>	- <sup>5</sup>			
Agreed TAC <sup>3</sup>	50	100	250	240	83	25	28	63 <sup>7</sup>			
Official landings	45	101	155	95	60 <sup>6</sup>	27 <sup>6</sup>	n/a	-			
Catch as used by WG <sup>3</sup>	41	97	151	92	55	26	33	-	320	18	125
Sp. stock biomass	35	52	32	54	67	66	76	81 <sup>2</sup>	430	32	158
Recruitment (age 3)	263	345	73	25	16	17	34	118 <sup>2</sup>	1030	5	171
Mean F(4-7,u)	0.46	0.51	0.57	0.50	0.40	0.20	0.34	-	0.89	0.20	0.54

<sup>1</sup>Over period 1950-1991. <sup>2</sup>Assumed. <sup>3</sup>Norwegian coastal haddock not included. <sup>4</sup>No directed fishery. <sup>5</sup>Within safe biological limits. <sup>6</sup>Preliminary. <sup>7</sup>Increased during the year by 8,000 t. Weights in '000 t, recruitment in millions.

**Catches:** Landings have rapidly declined from 151,000 t in 1987. In 1990 and 1991 only a very small haddock fishery has been allowed and the landings of 26,000 t and 33,000 t, respectively, are close to the lowest after 1945 (Tables 2.2.1 and 2.2.2). An increase is expected in 1992, to 54,000 t, due to improved recruitment.

**Data and assessment:** Analytical assessment based on catch-at-age data. VPA tuned using 4 time series of trawl and acoustic surveys. Recruitment estimated by combination of data from 10 index series.

**Fishing mortality:** Decreased from an average level of 0.51 in 1985-1988 to the lowest level on record in 1990 ( $F=0.20$ ) (Figure 2.2). An increase to the  $F_{med}$  level ( $F=0.34$ ) in 1991 is observed and a further increase to 0.55 is estimated for 1992.

**Recruitment:** After the poor year classes of 1985-1987, improved recruitment is observed. However, there is considerable uncertainty concerning the estimates of recruitment of the 1988-1991 year classes.

**State of stock:** The spawning stock has been very low during the 1980s and in 1993 the 1983 year class will still be contributing a large proportion (about 40%) of the biomass. Some increase can be expected from 1994 onwards due to improved recruitment.

### Forecast for 1993:

Assuming  $F(92) = 0.55$ , Basis: TAC/catch estimate, Catch(92) = Not calculated, Landings (92) = 54.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{0.1}$	0.14	60	-	25	96	SSB increasing.
B	$F_{90}$	0.20		-	35	90	SSB increasing.
C	$F_{91}(\approx F_{med})$	0.34		-	56	79	SSB increases to 1991/1992 level.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will keep catches at the same level and lead to an increase in spawning stock biomass which will still be below the average historic level.

**Management advice:** The spawning stock biomass is expected to increase from 1993 to 1994, but will still be below the long-term mean. Recruitment is improving and the stock is considered to be within safe biological limits.

Fishing mortality is expected to increase in 1992, but this is highly dependent on the size of the 1988 year class. ACFM notes that there are no long-term benefits in yield to be expected from increasing fishing mortality beyond the estimated 1991 levels.

**Special comments:** Because of the stock composition, the catch and biomass projections are currently very dependent on the size of recruiting year classes, particularly the 1988 year class.

## 2.3 North-East Arctic Saithe

**Source of information:** Report of the Arctic Fisheries Working Group, August/September 1992 (C.M.1993/Assess:1).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	85 <sup>3</sup>	74 <sup>3</sup>	<90	<83	120	93	90	- <sup>5</sup>			
Agreed TAC <sup>4</sup>	-	-	-	-	120	103	100	115			
Official landings	107	70	92	114	123	95	n/a	-			
Catch as used by WG	107	70	92	115	123	95	109	-	262	70	164
Sp. stock biomass	131	98	99	93	118	118	102	88 <sup>2</sup>	861	93	366
Recruitment (age 1)	245	115	93	133	460	182	200 <sup>2</sup>	200 <sup>2</sup>	475	93	274
Mean F(3-6,u)	0.53	0.38	0.33	0.40	0.58	0.49	0.40	-	0.68	0.15	0.39

<sup>1</sup>Over period 1960-1991. <sup>2</sup>Assumed. <sup>3</sup>Catch at  $F_{max}$ , reduction to this level as quickly as possible recommended. <sup>4</sup>Target set by Norwegian authorities. <sup>5</sup>Within safe biological limits. Weights in '000 t, recruitment in millions.

**Catches:** From a level at or above 150,000 t during the 10 years prior to 1985, the landings declined rapidly to the lowest on record in 1986 (Table 2.3). After this an increase to 123,000 t is observed in 1989 followed by a decrease to 95,000 t in 1990. In 1991, landings increased to 109,000 t.

**Data and assessment:** Analytical assessment based on catch-at-age data. VPA tuned using CPUE from Norwegian trawlers and purse seiners and acoustic survey data. Reliable recruitment indices are not available.

**Fishing mortality:** Fishing mortality has been higher than  $F_{med}$  since 1970. After 1989, fishing mortality showed a declining trend (Figure 2.3).

**Recruitment:** The 1983 year class is strong, the 1984 year class is average and the year classes of 1985, 1986 and 1987 are very poor. The 1988 year class appears to be very strong. The strength of the 1989 year class is still uncertain, but there is some evidence that it may be better than assumed.

**State of stock:** Although the spawning stock is still at a historic low level, there is no evidence of recruitment failure.

### Forecast for 1993:

Assuming  $F(92) = 0.36$ , Basis: TAC, Catch(92) = Not calculated, Landings (92) = 115.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{0.1} \approx F_{low}$	0.18	98	-	67	224	SSB increasing.
B	$F_{med} \approx F_{max}$	0.31		-	107	195	SSB increasing.
C	$F_{92}$	0.36		-	121	186	SSB increasing.
D	$F_{91}$	0.40		-	132	178	SSB increasing.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a slight increase in catches and a marked increase in spawning stock biomass to about half of the historic mean.

**Management advice:** Spawning stock biomass has been at a low level in recent years. However, the 1988 year class is strong and will give an increase in the spawning stock biomass in 1994. The stock is considered to be within safe biological limits.

Continued fishing at current levels will allow the spawning stock biomass to increase substantially in the short-term. The fishing mortality is, however, in excess of  $F_{med}$  and only 10-20% below  $F_{high}$  ( $=0.46$ ). ACFM notes that there are no long-term benefits in yield to be expected from increasing fishing mortality beyond the current level and that some decrease may help stabilize the spawning stock at a higher level than in recent years.

**Special comments:** The design of the acoustic survey has been gradually established during its six years' history and the survey may become a stabilizing factor in the VPA tuning in the future. The survey gave strong signals about the 1988 year class which have been confirmed in the fisheries. If the survey proves to be a good predictor of year class strength at age 2, it will reduce uncertainty in the predictions.



## 2.4 Redfish in Sub-areas I and II

**Source of information:** Report of the Arctic Fisheries Working Group, August/September 1992 (C.M.1993/Assess:1).

Total redfish landings in Sub-areas I and II declined continuously from 132,000 t in 1982 to 35,000 t in 1987, but have increased in the most recent years (Tables 2.4.1 - 2.4.4). Landings in 1991 were 61,000 t, but a sharp decline to 32,000 t is expected in 1992.

The proportion of *Sebastes mentella* in the landings declined from 85% in 1983 to 30% in 1987 (Table 2.4.5), but in more recent years the proportion has been increasing and is expected to be 63% in 1992.

### 2.4.1 *Sebastes mentella* in Sub-areas I and II

**Source of information:** Report of the Arctic Fisheries Working Group, August/September 1992 (C.M.1993/Assess:1).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	85	85	70 <sup>2</sup>	11	12	18	12	22 <sup>2</sup>			
Agreed TAC	85	85	85	-	-	-	-				
Catch as used by WG	63	23	11	16	23	35	40	-	269	5	65

<sup>1</sup>Over period 1965-1991. <sup>2</sup>Precautionary TAC. Weights in '000 t, recruitment in millions.

**Catches:** The landings declined rapidly from 1982 to a very low level of 11,000 t in 1987 (Table 2.4.5). Subsequently, they have increased to reach 40,000 t in 1991, but are forecast to be only 20,000 t in 1992.

**Data and assessment:** An analytical assessment was attempted based on catch-at-age data, but it was considered unreliable.

**Fishing mortality:** Not known, but effort has been increasing in recent years up to 1991.

**Recruitment:** The 1982 year class is more abundant than adjacent year classes, but the overall level of recruitment is unknown. The most recent 0-group indices of redfish (1991 and 1992) are very low.

**State of stock:** Historical catches indicate that the stock could be at a relatively low level. CPUE declined to a record low level in 1992.

**Management advice:** There is evidence of increased effort in recent years and ACFM last year expressed doubt that the increasing trend in catches could be maintained for very long. A sharp decrease in catches is expected in 1992. Although accompanied by a reduction in effort, a rapid decline in catch per unit effort is seen after 1990, the value for 1992 being the lowest on record.

The decrease in landings and catch per unit effort may reflect a stock decline. ACFM can only advise that if a TAC is to be implemented, a precautionary TAC of 18,000 t, the average landings for the period 1986-1989, seems appropriate.

**Special comments:** Age-reading problems appear to be the main reason for the unreliability of the analytical assessments. ACFM, therefore, encourages a continuation of the work to improve age-reading techniques.

ACFM notes that for the *S.mentella* and *S.marinus* stocks, there are problems involved in estimating species composition in the redfish catches in addition to the problems with age determination. As a result, it is difficult to get reliable information about the actual status of each stock and any procedure to regulate catches separately would be hard to implement. ACFM notes, however, that a management strategy could be to introduce either TAC or effort control in smaller areas. This procedure could be based on CPUE or survey indices and could be defined in such a fashion as to safeguard against depletion of either of the stocks.

## 2.4.2 *Sebastes marinus* in Sub-areas I and II

**Source of information:** Report of the Arctic Fisheries Working Group, August/September 1992 (C.M.1993/Assess:1).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	15 <sup>2</sup>	15 <sup>2</sup>	3 <sup>3</sup>	15	24	23	24	25 <sup>2</sup>			
Agreed TAC	15	15	-	-	-	-	-				
Catch as used by WG	29	30	24	26	23	27	22	12 <sup>4</sup>	49	13	26

<sup>1</sup>Over period 1969-1991. <sup>2</sup>Precautionary TAC. <sup>3</sup>Recommended that a precautionary TAC is set based on recent catches.

<sup>4</sup>Forecasted. Weights in '000 t.

**Catches:** Landings declined from 49,000 t in 1976 to 16,000 t in 1982 (Table 2.4.5). In more recent years they have been fluctuating around the mean level, but are forecast to be only 12,000 t in 1992.

**Data and assessment:** Catch at age data are available, but are still considered unreliable. No reliable assessment is available.

**Fishing mortality:** Unknown.

**Recruitment:** Unknown.

**State of stock:** Unknown.

**Forecast for 1993:** None available.

**Management advice:** If the recent declines in landings reflect a stock decline, a precautionary TAC based on recent catch levels, e.g., 25,000 t (1987-1990), may not be sufficient to halt the decline. ACFM can only advise that if a more conservative approach is desired, a TAC of 12,000 t, corresponding to the forecasted landings in 1992, seems more appropriate.

## 2.5 Greenland Halibut in Sub-areas I and II

**Source of information:** Report of the Arctic Fisheries Working Group, August/September 1992 (C.M.1993/Assess:1).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	20	20	3 <sup>3</sup>	19	21	15	9	6			
Agreed TAC	20	20	-	-	-	-	-	7 <sup>4</sup>			
Official landings	20	23	19	20	20	23	n/a	-			
Catch as used by WG	20	23	19	20	21	23	27	-	89	13	28
Sp. stock biomass	68	65	57	51	52	52	50	41 <sup>2</sup>	237	41	94
Recruitment (age 3)	27	31	30	21	27 <sup>2</sup>	27 <sup>2</sup>	27 <sup>2</sup>	27 <sup>2</sup>	46	21	30
Mean F(6-10,u)	0.32	0.36	0.36	0.40	0.33	0.43	0.55	-	0.55	0.14	0.32

<sup>1</sup>Over period 1970-1991. <sup>2</sup>Assumed. <sup>3</sup>Recommended that a precautionary TAC is set based on recent catches. <sup>4</sup>Target set by Norwegian authorities. Weights in '000 t, recruitment in millions.

**Catches:** Landings have been stable at around 20,000 t for more than 10 years, but increased to 27,000 t in 1991 (Tables 2.5.1-2.5.4). A sharp reduction to 7,000 t is expected in 1992 due to a cessation of the directed trawl fishery.

**Data and assessment:** Analytical assessment based on catch-at-age data. VPA tuned using two time series of commercial CPUE data. Reliable recruitment indices are not available.

**Fishing mortality:** Varying between 0.3 and 0.4 since 1984, but increased in 1990 to 0.43 and in 1991 to 0.55 (Figure 2.5). Fishing mortality is expected to decline to 0.15 in 1992.

**Recruitment:** Has generally varied little between years, but information from surveys indicates low recent recruitment. The reliability of these indices has not been established.

**State of stock:** Both the total stock and the spawning stock are at historically low levels.

### Forecast for 1993:

Assuming  $F(92) = 0.15$ , Basis: expected catch, Catch(92) = Not calculated, Landings (92) = 7.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/im- plications
A	Landings(93)=Landings(92)	0.12	50	-	7	59	
B	$F_{92}$	0.15		-	9	57	SSB increasing.
C	$F_{med}$	0.23		-	12	53	SSB remains at low level.
D	$F_{max}$	0.29		-	15	51	
E	$F_{91}$	0.55		-	26	43	SSB decreases to near record low level.

Weights in '000 t.

Continued fishing at the assumed 1992 level of fishing mortality will lead to a slight increase in catch and an increase in spawning stock biomass.

**Management advice:** Both spawning and total stock biomass are at historically low levels and there are indications of recruitment failure. ACFM considers the stock to be outside safe biological limits and in danger of recruitment overfishing.

Last year ACFM recommended that, as a first step, the spawning stock biomass should be rebuilt to the 1991 level. This has been achieved by stopping directed trawl fishing and thereby reducing landings in 1992 to an estimated 7,000 t. To rebuild the spawning stock, expected landings in 1993 must not increase from the expected 1992 level. ACFM, therefore, recommends that the TAC for 1993 should not exceed 7,000 t.

**Special comments:** The continuous large reduction in CPUE, declining spawning stock biomass, and indications of weak year classes in the 0-group survey in the four most recent years must be taken into account when setting a TAC. It is also important for the near future development of the stock that the recommended TAC be accepted and enforced, as was done in 1992.

## 2.6 Demersal Stocks at Greenland and Iceland

### 2.6.1 Cod stocks off Greenland (ICES Sub-area XIV and NAFO Sub-area 1)

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
<b>East Greenland</b>											
Recommended TAC	4	4	5	5	5	-	-	-			
Agreed TAC	11.5	11.5	11.5	11.5	15	15 <sup>2</sup>	25	17			
Official landings	2	5	7	12	16	33	22	-			
Catch as used by WG	2	5	7	9	15	33	22	-	33	2	14
<b>West Greenland</b>											
Recommended TAC	Various options (see Special comments)										
Agreed TAC	28.3	12.5	12.5	53	90	110	90	66			
Official landings	15	7	12	60	109	68	20	-			
Catch as used by WG	15	7	12	63	112	68	20	-	112	7	45
<b>Greenland (total)</b>											
Recommended TAC											
Agreed TAC						125	115	83			
Official landings	17	12	19	72	127	101	42	-			
Catch as used by WG	17	12	19	72	127	101	42	-	127	12	59
Greenland stock biomass index <sup>3</sup>	65	119	678	648	491	92	49				

<sup>1</sup>Over period 1981-1991. <sup>2</sup>During 1990 combined with West Greenland TAC to 125,000 t. <sup>3</sup>From groundfish survey. Weights in '000 t.

**Catches:** From 1990 to 1991, catches dropped dramatically at West Greenland (70%), especially offshore, and also at East Greenland (33%) (Tables 2.6.1.1-2.6.1.2). The directed trawl fishery stopped at West Greenland during 1991 due to the low catch rates.

**Data and assessment:** Analytical assessments of Greenland cod were attempted but proved unreliable. In addition, a combined assessment of the Greenland and Iceland cod stocks was attempted, but this also proved unreliable. Indices of stock sizes of Greenland cod were estimated on the basis of groundfish surveys.

**Fishing mortality:** No information available.

**Recruitment:** Year classes of 1986-1990 are estimated to be poor.

**State of stock:** The Greenland cod stock is at a very low level at present. The offshore stock off West Greenland is severely depleted. At East Greenland, where the stock size is at a medium level (relative to the period 1982-90), declines are expected in the future due to low recruitment.

In 1991, the main part of the total offshore stock at Greenland was distributed in the northern East Greenland area. To increase the prospect of successful future spawnings (whether at Greenland or Iceland), a reduction in the fishing mortality would be beneficial.

**Forecast for 1993:** Not available.

**Special comments:** Since 1982 no specific TACs have been advised for West Greenland, but a number of management options concerning the exploitation of the 1984 year class have been advised by NAFO. Emigration of this year class has been more extensive than assumed. TACs are fixed until 1994 in a contract between Greenland and the EC. ACFM has only advised on the state of the stock.

## 2.6.2 Icelandic cod (Division Va)

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC <sup>3</sup>	200	300	300	300	300	250	240 <sup>5</sup>	250 <sup>6</sup>			
Agreed TAC <sup>4</sup>	263	300	330	350	325	300	245 <sup>5</sup>	265 <sup>6</sup>			
Official landings	325	369	392	378	356	335		-			
Catch as used by WG	325	369	392	378	356	335	313	250 <sup>2</sup>	538	284	394
Sp. stock biomass	271	272	256	194	273	348	352	211 <sup>2</sup>	1,428	194	556
Recruitment (age 3)	145	336	343	175	86	139	123	150 <sup>2</sup>	432	86	210
Mean F(5-10,u)	.66	.78	.83	.99	.68	.73	.80	-	.99	.30	.58

<sup>1</sup>Over period 1955-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>National advice - not ACFM. <sup>4</sup>National TAC. <sup>5</sup>January-August 1991. <sup>6</sup>September 1991 - August 1992. Weights in '000 t, recruitment in millions.

**Catches:** Catches have exceeded national advice and national TAC levels considerably for the previous decade (Table 2.6.2).

**Data and assessment:** Analytical assessments based on VPA with survey and CPUE data. Catch-at-age data reliable.

**Fishing mortality:** Close to  $F_{high}$  (based on a long time series with a considerable data range) (Figure 2.6.2).

**Recruitment:** Poor recruitment of year classes 1985 onwards following the good 1983 and 1984 year classes.

**State of stock:** SSB is close to the lowest level on record and has shown a declining trend since 1955.

### Forecast for 1993:

Assuming  $F(92) = 0.78$ , Basis: TAC (see Special comment 5), Catch(92) = 250, Landings (92) = 250.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	Incr. SSB	0.46	214	154	154	256	Immediate increase in SSB. (See Special comment 1.)
B	Const.SSB	0.61	204	195	195	220	SSB stable - increases by 1995. (See Special comment 2.)
C	Const. F	0.78	193	236	236	194	SSB decreases below historical low in 1995. (See Special comment 3.)

Weights in '000 t.

Continued fishing at  $F=0.78$  will lead to decreasing SSB and decreasing catches.

**Management advice:** This stock is considered to have reached a level of exploitation which will bring it below the minimum biologically acceptable level. Therefore ACFM recommends an immediate substantial reduction in fishing mortality in 1993. Fishing mortality in 1993 should be no higher than 0.46 corresponding to a catch in 1993 of no more than 154,000 t.

### Special comments:

- 1) A 40% reduction in fishing mortality will, with high probability, lead to an increase in SSB. This corresponds to catches of about 150,000 t in 1993, increasing to 200,000 t in 1995.
- 2) A 20% reduction in fishing mortality is expected to lead to a stable SSB and catches of about 200,000 t. This is considered to be a high-risk option since there is considerable probability of a continued decline in the SSB.
- 3) The stock will continue to decline under the 1992 level of exploitation. Since recruitment has been lower at low SSB levels, this considerably endangers the stock.
- 4) The system used for regulating catches has evolved during the past decade, from effort limitations to mixed effort-catch limitations and finally to an ITQ system in 1991. The fishing year was changed in 1991 to last from 1 September to 31 August, but in the transition year of 1991 an 8-month "year" was implemented (January-August). The experience from the 8-month period indicates that current catch regulations provide a reasonable enforcement of the agreed TAC (the TAC was set at 245,000 t for January-August 1991, and the catches during the same period were 250,000 t).
- 5) The catch in 1992 is assumed to become 250,000 t. The national TAC for the September 1991-August 1992 season is set at 265,000 t of which 63,000 t have been caught in 1991, leaving 202,000 t for January-August 1992. The catch of 63,000 t in September-December 1991 was unusually poor in spite of the fact that this was in the start of the season, so that the TAC was not limiting. Due to the decline in the stock, lower catches are expected in September-December 1992. Given this fact and the remaining 202,000 t of the TAC, it is indicated that catches will be close to 250,000 t in 1992.



### 2.6.3 Icelandic saithe (Division Va)

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	60	60	64	64	80	80	87	70			
Agreed TAC	70	70	70	80	80	90	65 <sup>3</sup>	75 <sup>4</sup>			
Official landings	57	65	81	77	82	98	101	-	101	57	73
Catch as used by WG	57	66	81	77	82	98	102	-	102	57	73
Sp. stock biomass	169	182	187	146	156	231	141	190 <sup>2</sup>	232	137	175
Recruitment (age 3 )	35	74	103	65	38	40 <sup>2</sup>	40 <sup>2</sup>	40 <sup>2</sup>	103	21	46
Mean F(4 - 9,u)	0.28	0.26	0.37	0.33	0.32	0.35	0.36	-	0.37	0.26	0.32

<sup>1</sup>Over period 1980-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>National quota for the period 1 January-31 August 1991. <sup>4</sup>National quota for the period 1 September-31 August 1992. Weights in '000 t, recruitment in millions.

**Catches:** Landings have been increasing from 57,000 t in 1985 to 102,000 t in 1991 (Table 2.6.3).

**Data and assessment:** Effort data were used to tune the VPA. No recruitment indices are available.

**Fishing mortality:** Fishing mortality has fluctuated between 0.26 and 0.37 in the period 1980-1991 (Figure 2.6.3).

**Recruitment:** Year classes 1983-1985 are well above average. Average recruitment assumed for the most recent year classes.

**State of stock:** Since 1980, the spawning stock has fluctuated without trend between about 140,000 t and 230,000 t.

#### Forecast for 1993:

Assuming  $F(92) = 0.27$ , Basis: TAC, Catch(92) = 77, Landings (92) = 77.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{0.1}$	0.18	188	53	53	213	SSB increasing.
B	$F_{92}$	0.27		75	75	193	SSB stable.
C	$F_{91}$	0.36		95	95	176	SSB decreases to average 1980-1991 level.
D	$F_{max}$	0.42		108	108	164	SSB decreasing from 1992 level.

Weights in '000 t.

Continued fishing at expected 1992 level of fishing mortality will lead to slight increase in SSB.

**Management advice:** Exploitation of this stock is currently well within safe biological limits. ACFM points out that increasing the fishing mortalities from the 1992 level will only give marginal gains in the long term.

**Special comments:** There are severe problems with estimating maturity at age for this stock and hence SSB values should only be treated as rough indications. In the predictions it is assumed that the agreed national TAC will hold since, as is explained in Section 2.6.2, a new regulatory system was enforced in 1991.

## 2.6.4 Greenland halibut in Sub-areas V and XIV

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	≤28	≤28	33	-	40	30	-	-	
Agreed TAC	30	30	30	30	30	45	30 <sup>3</sup>	25 <sup>4</sup>	45	30	
Official landings	32	33	47	51	61	39	43	-	61	19	
Catch as used by WG	32	33	47	51	61	39	43	-	61	19	38
Sp. stock biomass	103	112	125	130	118	101	102	82 <sup>2</sup>	130	73	98
Recruitment (age 5)	43	40	35	32	28	34 <sup>2</sup>	34 <sup>2</sup>	34 <sup>2</sup>	43	28	36
Mean F(8-13,u)	0.32	0.25	0.29	0.41	0.43	0.35	0.41	0.27 <sup>5</sup>	0.48	0.25	0.38

<sup>1</sup>Over period 1980-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>National quota in Division Va for the period 1 January 1991-31 August 1991. <sup>4</sup>National quota in Division Va for the period 1 September 1991-31 August 1992. <sup>5</sup>To account for expected catch of 27,000 t in 1992. Weights in '000 t, recruitment in millions.

**Catches:** Catches were stable at 30,000-34,000 t in 1983-1986 (Tables 2.6.4.1-2.6.4.4). They increased to 61,000 t in 1989, but dropped sharply to 39,000 t in 1990. The 1991 catch amounted to 43,000 t.

**Data and assessment:** VPA tuned with effort data estimated from the Icelandic trawler fleet. No recruitment indices are available.

**Fishing mortality:** Fishing mortality has fluctuated between 0.25 and 0.48 in the period 1980-1990 (Figure 2.6.4). In 1991 the estimated fishing mortality was 0.41.

**Recruitment:** Increased from 31 million in 1983 to about 43 million in 1985 which is the highest on record. Since then, recruitment has been lower and about average.

**State of stock:** Spawning stock biomass increased from 1983 to 1988 from 73,000 t to 130,000 t. Has been decreasing since then.

### Forecast for 1993:

Assuming  $F(92) = 0.27$ , Basis: TAC, Catch(92) = 27, Landings (92) = 27.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{0.1}$	0.25	86	26	26	92	SSB increases to near long-term average
B	$F_{92}$	0.27		28	28	91	
C	$F_{91}$	0.41		40	40	82	SSB declines to below long-term average.
D	$F_{max}$	0.62		56	56	71	SSB declines to historical low level.

Weights in '000 t.

Continued fishing at the 1992 level of fishing mortality will lead to a slight increase in SSB. A TAC of 30,000 t in 1993 will keep the stock stable. An increase in fishing mortality from the 1992 level will only give a marginal increase in the catches in the long term, but may result in a considerable decrease in the SSB.

**Management advice:** ACFM advises that effort should not be allowed to increase in this fishery until better information (e.g. from groundfish surveys) is available.

**Special comments:** As explained in Section 2.6.2, recent changes in the catch regulations seem to result in adherence to the agreed national TAC within Division Va. Therefore, a catch of 27,000 t is assumed in 1992, based on the agreed Icelandic national TAC (25,000 t) and expected additional catches by other nations (2,000 t).

There are some uncertainties involved in the assessment of this stock (including the stock distribution) and this indicates a need to take some care in the exploitation of the stock.

## 2.7 Redfish in Sub-areas V, VI, XII and XIV

### Stocks

The Irminger Sea redfish stock complex comprises *S. marinus* and *S. mentella* stocks on which the so-called "traditional" redfish fishery along East Greenland, Iceland and Faroes coasts is based and the *S. mentella* oceanic stock which is fished in the open sea, mainly in international waters outside the national economic zones. At present, ACFM has no new evidence at hand to justify splitting of the *S. marinus* and *S. mentella* stocks fished in the traditional redfish fishery into separate stock units in Greenlandic, Icelandic or Faroese waters. Although the areal separation of the spawning stocks of the oceanic-type and traditional *S. mentella* has not yet been well defined, the Study Group on Oceanic-type *Sebastes mentella* (ICES, C.M.1990/G:2) and the Study Group on Redfish Stocks (ICES, C.M.1992/G:14) consider the oceanic type to be a separate stock.

### Landings

The total landings from the Irminger Sea redfish stock complex (i.e., redfish in all Sub-areas) reached their highest level on record in 1982 with some 230,000 t (Tables 2.7.1-2.7.14). Since then, landings have declined to the level of 129,000 t in 1991. The catches based on the oceanic type *S. mentella* reached their maximum in 1986 of 105,000 t (Table 2.7.13). Since then, the catches have declined to approximately 91,000 t in 1987 and 1988 and to the very low level in 1989 and 1990 of 38,000 t and 32,000 t, respectively. The 1991 catches of only 23,000 t were the lowest since the beginning of this fishery.

### Stock Distribution with Respect to National Fisheries Zones

The distribution of the *S. marinus* and the traditional *S. mentella* stocks in the national fisheries zones is reflected in the catch statistics. All catches taken in ICES Sub-area XIV are within the national fisheries zone of Greenland. Likewise, catches reported in Divisions Va and Vb are taken within the national fisheries zones of Iceland and the Faroes, respectively. In Sub-area VI, the catches could be taken within the fisheries zone of the EC (United Kingdom) or of the Faroe Islands, depending on where they are taken within Sub-area VI.

The North-Western Working Group noted that the newly found distribution of traditional *S. mentella* in the Irminger Sea in international waters, might also have an impact on considerations on stock distribution with respect to national fisheries zones.

Catches from the oceanic-type *S. mentella* stock have so far have all been taken in Sub-areas XII and XIV, almost exclusively in international waters, i.e., outside the national fisheries zones of the neighbouring countries with the exception of some catches within the national fisheries zones of Greenland and, at the beginning of 1991, also in the Icelandic fisheries zone.

From distribution information available it is obvious that a substantial part of the adult oceanic-type *S. mentella* is, at least at times, to be found within the national fisheries zone of Iceland and Greenland. With the present state of knowledge, the North-Western Working Group has no way to quantify the proportion of the adult stock occurring in respective national zones.

### Assessments

The North-Western Working Group was not able to assess any of the redfish stocks analytically.

ACFM would like to point out some inherent problems in assessing redfish stocks and advising TACs for these:

The catch is landed as redfish with no specification as to species. The necessary splitting of the landings into catches by species, therefore, has to be done based on sampling.

Age determination of redfish is a very difficult task for several reasons. The growth is very slow, the growth increments are indistinct both in scales and otoliths, and the fish recruit to the fishery at a late age. Furthermore, a validation of the ageing methods is badly needed.

Area coverage in ichthyoplankton and acoustic surveys for the oceanic-type *S. mentella* has differed from year to year and, therefore, the survey results do not necessarily reflect changes in stock abundance. Acoustic estimates are uncertain and, therefore, not comparable from year to year, due to noisy signals from the scattering layer and/or jelly fish concentrations associated with *S. mentella* concentrations.

If ACFM is to provide any advice other than for precautionary TACs in the future, several of the questions mentioned above have to be resolved.

#### **By-catch of small redfish in the Denmark Strait shrimp fishery**

There has been an increase in the shrimp fisheries in the Denmark Strait since 1981. The Dohrn Bank area is the main fishing ground in this area.

Information on by-catches of redfish obtained by observers on commercial shrimp trawlers shows marked variations from year to year. In March-April 1987, the numbers of small redfish removed by shrimp trawlers in the two months covered by observers was estimated to be 7 million.

Information from a small-scale observer program in November 1989 covering 37 tows in 10 days gave considerably higher estimates. For 4-7 trawlers fishing for 10 days, the estimate of numbers of small redfish taken by shrimp trawls was 5 million.

Information on by-catch from a Greenland shrimp trawler fishing in Sub-area XIV between 65°30'N and 67°N was available for the period March/April 1991. The observed by-catch of redfish was generally small and consisted mainly of *S. mentella*. The bulk of the redfish was in the length range 10-20 cm with a mode at 13 cm.

ACFM has previously addressed the question of by-catches of small redfish in the important nursery areas for redfish in East Greenland waters and in 1981 recommended a prohibition of fishing with bottom trawls in an area defined by the following coordinates:

From the coast of Greenland at 67°00'N to

67°00'N 30°30'W to  
65°40'N 30°30'W to  
65°40'N 31°50'W to  
65°30'N 33°10'W to  
65°10'N 34°00'W to  
65°00'N 35°05'W to  
64°20'N 35°35'W to  
64°20'N 36°00'W to  
63°50'N 36°50'W to  
63°15'N 39°30'W to  
63°45'N 39°30'W to the coast of Greenland at 63°45'N

The definition of this redfish box was based on survey data and indicated the main nursery areas as found by trawl samples.

Since early in 1990, a minor part of the redfish box has been opened to the shrimp fishery, but no information of the by-catches in this area was available apart from a shrimp survey conducted by Greenland. The observed by-catch of redfish was generally small and consisted mainly of *S. mentella*. The size of the redfish caught during the trial fishery inside the redfish box was generally smaller than the redfish taken outside the redfish box.

ACFM reiterates its earlier advice and recommends that all fishing with bottom trawls be prohibited in the area defined above.

### 2.7.1 Redfish *Sebastes marinus* and *Sebastes mentella* "traditional fishery" in Sub-areas V, VI and XIV

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	129	129	≤ 83 <sup>2</sup>	≤ 84 <sup>2</sup>	117	116	117 <sup>3</sup>	116 <sup>3</sup>	129	116	
Agreed TAC	-	-	-	-	-	-	-	-	-	-	
Landings as used by WG, total	124	124	115	121	112	112	125	-	169	112	131
Division Va	92	87	88	94	92	92	98	-	124	72	97
Division Vb	20	21	17	15	15	12	15	-	21	7	14
Sub-area VI	1	1	1	1	1	1	1		1	+	1
Sub-area XIV	11	15	8	10	3	7	11	-	43	3	20

<sup>1</sup>Over period 1980-1991. <sup>2</sup>For *S. marinus* only. <sup>3</sup>Precautionary. Weights in '000 t.

**Catches:** Total catches reached a peak of 169,000 t in 1982 but declined to 112,000 t in 1990. In 1991 catches increased to 125,000 t.

**Data and assessment:** No analytical assessment could be made due to age reading problems.

**Fishing mortality:** No information available.

**Recruitment:** Icelandic O-group survey indices since 1970 indicate good recruitment of redfish during the period 1972-1974. Between 1975-1989 most indices were below average. Higher values were found in 1985, 1987, 1990 and 1991.

**State of stocks:** Unknown, but CPUE for the Icelandic trawlers fishing in Division Va has been stable in the recent decade.

**Forecast for 1993:** Not available.

**Management advice:** ACFM recommends a precautionary TAC for 1993 of 120,000 t corresponding to the average catch during the stable CPUE period 1985-1991.

**Special comments:** The analysis for the two stocks has been combined due to problems of species separation in the catches (see Section 2.7 under Assessments).

Although CPUE has been stable in Division Va, catches have declined in Sub-area XIV. Species composition has changed and CPUE has declined in Sub-area XIV and Division Vb. Since there are uncertainties concerning stock-distribution, the reasons for the decline in areas adjacent to Division Va are not clear.

If ACFM is to provide advice for the two stocks separately, several of the assessment questions need to be resolved (see Section 2.7 under Assessments).

## 2.7.2 *Sebastes mentella* "oceanic type" in Sub-areas XII and XIV

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	66	- <sup>2</sup>			
Agreed TAC	-	-	-	-	-	-	-				
Landings as used by WG, total	72	105	91	91	38	32	23	-	105	23	64
Sub-area XII	17	24	3	10	17	7	6	-	60	3	25
Sub-area XIV	54	81	88	82	21	25	17	-	88	+	40

<sup>1</sup>Over period 1982-1991. <sup>2</sup>Preference for no major expansion of fishery. Weights in '000 t.

**Catches:** The fishery started in 1992. Landings increased from 1984 to 1986 and have declined since.

**Data and assessment:** No analytical assessment is available due to age-reading problems. Effort series is available. Ichthyoplankton and acoustic survey data are available but the area covered differs from year to year. Acoustic estimates prior to 1991 are often uncertain due to a noisy signal from the scattering layer and are, therefore, not comparable from year to year.

**Fishing mortality:** No information available.

**Recruitment:** No estimates available.

**State of stock:** The 1991 Icelandic acoustic survey estimated stock biomass of 526,000 t in the area covered by the survey which is only a part of the total distribution area. The 1991 Russian ichthyoplankton survey estimated a stock biomass of 802,000 t.

Due to uncertainties regarding this stock the Working Group carried out simulations with various input parameters in order to examine the possible response of this stock to fishing.

Based on the historical catches, different assumptions on input parameters and (survey) biomass in 1991, the stock was projected for a sequence of TAC values (Figures 2.7.2.1-2.7.2.2). A 10-year period (starting in 1991) was considered so as to account for the slow stock dynamics of this species. A comparison between historical biomass and trend back to 1982 and the Russian commercial CPUE series was made and showed the best proportional relationship when using the 263,000 t biomass option. However, all surveys indicate a bigger stock.

**Forecast for 1993:** Not available

**Management advice:** The simulations indicate that a TAC of 100,000 - 150,000 t may reduce the stock to very low levels during the next 10 years. A TAC of about 50,000 t will result in only a slight reduction from current levels under the most likely scenarios.



## 2.8 Demersal Stocks at the Faroe Islands

### 2.8.1 Faroe saithe (Division Vb)

Source of information: Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	19	-	≤32	≤32	40	-	30	- <sup>3</sup>			
Agreed TAC	-	-	-	-	-	-	-				
Official landings	45	42	40	45	44	60	53	-	60	31	45
Unallocated landings	-	-	-	-	1	2	1	-	-	-	
Catch as used by WG	45	42	40	45	45	62	54	-	62	31	45
Sp. stock biomass	85	106	94	97	103	92	81	81 <sup>2</sup>	106	73	92
Recruitment (age 3)	22	61	48	48	35	30	43	30 <sup>2</sup>	61	14	37
Mean F(4 - 8,u)	0.41	0.53	0.43	0.48	0.39	0.56	0.58	-	0.58	0.34	0.46

<sup>1</sup>Over period 1982-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Significant reduction of fishing mortality. Weights in '000 t, recruitment in millions.

**Catches:** The catches increased from 25,000 t in 1980 to 55,000 t in 1984 (Table 2.8.1). From 1985-1989 the catches were at a level of 40,000 - 45,000 t but increased to 62,000 t in 1990 due to the recruitment of the good 1983-1985 year classes combined with an increase in effort. The 1991 catch was 54,000 t.

**Data and assessment:** VPA tuned with effort data from a group of pair trawlers. No recruitment indices available.

**Fishing mortality:** The fishing mortality has been steadily increasing with some fluctuation since 1980 and reached the highest level of 0.58 in 1991 (Figure 2.8.1).

**Recruitment:** After a good recruitment in 1983-1985, the recent year classes are at the average level.

**State of stock:** During the last decade, SSB has been fluctuating between 73,000 t and 108,000 t.

#### Forecast for 1993:

Assuming  $F(92) = 0.58$ , Basis:  $F_{91} = F_{92}$ ,  $Catch(92) = 41$ ,  $Landings(92) = 41$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{0.1}$	0.14	72	11	11	94	SSB sharply increasing.
B	$F_{max}$	0.35	-	24	24	80	SSB stable.
C	$F_{91}$	0.58	-	37	37	67	SSB decreasing.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to continuing decrease of SSB to the lowest level on record in 1994.

**Management advice:** ACFM considers that the fishing mortality in 1993 should be reduced from its current level in order to prevent a further decline of the SSB to lowest known level. In the longer term, catches would be expected to increase if fishing mortality were reduced.

## 2.8.2 Faroe Plateau cod (Sub-division Vb<sub>1</sub>)

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	23	22	≤31	≤29	≤19	-	16	- <sup>4</sup>	-	-	-
Agreed TAC	-	-	-	-	-	-	-	-	-	-	-
Official landings	39	35	21	22	21	12	8	-	39	8	-
Unallocated landings <sup>3</sup>	-	-	-	1	2	1	-	-	-	-	-
Catch as used by WG	39	35	21	23	23	13	8	-	39	8	28
Sp. stock biomass	84	74	62	52	39	29	21	23 <sup>2</sup>	114	21	63
Recruitment (age 2)	17	9	10	9	16	3	13	8 <sup>2</sup>	48	3	6
Mean F(3 - 7,u)	0.71	0.66	0.44	0.60	0.83	0.67	0.51	-	0.83	0.42	0.61

<sup>1</sup>Over period 1982-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Reported to Division IIa. <sup>4</sup>Fishing mortality not above the 1990 level. Weights in '000 t, recruitment in millions.

**Catches:** From the good recruitment of the early 1980s, catches were at a high level in 1983-1986 (Table 2.8.2). Since then catches decreased sharply to lowest level on record of only 8,000 t in 1991.

**Data and assessment:** VPA tuned with groundfish survey and commercial longliner data. Recruitment indices available.

**Fishing mortality:** Fishing mortality has been fluctuating in the range 0.42 - 0.83 with an average of 0.61 in the period 1982-1990 (Figure 2.8.2). In 1991 the fishing mortality decreased to 0.51.

**Recruitment:** Recent recruitment has been poor, especially the 1988 year class.

**State of stock:** SSB has been declining steadily from the high level in 1984 to the lowest level on record in 1991.

### Forecast for 1993:

Assuming  $F(92) = 0.51$ , Basis:  $F_{92}=F_{91}$ ,  $Catch(92) = 10$ ,  $Landings(92) = 10$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{0.1}$	0.15	26	4	4	33	SSB increasing.
B	$F_{max}$	0.32		7	7	29	SSB increasing.
C	$F_{91}$	0.51		11	11	25	SSB stable near the lowest recorded level.

Weights in ' 000 t.

Continued fishing at current levels of fishing mortality will result in stabilizing the SSB near the historically low level, and even significant reductions in fishing mortality will not allow the SSB to increase to acceptable levels in 1993.

**Management advice:** The spawning stock is presently below any level previously experienced and the recruitment in recent years has been poor. ACFM considers the present SSB to be below the minimum biologically acceptable level (MBAL) and recommends that no fishing should take place on this stock until a substantial increase in recruitment and biomass is evident.

### 2.8.3 Faroe Bank cod (Sub-division Vb<sub>2</sub>)

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

**Catches:** Total landings reached a peak value of 3,500 t in 1987, and then showed a severe drop in 1989 (Table 2.8.3). In 1990, a closure of the Bank was implemented for all forms of fishing from 1 June onwards. Consequently a further drop in landings to 600 t was observed for 1990. In 1991, a catch of 300 t has been reported, which probably originated from the deeper parts of the Bank outside the closed area.

**State of stock:** The groundfish surveys carried out on the Bank indicate a sharp and steady decline in stock biomass during the late 1980s, which was probably related to the increased fishing effort after the Bank was opened to all gears in the 1980s. Since 1990, the survey catches have increased somewhat, but they indicate that recruitment has been low and that the stock still appears to be in a depressed state.

**Management advice:** In view of the uncertainties about the state of this stock, ACFM advises that it still requires protection and that a precautionary TAC of not more than 500 t be set for the entire Bank area (<350 m depth).

#### **Special comments:**

1. ACFM was informed about an experimental longline fishery in April 1992, which yielded very high catch rates. Although this suggests that there may be more cod available than the groundfish surveys indicate, the significance of these results could not be evaluated because comparable data from the period before the closure were not available.
2. ACFM is aware of the difficulty of obtaining reliable estimates of abundance of this stock after the closure of the Bank. To overcome this situation, a carefully monitored fishery might be allowed under the constraints of a precautionary TAC. The reported catches during the years after the closure of the Bank might be used as a guideline (300-600 t).
3. Part of the Faroe Bank cod stock is fished in the deeper parts (>200 m) of the Bank. If a limited fishery under a TAC constraint is allowed on the Bank, this TAC should apply to the entire Bank.

## 2.8.4 Faroe haddock (Division Vb)

**Source of information:** Report of the North-Western Working Group, May 1992 (C.M.1992/Assess:14).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	12	14	≤17	≤18	≤11	-	11	13-15	-	-	-
Agreed TAC	-	-	-	-	-	-	-	-	-	-	-
Official landings	15	14	15	12	14	12	9 <sup>3</sup>	-	15	9	13
Catch as used by WG <sup>4</sup>	15	14	15	12	14	12	9	-	15	9	13
Sp. stock biomass	56	60	64	60	49	40	36	33 <sup>2</sup>	64	36	48
Recruitment (age 2)	37	27	9	19	14	11	5	17 <sup>2</sup>	41	5	20
Mean F(3 - 7,u)	0.28	0.23	0.27	0.21	0.29	0.31	0.29	-	0.38	0.21	0.28

<sup>1</sup>Over period 1982-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Preliminary. <sup>4</sup>Includes catches reported to Division IIa. Weights in '000 t, recruitment in millions.

**Catches:** Catches have been stable at the level of 12,000 - 15,000 t except for 1991 when catches reached a historically low level of only 9,000 t (Tables 2.8.4.1-2.8.4.2).

**Data and assessment:** VPA tuned with groundfish survey and commercial longliner data.

**Fishing mortality:** The fishing mortality has been fairly stable in recent years (Figure 2.8.4).

**Recruitment:** Decreasing since 1982.

**State of stock:** SSB has been decreasing and in 1991 is at the second lowest level since 1960. SSB in 1993 will be at the lowest level on record.

### Forecast for 1993:

Assuming  $F(92) = 0.29$ , Basis:  $F_{92} = F_{91}$ ,  $Catch(92) = 9$ ,  $Landings(92) = 9$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	F01	0.17	32	5	5	35	SSB increasing.
B	F91	0.29		8	8	32	SSB stable.
C	F <sub>max</sub>	0.44		12	12	28	SSB declining.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will result in unchanged SSB at a historically low level.

**Management advice:** ACFM advises that the fishing mortality in 1993 should be decreased in order to increase the SSB from its lowest known level.

**Special comments:** Assessments have been unreliable for this stock in the past due to inadequate tuning data. These data have now been revised but there is still some uncertainty in the assessment.

## 2.9 Herring Stocks North of 62°N

### 2.9.1 Icelandic summer-spawning herring (Division Va)

**Source of information:** Report of the Atlanto-Scandian Herring and Capelin Working Group, October 1992 (C.M.1993/Assess:6).

Year <sup>1</sup>	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>2</sup>	Min <sup>2</sup>	Mean <sup>2</sup>
Recommended TAC	50	65	70	100	90	90	79	86			
Agreed TAC <sup>3</sup>	50	65	72.9	90	90	100	110	110			
Official landings	49	65	75	93	97	102 <sup>4</sup>	99 <sup>4</sup>	-			
Discards/slipping	-	-	-	-	3.7	3.2	9.2 <sup>4</sup>	-			
Catch as used by WG	49	65	75	93	101	106 <sup>4</sup>	109 <sup>4</sup>	-	109	0.3	44
Sp. stock biom. <sup>5</sup>	256	264	410	478	449	437	427	520	427	10	208
Recruitment (2-ringers)	415	1390	577	320	675	631	1334	1016	1390	29	407
Mean F (4-14,w)	0.22	0.35	0.38	0.24	0.26	0.30	0.27	-	1.66	.01	0.35

<sup>1</sup>Year refers to start of season. <sup>2</sup>Over period 1968-1991. <sup>3</sup>National quota. <sup>4</sup>Seasonal catches and landings. <sup>5</sup>At time of spawning. Weights in '000 t, recruitment in millions.

**Catches:** Stable in the period 1979-1985 (Table 2.9.1). Catches in 1988-1991 were the highest since the mid-1960s.

**Data and assessment:** Analytical assessment based on catch-at-age data and acoustic surveys. The database is satisfactory.

**Fishing mortality:** Stable at a level slightly above  $F_{0.1}$  (Figure 2.9.1.1).

**Recruitment:** Variable but with increasing trend. The 1988 and 1989 year classes are estimated to be strong.

**State of stock:** A continuing recovery from the very low level in the early 1970s (Figure 2.9.1.2). The spawning stock biomass in 1992 is now estimated to be about 520,000 t which is higher than the peak estimate of 315,000 t in 1961, i.e., prior to the collapse of the stock.

#### Forecast for 1993:

Assuming  $F(92) = 0.27$ , Basis: TAC, Catch(92) = 120, Landings (92) = 110.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	F(94)	SSB(94)	Catch (94)	Lndngs (94)	SSB (95)
A	Catch 80	0.15	615	80	70	0.13	650	80	70	665
B	$F_{0.1}$	0.21		110	100	0.21	625	115	105	605
C	Catch 150	0.30		150	135	0.31	580	150	135	525

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a stable spawning stock.

**Management advice:** This stock is within safe biological limits. ACFM notes that fishing mortalities have been close to  $F_{0.1}$  and that fishing at higher levels of  $F$  will provide little gain in long-term yields. Fishing at the  $F_{0.1}$  level would result in catches of 110,000 t in 1993 and 115,000 t in 1994, corresponding to landings of about 105,000 t each year.

## 2.9.2 Norwegian spring-spawning herring

**Source of information:** Report of the Atlanto-Scandian Herring and Capelin Working Group, October 1992 (C.M.1993/Assess:6).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	50	150	150	120-150	100	80	0 <sup>2</sup>	0 <sup>2</sup>			
Agreed TAC <sup>3</sup>	60	126	115	120	100 <sup>4</sup>	80 <sup>5</sup>	76	100	-	-	-
Landings as used by WG	71	127	113	125	94	78	79	-	1955	7	545
Discards/slipping	99	98	14	10	10	8	5	-	-	-	-
Catch as used by WG	170	225	127	135	104	86	84	-	1955	7	545
Sp. stock biomass	523	382	636	1770	2091	2075	2183	1947	11188	9	2799
Recruitment (age 3)	231	13477	454	647	95	328	822	6234	50672	8	3318
Mean F(5 - 9,u)	0.40	0.64	0.24	0.24	0.06	0.05	0.04	-	2.3	0.01	0.33

<sup>1</sup>Over period 1952-1991. <sup>2</sup>On biological grounds. <sup>3</sup>National quota. <sup>4</sup>Includes estimated 10,000 t slipping. <sup>5</sup>Includes estimated 8,000 t slipping. Weights in '000 t, recruitment in millions.

**Catches:** Kept at a low level in recent years (Tables 2.9.2.1 - 2.9.2.2).

**Data and assessment:** VPA tuned to acoustic surveys at the wintering areas in 1991 and 1992.

**Fishing mortality:** Has been at a low level in recent years (Figure 2.9.2.1).

**Recruitment:** High recruitment from the 1983 year class, low recruitment since then. However, according to acoustic estimates, recruitment will increase in the coming years.

**State of stock:** The spawning stock biomass is still below the minimum target level of 2.5 million t, and is still dominated by a single year class (1983).

### Forecast for 1993:

Assuming  $F(92) = 0.04$ , Basis: TAC, Catch(92) = 100, Landings (92) = 95.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	No fishing	0	2226	0	0	3094	Increasing SSB.
B	$F_{93} = F_{90}$	0.05	2195	125	119	2950	Increasing SSB.
C	$F_{93} = 2 \times F_{90}$	0.10	2165	240	228	2830	Increasing SSB.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to increase in spawning stock.

**Management advice:** The spawning stock is still below the level known to have given good recruitment in the period prior to the collapse of the stock, and is still very much below the historic level in the 1950s (about 7-10 million t). Although SSB is predicted to increase markedly in 1994 due to the contributions of the 1989 and 1990 year classes, the strengths of these year classes are still not certain and it is still not possible at present to assess their strengths relative to the 1983 year class.

The stock is still considered to be outside safe biological limits. ACFM, therefore, recommends that the recent levels of fishing mortality (0.05) should not be increased before the anticipated recruitment has been confirmed and the spawning stock biomass has increased above the minimum target level.

**Special comments:** In the 1992 assessment a new series of acoustic surveys was used in the tuning, resulting in a 20% increase in the estimate of the SSB compared to the 1991 assessment. ACFM considers the assessment in 1992 less certain as it is based on only 2 surveys, and the main change is due to a revision of the 1983 year class.

*Ichthyophonus hoferi* disease in herring

Substantial research has been conducted into the degree of infestation and distribution of the disease since it was discovered in 1991. From this it appears the infestation is mainly confined to adult fish. In a survey at the wintering areas of the Norwegian spring-spawning herring in 1992, which covered the major part of the adult stock, prevalence of the disease was found to be in the order of 1-2%. Samples from the Norwegian Sea in summer 1992 indicated high infestation rates, however. Currently, the impact of this disease on the population dynamics of herring is unknown.

### 2.9.2.1 Stock recovery policies and management considerations

Historical assessments of the Norwegian spring spawning herring showed recruitment to be drastically reduced when the spawning stock fell below 2.5 million t. Following the stock collapse in 1970, all directed herring fisheries were closed by the Norwegian authorities. ACFM in 1979 to 1982 advised no resumption of the directed fishery on this stock until a substantial increase in the spawning stock and the recruitment was observed. During the 1970s and early 1980s the SSB increased gradually from approximately 100,000 t in the mid seventies to approximately 500,000 t in 1983. Compared to the year classes since the collapse, the 1983 year class was much stronger, and in the anticipation of a further increase of the stock due to this year class a cautious reopening of the fishery was argued. In 1984 ACFM assessed that a level of  $F = 0.05$  would have only minor negative impact on the further rebuilding of the stock. This level of fishing has been the guideline for the exploitation since.

The 1992 acoustic estimate of O-group herring in the Barents Sea (300 billion individuals) is by far the largest since the collapse. There are, however, major uncertainties in the acoustic estimates of O-group herring and the estimated size of the 1992 year class should be treated with caution. Furthermore, the predation pressure on herring is expected to increase considerably in the coming years due to good recruitment of cod.

The collapse of the Norwegian spring-spawning herring in the late 1960s was the largest loss in fishable biomass recorded in the North Atlantic. In addition, the lack of herring had severe impact on the ecosystems in areas where it used to be distributed. A recovery policy for herring must, therefore, take ecological interactions as well as fisheries into account.

Although the spawning stock is predicted to be larger than 2.5 million t in 1994, ACFM recommends that the recent levels of fishing mortality (0.05) should not be increased before the anticipated recruitment has been confirmed and the spawning stock biomass has increased above the minimum target level. The fishing mortality could then, assuming the spawning stock is above 2.5 million t, be increased gradually to reach  $F_{0.1}$  when the stock approaches the MSY-level of about 6 million t. In the medium and long term such a policy will lead to stable and increasing catches. No long-term gains would arise from higher fishing mortalities.



### 2.9.2.2 Distribution in time and space of the Norwegian spring-spawning herring

The general distribution pattern of the Norwegian spring-spawning herring in 1991-1992 is shown in Figure 2.9.2.2.

Since 1989 a gradual southward extension of the spawning grounds has been observed, and in 1992 spawning of the 1983 year class was recorded at Egersund south of Stavanger and Siragrunnen ( $58^{\circ}15'N$ ,  $06^{\circ}15'E$ ), approximately 25 nm north of Lindesnes.

The feeding areas for the adult stock are in the Norwegian Sea, and have in recent years gradually extended to the west and north. In June-July 1992 herring were found to be distributed over wide areas in the Norwegian Sea.

Since 1986/1987 the wintering areas have been in the fjords of northern Norway between  $67^{\circ}N$  and  $69^{\circ}N$ .

According to the survey results, the spawning migration starts in early January from over-wintering areas in the Norwegian fjords and the route is close to the Norwegian shore. There have been no records of spawning migration from the coastal banks or the Norwegian Sea.

In the period 1988-1992, the most important nursery areas have been in the Barents Sea.

## **2.10 Capelin**

### **2.10.1 Barents Sea Capelin (Sub-areas I and II, excluding Division IIa west of 5°W)**

#### **2.10.1.1 Advice from the May 1992 ACFM Meeting**

**Source of information:** Report of the Atlanto-Scandian Herring and Capelin Working Group, April 1991 (C.M.1991/Assess:17) and working document (Notes from a meeting in Murmansk on 25 March 1992 between Norwegian and Russian scientists).

**State of the stock:** No new data concerning the stock situation have become available since October 1991. Based on the 1991 survey and two assumptions on the growth between ages 2 and 3, two scenarios for the stock situation at 1 October 1992 were calculated. Under both assumptions the results showed that the maturing part of the stock ( $> 14$  cm) will be larger in October 1992 than the corresponding part of the stock was in October 1991, and that the component which will spawn in 1994 (11-14 cm in October 1992) will be smaller. Based on a larval survey, the 1991 year class was found to be only 1/3 of the strength of the 1990 year class and the number of fish less than 11 cm is thus expected to be much lower in the autumn of 1992 than in the autumn of 1991.

**Management advice:** As there is no basis to predict growth, and hence the size of the of the mature part of the stock, the calculations presented to ACFM were only indicative of the state of the stock. ACFM, however, finds the 1992 stock situation similar to the 1991 situation, and consequently the management system applied for the 1991 autumn fishery could be adopted for 1992. This means that if a fishery occurs in summer/autumn 1992, the catches should be kept to the lowest possible level so as to minimize the catches of juveniles.

ACFM will give final advice on TAC for the 1993 winter (January-April) fishery at its November 1992 meeting.

**Minimum landing size for capelin in the autumn fisheries:** The Norwegian Ministry of Fisheries has requested scientific advice from ICES on a minimum landing size for capelin. ACFM is presently not in a position to give this advice, but will return to this question at its November meeting.

### 2.10.1.2 Advice from the October/November 1992 ACFM Meeting

**Source of information:** Report of the Atlanto-Scandian Herring and Capelin Working Group, October 1992 (C.M.1993/Assess:6).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mea
Recommended TAC	1000	0	0	0	0	0	1000 <sup>3</sup>	834-1030 <sup>3</sup>			
Agreed TAC	1100	120	0	0	0	0	1100	-			
Catch as used by WG	868	123	0	0	0	0	906	887 <sup>3,4</sup>	2940	0	1276
Sp. stock biomass (1 Oct)	275	63	17	203	181	2620	2117	2201 <sup>2</sup>	3867	17	1545
Recruitment (age 2)	47	3	2	29	19	177	574	196 <sup>2</sup>	574	2	220

<sup>1</sup>Over period 1973-1991. <sup>2</sup>Year before spawning. <sup>3</sup>Winter/spring (January-April) fishery. <sup>4</sup>Preliminary. Weights in '000 t, recruitment in billions.

**Catches:** There was a drastic decline in catches after a peak in 1983. There was no fishing between May 1986 and 1991. The fishery was re-opened in January 1991, but catches in the last two seasons have been below the agreed TACs (Table 2.10.1.2).

**Data and assessment:** Based on annual acoustic survey.

**Fishing mortality:** Not estimated.

**Recruitment:** The 1989 year class was very strong, but has been considerably reduced from last year. The 1990 and 1991 year classes are below average. The O-group index for the 1992 year class is extremely poor.

**State of stock:** The maturing stock component in autumn 1992 due to spawn in winter 1993 is still at a high level, the same as in 1991. Due to large concentrations of young cod, however, this stock component is expected to be reduced significantly by predation during the autumn and winter 1992-1993. More recent year classes are below average or poor and hence the prospects for adequate spawning stocks in 1994-1995 are poor.

**Management advice for winter/spring 1993:** ACFM considers that the minimum stock biomass of capelin needed to secure adequate recruitment ranges from 400,000 to 500,000 t. In October 1992, the maturing stock was estimated to be 2.2 million t. Assuming the autumn 1992 TAC of 265,000 t is taken, and accounting for predation by cod on capelin prior to the time of capelin spawning in 1993 and additional sources of natural mortality, the following TAC options for the winter/spring 1993 fishery (January-April) would provide a minimum spawning stock biomass of capelin between 474,000-1,032,000 t in 1993.

Capelin SSB ('000 t) at spawning time 1993		Winter/spring 1993 TAC ( '000 t)
Min	Max	
1032	1297	0
753	1057	300
660	964	400
576	870	500
474	777	600

Given the uncertainties in this assessment and the reduced recruitment, ACFM advises a cautious approach be taken in setting a TAC for the 1993 winter/spring season.

**Management advice for summer/autumn 1993:** ACFM recommends no fishery in the summer/autumn 1993, since this would adversely affect the already poor recruitment to the future SSB (SSB in 1994 and 1995).

#### **Optimum minimum landing size for capelin in a summer/autumn fishery**

Depending on the context, different factors would be relevant in calculating optimum minimum landing sizes for capelin in a summer/autumn fishery yielding different answers. In the context of optimizing yield, factors influencing yield per recruit such as annual variability in maturation rates at age/length and loss in yield due to post-spawning mortality would have to be taken into consideration. This would result in year-specific optimum size limits. In the context of minimizing exploitation, factors as by-catch, mesh size, discards and segregation by size and maturity would have to be applied. The two aspects of optimization would not lead to the same size limit.

In the Barents Sea the catches of juvenile capelin are limited to the summer/autumn season, and a reduction in catches in this season would reduce the exploitation on this stock component. ACFM noted that a minimum landing size of 11 cm has been enforced for several years in the summer/autumn fishery with the aim of protecting the 1-year old capelin, and concluded that it would be inappropriate to recommend in addition an optimum size limit. ACFM also concludes that spatial or temporal reductions in exploitation of juvenile capelin would be more effective.

## 2.10.2 Capelin in the Iceland-East Greenland-Jan Mayen area (Sub-areas V and XIV and Division IIa west of 5°W)

### 2.10.2.1 Advice from the May 1992 ACFM Meeting

**Source of information:** Report of the Atlanto-Scandian Herring and Capelin Working Group, April 1991 (C.M.1991/Assess:17 and Working Paper).

Year <sup>3</sup>	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	700	1100	500 <sup>4</sup>	900	900 <sup>4</sup>	500 <sup>4</sup>	0 <sup>4</sup>	500 <sup>4</sup>	1100	0	-
Agreed TAC	1280	1290	1115	1065	900	600 <sup>4</sup>	740		1290	0	-
Catch as used by WG	1311	1333	1112	1022	799	318	678		1333	0	793
Sp. stock biomass	460	420	400	440	115	330	460		460	115	340
Recruitment <sup>5</sup>	73.8	33.8	58.6	70.2	43.9	29.2	39.2	60.0 <sup>2</sup>	73.8	23.5	47.3

<sup>1</sup>Over period 1979-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>The figures in the table refer to a fishing season starting in July in the year indicated, and ending in March of the following year. <sup>4</sup>Preliminary TAC for the period July-November. <sup>5</sup>Refers to year class which enters the fishery as 2-group, based on acoustics as 1-group. Weights in '000 t, recruitment in billions.

**Catches:** After being low in the 1989/1990 and 1990/1991 seasons, the catch rose to 678,000 t in the 1991/1992 season.

**Data and assessment:** Analytical assessment based on acoustic surveys.

**Fishing mortality:** Not estimated.

**Recruitment:** Highly variable. In the seasons starting in autumns of 1989 and 1990 the recruiting year classes did not appear in the expected strengths, but in 1991 the 2-year-old recruits appeared in greater strength than expected.

**State of stock:** The spawning stock fell below the minimum safe level of 400,000 t in the 1989/1990 and 1990/1991 seasons. The stock has recovered due to good recruitment.

**Management advice:** In order to ensure a spawning stock biomass of 400,000 t in March 1993, a precautionary TAC for the first half of the 1992/1993 season should not exceed 500,000 t. This corresponds to 2/3 of the expected recommended TAC of 775,000 t.

New information will become available during the summer/autumn fishery and from planned acoustic surveys in October-November 1992 and January-February 1993. ACFM recommends that these data be used when the final TAC for the 1992/1993 season is set.

**Special comments:** The precautionary TAC computations are based on a new method described in a Working Paper presented to the meeting. This involves the use of 1-group indices from the October-November survey for predicting the mature 2-group in the following year and 2-group indices from the same survey for predicting the 3-group in the following year. The computations further include a 2/3-rule intended to reduce the probability of over-exploitation.

ACFM endorses the new method and notes that the method seems to be an improvement over the previous one.

#### **2.10.2.2 Advice from the October/November 1992 ACFM Meeting**

**Source of information:** Report of the Atlanto-Scandian Herring and Capelin Working Group, October 1992 (C.M.1993/Assess:6).

**Catches:** See Table 2.10.2.2.

**State of the stock and management advice:** No new assessment was available and the ACFM advice from the May 1992 meeting still pertains.

**Special comments:** It is known from acoustic surveys that the main distribution area of juvenile 1-group capelin is usually in the shelf area north and northeast of Iceland. In order to avoid excessive mortalities on the juvenile capelin during the adult fishery, ACFM recommends that the two most important areas of juvenile abundance remain closed to a commercial fishery, at least until surveys have identified the current situation.

### 3. STOCKS IN NEAFC REGION 2

#### 3.1 Herring Stocks South of 62°N

##### 3.1.1 Request from Sweden on evaluation of the mixed clupeoid fishery in Division IIIa and its potential impact on the yield from the North Sea herring stock

Juvenile North Sea herring of the 0- and 1-ringer groups are caught in both the North Sea and Division IIIa. Any harvest of these groups has the potential to reduce yield from the stock. In view of the fact that juvenile herring are exploited by more fisheries than the fleet operating under the mixed clupeoid TAC, ACFM considered four scenarios of preventing the catch of juveniles:

- 1) For both the North Sea and Division IIIa;
- 2) Division IIIa;
- 3) The North Sea;
- 4) Mixed clupeoid fishery in Division IIIa.

For each of scenarios 1-3, the consequences of eliminating 0- and 1-ringers from the catches were evaluated. In scenario 4, the elimination of all herring catches in the mixed clupeoid fishery in Division IIIa was evaluated. These evaluations are based on the fishing pattern in 1991 and input parameters are taken from the 1991 assessment. The 1991 fishing pattern was used because the improved sampling in 1991 has made it possible to separate the catches according to the different fisheries. In 1991, a minimum legal mesh size of 32 mm was introduced by the EC for the mixed clupeoid fishery. The net increase in long-term yield and spawning stock biomass for North Sea autumn spawners is summarized in the following text table for each simulation:

Preventing catch of juveniles in:	Ages	Relative Increase	
		Net Yield	SS Biomass
North Sea + Division IIIa	0	1.4%	6.7%
	0,1	9.3%	42.9%
Division IIIa	0	0.0%	2.0%
	0,1	3.5%	14.6%
North Sea	0	4.0%	4.7%
	0,1	7.9%	24.8%
Mixed Clupeoids Division IIIa	0,1,2	1.4%	9.8%

The net gain in catch and SSB ranged from 0-9.3% and from 2-43% respectively. The impact of the mixed clupeoid fishery in Division IIIa is less than 2% of net yield and about 10% in SSB. It should, however, be stressed that the abundance of North Sea autumn spawners in 1991 was much lower than in previous years and the spatial distribution depends on year class strength. This, along with assumptions on mean weight at age and selection at age, affects the conclusions.

##### 3.1.2 Biological justification for a target spawning stock biomass of 2.2 million t for the North Sea herring

In response to a request from the EC, ACFM considered the background of the figure 2.2 million t, which has been used as a management objective for North sea herring SSB in recent years.

The figure of 2.2 million t first appeared in the Agreed Record of Conclusions of Fisheries Consultations between the European Economic Community and Norway in Brussels, 26-28 November 1986. This document states that: "The Parties agreed that the target level for the spawning stock biomass should be about 2.2 million tonnes. The Parties will manage the North Sea herring stock in a way designed to reach this objective". The record does not specify how the figure of 2.2 million t was arrived at.

The target SSB of 2.2 million t does not correspond to a specific biological reference point. It is merely an indication of what the average stock level might be under a regime of low fishing mortality and average recruitment.

A management policy that is aimed at maintaining SSB at a specific target level will result in considerable fluctuations in TACs from year to year (reflecting fluctuations in recruitment). It may be more practical, therefore, to use a specific fishing mortality as a management objective rather than a specific stock biomass, as long as the spawning stock does not approach the minimum biologically acceptable level of 800,000 t.

ACFM stresses that management objectives, once defined, should be adhered to over a longer period. It will take several years before the full effects of any particular management strategy become apparent. If management objectives are changed too frequently, it will not be possible to evaluate the effects of any particular management regime.

### **3.1.3 General comments on the quality of the data used for assessment of the herring stocks**

ACFM notes that for many stocks the quality of the data needed to provide proper advice for management has deteriorated in recent years.

In the case of catch sampling, some improvements have been achieved but there are still problems of access to the landings in some countries. ACFM strongly recommends that all landings should be covered by national sampling programmes.

The assessments of pelagic stocks are very dependant on fishery-independent estimates of the stocks. There is a trend in many countries of reduced funding and ship time for surveys. ACFM stresses that it is imperative, if assessments are required, that adequate fishery-independent estimates of stock size and recruitment are available.



### 3.1.4 Herring in Divisions IVa,b

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
<b>Divisions IVa,b</b>											
Recommended TAC	166	235	600	500	484	373/332	363 <sup>4</sup>	352	-	-	-
Agreed TAC	-	500	560	500	484	385	370 <sup>4</sup>	380	-	-	-
National landings <sup>3</sup>	414	494	543	644	638	500	494	-			
Unallocated landings	52	2	37	2	-21	-11	9	-			
Discards/slipping <sup>5</sup>	----- Not available -----				3	3	2	-	-Not available-		
Catch as used by WG <sup>6</sup>	466	496	580	646	620	492	505	-	646	10	315
<b>Total North Sea Sub-area IV and Division VIIId including catches in Division IIIa</b>											
Sp. stock biomass	751	805	915	1,095	1,340	1,247	1,277	1,320 <sup>2</sup>	1,549	52	550
Recruitment (1 ring)	15.8	27.6	33.5	27.8	15.3	17.7	15.6 <sup>2</sup>	15.0 <sup>2</sup>	35.9	0.9	11.8
Mean F(2-6,u)	.62	.53	.53	.52	.52	.41	.39	-	1.36	0.05	0.57

<sup>1</sup>Over period 1972-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Provided by Working Group members. <sup>4</sup>Revised July 1991. <sup>5</sup>One fleet only.

<sup>6</sup>Includes spring spawners not included in assessment. Weights in '000 t, recruitment in 10<sup>9</sup>.

**Catches:** The 1991 catch in Divisions IVa,b (505,000 t) was 36% above the revised TAC (370,000 t). Catches in the whole of Sub-area IV and Division VIIId from 1980-1991 are given in Table 3.1.4.

**Data and assessment:** Autumn spawners in Division IIIa included. Improved sampling of landings. SSB indices from acoustic, larvae and bottom trawl surveys. Recruitment indices from the IYFS. Uncertain assessment due to inconsistency in survey series and to unknown effects of fungus disease (see Special Comment 3).

**Fishing mortality:** Fishing mortality was relatively stable between 1986 and 1989, and declined in 1990 and 1991 (Figure 3.1.4). F on 1-ringers close to F on older fish; F on 0-ringers in the order of 20% of F on older fish.

**Recruitment:** Bottom trawl survey indicates that the 1990 year class is about average. The 1991 year class appears to be stronger, but this is uncertain.

**State of stock:** Fairly stable SSB since 1989 and above the minimum biologically acceptable level of 800,000 t.

## Forecast for 1993:

### Forecast for 1993 by fleet, total North Sea and Division IIIa combined

Assuming  $F(92) = F(91) = 0.39$ . Catch (92) all fleets combined = 665

F(93) relative to F(91) by fleet							Catch ('000 tonnes)								
							North Sea			Division IIIa				North Sea & Div. IIIa	
A	B	C	D	E	F(93)	SSB(93)	A	B	Total	C	D	E	Total	Total	0+1 ringers
0.8	1	1	1	1	0.33	1,342	340	155	495	79	33	116	228	723	326
1	0.8	1	1	1	0.39	1,294	413	124	537	79	33	116	228	765	303
1	1	1	0	1	0.39	1,289	406	155	561	80	0	118	198	759	293
1	1	1	1	1	0.40	1,287	411	155	566	79	33	116	228	794	327
1	1.2	1	1	1	0.40	1,280	410	184	594	79	33	116	228	822	348
1.2	1	1	1	1	0.47	1,235	478	153	631	79	33	116	228	859	326

A: Directed herring fisheries (mainly for human consumption) in the North Sea.

B: Small-mesh fisheries in the North Sea.

C: Human consumption landings in Division IIIa.

D: Mixed clupeoid landings in Division IIIa.

E: Other industrial landings in Division IIIa.

**Management advice:** The TAC advice provided by ACFM in recent years included a component of the catches of adults and a component of the catches of juveniles, the latter taken mainly in the industrial small-mesh fisheries. However, it appears that most of the juvenile herring was not counted against national quotas. This has resulted in total catches which were considerably above the agreed TACs. In order to resolve these problems, ACFM advises that the TAC be divided between the different fisheries corresponding to the catch projections, and that these individual fishery quotas be managed separately.

### Special comments:

1. In the past, ACFM has based its advice on an arbitrarily-chosen target fishing mortality of 0.3 which appeared to represent a suitable target for managing the stock because it allowed the restoration of the spawning stock biomass to a level of 1.5-2.2 million t. In practice, the observed fishing mortalities have been higher and spawning stock biomass has fluctuated between 1.0 and 1.3 million t in recent years.

This year ACFM presents catch options for a small number of scenarios which allow for a number of decreases and increases in effort in particular fleets in 1993. The corresponding overall fishing mortality used in the options ranges from 0.33 to 0.47. It is quite clear that, as a consequence of the complexity of the North Sea herring fisheries, the number of possible scenarios is virtually unlimited. Therefore, ACFM would welcome clearly-formulated guidelines from managers as to which catch options should be investigated in future.

The options presented do not result in very different stock sizes in the short term. In the long term, however, a consistent choice of a relatively low fishing mortality would tend to stabilise catches and any increases in F beyond 0.3 will not result in any long-term increases in yield.

2. Catches of juvenile herring, both in the North Sea and in Division IIIa, substantially reduce the long term yield of adult herring and the spawning stock biomass. The estimated effects are presented in Section 3.1.1.
3. A fungal disease (*Ichthyophonus* sp.) has been identified as a potential source of mortality. It may be necessary to review this assessment at the November 1992 ACFM meeting when more information on the disease should be available.

### 3.1.5 Herring in Divisions IVc and VIIId (Downs herring)

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	62	42	10	15	30	30	30	54			
Agreed TAC	90	70	40	30	30	30	50 <sup>3</sup>	50			
National landings <sup>2</sup>	48	32	23	21	30	24	42	-			
Unallocated landings	22	19	22	31	48	32	16	-			
Discards/slipping	-----	Not available -----			1	5	3	-			
Catch as used by WG	70	51	45	52	79	61	61	-	79	1	39
Sp. stock biomass											
Recruitment (age )	----- Included in total North Sea -----										
Mean F											

<sup>1</sup>Over period 1972-1991. <sup>2</sup>Provided by Working Group members. <sup>3</sup>Revised July 1991. Weights in '000 t.

**Catches:** Rather stable and higher than agreed TACs. Most of the catches come from the Division VIIId spawning fishery in November/December. Catches in the whole of Sub-area IV and Division VIIId from 1980-1991 are given in Table 3.1.4.

**Data and assessment:** Catch-at-age data were provided but no assessment was made as the stock also supports catches in Divisions IVa,b. Trends in spawning stock level are provided by larvae surveys.

**Fishing mortality:** The fishing mortality is not known.

**Recruitment:** No data.

**State of stock:** Larvae surveys indicate a stable SSB since 1981.

**Forecast for 1993:** Included in total North Sea.

**Management advice:** The level of TAC agreed for 1992 (50,000 t) is expected to allow the stock to remain at a fairly stable level. A catch of 50,000 t in 1993 is expected to allow the stock to remain at an acceptable level.

Any rebuilding of this stock towards historic levels (those observed up to the 1950s) would require catch levels below this.

**Special comments:** The spawning ground and season seem to be very restricted, suggesting a high susceptibility of the stock to environmental conditions. The population spawning in the southern North Sea is part of the total North Sea stock, and the catches taken in this area are part of the total North Sea TAC (see Section 3.1.4).

Whereas this population was very large up till the early 1950s, it was reduced to a very low level in subsequent years, and it nearly became extinct in the 1970s. During the period of closure (1977-1981), the population recovered to some extent, but spawning has remained confined to a much smaller area and time period than it was in the past.

### 3.1.6 Herring in Sub-divisions 22-24 and Division IIIa

**Source of information:** Report of the Working Group on Assessment of Pelagic Stocks in the Baltic, April 1992 (C.M.1992/Assess:13). Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Rec. TAC spring spawners 22-24	-	-	-	97	90	64	87	80			
Rec. TAC spring spawners IIIa	80 <sup>3</sup>	132 <sup>3</sup>	112 <sup>3</sup>	99 <sup>3</sup>	84 <sup>3</sup>	67	91	90			
Rec. TAC spring spawners NE N. Sea	-	-	-	-	-	-	-	10			
Agreed TAC IIIa	117	46	138	138	138	120	104.5	124			
Rec. TAC mixed clupeoids	-	-	80	80	80	60	0	0			
Agreed TAC mixed clupeoids	-	80	80	80	80	65	50	50			
<b>Catches:</b>											
Total in IIIa	244	217	220	329	162	202	188				
Autumn spawners in IIIa	124	146	161	201	91	76 <sup>4</sup>	77				
Spring spawners in IIIa	120	71	59	129	71	126 <sup>4</sup>	114				
Spring spawners in NE N. Sea	17	20	14	23	20	8	8				
Spring spawners in 22-24	110	95	102	99	95	78	69				
Total spring spawners	247	186	175	251	186	212 <sup>4</sup>	191	-			
Sp. stock biomass	269	233	187	218	238	217	181	139 <sup>2</sup>	238	80	174
Recruitment (age 2)	2942	1691	3432	5226	2349	3007	1219	2383 <sup>2</sup>	5226	918	2366
Mean F(2-6,u)	.79	.71	.69	.74	.65	.77	.81	.81	1.14	.63	0.80

<sup>1</sup>Over period 1974-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Adult herring fishery in Division IIIa only. <sup>4</sup>Estimated. Weights in '000 t, recruitment in millions.

**Catches:** There has been a continued decrease in catches in Sub-divisions 22-24 due to reduced effort (Tables 3.1.6.1-3.1.6.2). The total catch (spring and autumn spawners) in Division IIIa remained at a level of about 200,000 t in 1991 (Table 3.1.6.3), but insufficient sampling makes both the total amount and (particularly) the split into spring and autumn spawners uncertain. The amount of spring spawners caught in the eastern parts of the North Sea in 1991 was slightly below 10,000 t.

**Data and assessment:** Stock estimates from acoustic and trawl surveys used to calibrate the VPA.

**Fishing mortality:** In recent years fishing mortality has been slightly below or at the long-term average level (Figure 3.1.6). The absolute level of F (about 0.8) is, however, uncertain. Factors such as the low level of natural mortality assumed, and the very complex stock and migration structure contribute to the uncertainty about absolute exploitation level.

**Recruitment:** The 1990 year class is of average size, whereas 1989 year class is only about 50% of average.

**State of stock:** Spawning stock biomass has decreased from a high level in the middle of the 1980s and in 1991 was at the 1974-1991 average level.

#### Forecast for 1993:

Assuming  $F(92) = 0.81$ , Basis:  $F(92) = F(91)$ ,  $Catch(92) = 191$ ,  $Landings(92) = 191$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.8 $F_{91}$	0.65	131	158	158	149	Long-term benefit from reducing fishing mortality.
B	$F_{91}$	0.81	129	188	188	130	No change in long-term gain.
C	1.2 $F_{91}$	0.98	127	214	214	113	Long-term loss from increasing fishing mortality.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to little change in SSB.

**Management advice:** The stock has been at a fairly stable level over the past 10 years. The 1989 year class is predicted to be below average and the spawning stock size is expected to decrease in 1993. There is a benefit to be gained in long-term yield by decreasing fishing below the level seen in recent years.

Catches of juvenile herring substantially reduce the potential catches of adult herring and the level of SSB in future years. If the management objective is to increase SSB and to maximize catches of adult herring, the catches of juveniles have to be substantially reduced.

**Special comments:** The spring-spawning herring in Division IIIa and Sub-divisions 22-24 consist of a group of spring- and winter-spawning populations that cannot be separated and thus are treated as unit stock from an assessment point of view. The spring-spawning populations are the major part of this stock. A detailed description of the distribution and migration of the stock was given in the 1991 ACFM report.

As a result of the migration pattern, the stock is exploited in three different management units. The historical catches by management unit are given in the text table below. The catches in Division IIIa are mainly taken in the following fisheries:

- The directed fishery for herring is carried out by purse seiners and trawlers. Because of the mixed occurrence of yong and adult herring in Division IIIa, the catches contain varying amounts of young immature herring which are mainly landed for reduction.
- The "mixed fishery" is carried out under the "sprat" TAC. The landings consist of a mixture of industrial species (Norway pout and sandeel), juveniles of "consumption" species (herring and gadoid) and sprat.
- By-catch in other fisheries. Catches of herring occur in the fishery for Norway pout, sandeel and blue whiting.

It has not been possible to separate the by-catch taken in other fisheries or the landings taken in the directed fishery and used for reduction. The majority of the catches landed for industrial purposes are juvenile autumn spawners. The effect of these catches on the yield of the North Sea herring are evaluated in Section 3.1.1 of the Report to NEAFC.

The catches of spring and autumn spawning herring in Division IIIa and Sub-divisions 22-24 are predicted for 1993 assuming *status quo* effort in the mixed clupeoid fishery and three different levels of effort ( $0.8 \cdot F(1991)$ ,  $F(1991)$  and  $1.2 \cdot F(1991)$ ) in the fleets fishing herring for human consumption. The catches were allocated to management units assuming same relative area distribution as was observed in 1990 and 1991. The predicted catches of autumn spawners in Division IIIa are discussed in Section 3.1.4 of the Report to NEAFC.

Year	1992	1993	1993	1993
Assumption for human consumption fishery	$F_{92}=F_{91}$	$F_{93}=0.8F_{91}$	$F_{93}=F_{91}$	$F_{93}=1.2F_{91}$
Total catch in IIIa	209	284	341	391
Autumn sp. catch in IIIa	96	191	228	263
Spring sp. catch in IIIa	113	93	113	128
Spring sp. catch in IVa (East)	8	8	8	8
Spring sp. catch in 22-24	70	57	68	78
Total spring sp. catch	191	158	189	214

A fungal disease (*Ichthyophonus* sp.) has been identified as a potential source of mortality. It may be necessary to review this assessment at the November 1992 ACFM meeting when more information on the disease should be available.

The sampling from this stock was generally better in 1991 than in 1990. Both landing statistics and sampling for age and weight were of good quality for the part of the landings made for the human consumption market, but there are still large uncertainties about both quantities and age compositions of that part of the landings that goes for reduction. A major part of the Swedish Skagerrak landings for industrial purposes has not been sampled. In 1991 this amounted to about 31,000 t. This lack of sampling makes the assessments, both of the North Sea autumn spawners and of the spring spawners, more uncertain.

### 3.1.7 Celtic Sea and Division VIIj herring

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC <sup>3</sup>	13	17	18	13	20	15	15 <sup>5</sup>	27 <sup>6</sup>			
Agreed TAC <sup>4</sup>	13	17	18	18	20	17.5	21	21			
National landings <sup>7,8</sup>	11.6	13.3	17.8	16.8	17.9	17.0	21.3	-			
Unallocated landings <sup>7</sup>	4.6	6.1	5.3	-	1.3	0.7	0.4	-			
Discards/slipping <sup>7</sup>	3.1	3.9	4.2	2.4	3.5	2.5	1.9	-			
Catch as used by WG <sup>7</sup>	19.3	23.3	27.3	19.2	22.7	20.2	23.6	-	37.2	7.2	22.6
Sp. stock biomass											
Recruitment	----- Assessment carried out but estimates uncertain -----										
Mean F											

<sup>1</sup>Over period 1977-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>VIIj, VIIg, and VIIa south of 52°30'N for 1 April-31 March. <sup>4</sup>VIIg-k and VIIa south of 52°30'N for calendar year. <sup>5</sup>Expected discards should be deducted to give a TAC of 12,500 t. <sup>6</sup>Including discards. <sup>7</sup>Calendar year. <sup>8</sup>Provided by Working Group members. Weights in '000 t.

**Catches:** Catches revised downwards from those estimated by 1991 Working Group on basis of roe production (Tables 3.1.7.1-3.1.7.2). Catches now similar to those estimated by 1990 Working Group. No confidence can be attached to catches during the 1985-1989 period. Discard estimates very uncertain.

**Data and assessment:** No analytical assessment was possible. Acoustic estimate in 1990 gave minimum SSB level of 90,000 t. 1991 estimate of 77,000 t was considered to be based on only part of the stock as the autumn-spawning component was not included.

**Fishing mortality:** No estimate in recent years.

**Recruitment:** No recruitment indices.

**State of stock:** The available information suggests that the stock is in a healthy state and possibly at around the same level as in 1991 (i.e., at a minimum level of 90,000 t); there does not appear to be immediate cause for concern.

**Forecast for 1993:** Not available.

#### Management advice:

1. Landings have been reasonably stable over the last 6 years but the landing figures are uncertain. The stock size appears to be stable under the present catch level, but the stock size is extremely uncertain. If a TAC is to be implemented, a precautionary TAC in 1993 in the region of 20,000 - 24,000 t (including discards), corresponding to the 1990-1991 catch levels, would seem appropriate.

2. In order to provide some protection to the spawning concentrations, ACFM recommends a continuation of the system of rotating closures of selected parts of the spawning area (Figure 3.1.7).

Season 1: Prohibit all herring fishing from 1-16 November in the area bounded by 09°00' west longitude, 51°15' north latitude, 11°00' west longitude, 52°30' north latitude and by the Irish coast (Box A).

Season 2: Prohibit all herring fishing from 1-16 November in the area bounded by 07°30' west longitude, 51°15' north latitude, 09°00' west longitude, and by the Irish coast (Box B).

Season 3: Prohibit all herring fishing from 15-31 January in the area bounded by 52°30' north latitude, 06°00' west longitude, 52°00' north latitude, and by the Irish coast (Box C).

3. In the 1992/1993 fishing season, Box B should be closed from 1-16 November 1992 and in 1993/1994 Box C should be closed during 15-31 January 1994.

**Special comments:** ACFM stresses the need for improved quality of the catch data including discards and the need for fishery-independent data in order to be able to make a proper assessment of this stock.



### 3.1.8 Herring in Division VIa (North)

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	30	37-45	38-55	46	58	61	57	≤62			
Agreed TAC	56.5	51.9	49.7	49.8	58	75	62	62			
National landings <sup>3</sup>	43.3	43.9	45.0	42.2	49.3	66.3	51	-			
Unallocated landings	0.5	37.8	18.0	5.2	2.1	2.4	-10.6	-			
Discards/slipping	-	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	1.6	1.3	1.2	-			
Catch as used by WG	43.8	81.7	63.0	47.4	53.0	70.0	50.6	-	208.3	0.06	85.6
Sp. stock biomass	270	262	259	377	376	343	295	328 <sup>2</sup>	599	58	249
Recruitment (age 2)	585	671	596	1410	544	469	395	647 <sup>2</sup>	3600	191	782
Mean F(3-6,u)	0.24	0.35	0.26	0.19	0.17	0.22	0.21	0.22	1.07	0.001	0.49

<sup>1</sup>Over period 1970-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Provided by Working Group members. <sup>4</sup>Included in landings. Weights in '000 t, recruitment in millions.

**Catches:** Since 1987 catches have fluctuated between 47,000 and 70,000 t (Table 3.1.8). The TAC was not taken for the fourth year in succession but there is no evidence that this was because of any difficulties encountered by the fleet.

**Data and assessment:** Catch data considered reliable, but in some years there have been large proportions of unallocated catches. Fishery-independent information is available but estimates are uncertain. Very low effort invested in larvae surveys undermines their reliability. Acoustic estimate considered very imprecise. Estimates of recent stock size uncertain.

**Fishing mortality:** Not reliably known.

**Recruitment:** No independent evidence except for bottom trawl survey index which is highly variable. Geometric mean assumed.

**State of stock:** Available evidence suggests the stock is in no immediate danger.

**Management advice:** Continued fishing at recent levels is likely to provide catches in 1993 in the range 54,000 - 58,000 t.

**Special comments:** ACFM stresses the need of fishery-independent estimates to confirm the stock size and recommends that both acoustic surveys and larvae surveys be continued and improved.

### 3.1.9 Clyde herring (Division VIa)

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	3.07	3.5	3.2	2.9-3.4	2.6	2.9	≤1.6 <sup>4</sup>	-	-	-
Agreed TAC	3.0	3.4	3.5	3.2	3.2	2.6	2.9	2.3	-	-	-
National landings <sup>3</sup>	3.0	3.4	2.9	1.6	2.1	2.2	0.7	-	-	-	-
Unallocated landings	0.4	0.6	0.3	1.1	0.2	0.1	-	-	-	-	-
Discards/slipping	1.3	0.7	0.4	0.2	-	-	-	-	-	-	-
Catch as used by WG	4.8	4.6	3.6	1.9	2.3	2.3	0.7	-	7.8	0.7	3.9
Sp. stock biomass <sup>5</sup>	-	-	-	-	-	6.7	7.0	5.8 <sup>2</sup>	-	-	-
Recruitment (age 3) <sup>5</sup>	-	-	-	-	-	0.36	0.25	0.25 <sup>2</sup>	-	-	-
Mean F(3 - 7,u)	----- not available -----					0.16	0.064	-	-	-	-

<sup>1</sup>Over period 1970-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Provided by Working Group members. <sup>4</sup>Preferred TAC. <sup>5</sup>Local spring spawners only. Weights in '000 t.

**Catches:** Catches are based on a mixture of local spring spawners and immigrant autumn spawners. Catches uncertain due to problems of stock separation. At record low level in 1991 and well below TAC (Table 3.1.9). No reports of discarding. Effort decreased to lowest recorded level.

**Data and assessment:** Catch sampling at an acceptable level. Egg survey carried out on spawning grounds in April 1991. No analytical assessment.

**Fishing mortality:** Unknown, but presumed to be at a very low level in 1991.

**Recruitment:** The 1986 year class (30 million in 1991) accounts for 95% of the spawning stock. Subsequent recruitment has been at a very low level.

**State of stock:** Uncertain, but available information suggests the stock is near a historically low level. The size of the spawning stock which produced the good 1986 year class is not known, and it is, therefore, not clear whether the present level is below that able to produce another good year class if conditions for egg and larval survival improve.

**Management advice:** The status of the stock is uncertain but it suffers from current low recruitment, and fishing at the current low level is likely to reduce the stock size to a historically low level.

ACFM, therefore, recommends that until recruitment has improved, the fishery should be at the lowest possible level.

### 3.1.10 Herring in Divisions VIa (South) and VIIb,c

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	14	17	18	11-18	15	27/25	<26	29 <sup>2</sup>			
Agreed TAC	14	17	17	14	20	27.5	27.5	28			
National landings <sup>3</sup>	15.2	17.0	16.6	15.3	21.1	27.6	23.1	-			
Unallocated landings	8.2	11.8	32.0	13.8	7.1	13.8	11.2	-			
Discards/slipping	----- No estimates -----				1.0	2.5	3.4	-			
Catch as used by WG	23.4	28.8	48.6	29.1	29.2	43.9	37.7	-	48.6	15.0	29.2

<sup>1</sup>Over period 1970-1991. <sup>2</sup>Including discards. <sup>3</sup>Provided by Working Group members. Weights in '000 t.

**Catches:** Catches decreased in 1991 because of poor markets, especially in the roe fishery (Table 3.1.10). Catches have consistently exceeded recommended TACs each year since 1982. There are considerable amounts of unallocated catches which are mainly reported as having been taken in Division VIa (N).

**Data and assessment:** No assessment possible because there are no fishery-independent surveys. Age composition suggests stock in a healthy state.

**Fishing mortality:** Not available.

**Recruitment:** No recruitment indices available. Very strong 1985 year class still constitutes over 44% of catch in number.

**State of stock:** Not known precisely.

**Forecast for 1993:** No forecast available.

**Management advice:** If a TAC is to be set for this stock, a precautionary TAC for 1993 based on the 1988 and 1989 catches (before the roe fishery developed) would seem to be appropriate. The corresponding catch level would be 29,000 t (including discards).

**Special comments:** ACFM stresses the need for fishery-independent estimates of this stock.

### 3.1.11 Irish Sea herring (Division VIIa)

**Source of information:** Report of the Herring Assessment Working Group for the Area South of 62°N, March/April 1992 (C.M.1992/Assess:11).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	5.0	6.3	4.3	10.5 <sup>3</sup>	5.5	5.7	5.6	~6.6			
Agreed TAC	5.0	6.3	4.5	10.5	6.0	7.0	6.0	7.0			
National landings <sup>4</sup>	5.1	6.0	4.5	10.2	5.0	6.3	4.4	-			
Unallocated landings	4.1	1.4	1.3	-	-	-		-			
Discards/slipping	-----Not estimated-----										
Catch as used by WG	9.2	7.4	5.8	10.2	5.0	6.3	4.4	-	36.3 <sup>5</sup>	3.9 <sup>5</sup>	12.5 <sup>5</sup>
Sp. stock biomass	19.9	-	-	-	-	-	-	-	36.3	5.5	16.94
Recruitment (age 1)	16.9	-	----Recent trends uncertain----					-	668	139	282
Mean F(2-6,u)	0.37	-	-	-	-	-	-	-	1.03	0.15	0.64

<sup>1</sup>Over period 1972-1985. <sup>2</sup>Predicted or assumed. <sup>3</sup>Revised in May 1988 to 5.6. <sup>4</sup>Provided by Working Group members. <sup>5</sup>Over period 1972-1991. Weights in '000 t, recruitment in millions.

**Catches:** Although the UK quota of 4,400 t was taken in 1991, the Republic of Ireland took only 5% of its quota because the vessels fished elsewhere (Table 3.1.11).

**Data and assessment:** Catch-at-age data are generally good, although under-reporting is suspected to have been high in some years. There are no independent recruitment data. Acoustic surveys of Manx spawners in 1989-1990 provided SSB estimates of 18,000-27,000 t. Acoustic surveys of the mixed stocks took place in the summers of 1990 and 1991, but the results require further evaluation with regard to biases and mixing of Division VIIa and Celtic Sea stocks in Division VIIa (N).

**Fishing mortality:** Current levels of  $F_{2-6}$  are very uncertain but are considered most likely to be approximately 0.20 or less.

**Recruitment:** The strong 1985 year class was still prominent in the 1991 catches. The 1986 year class may have been comparatively weak, as observed in other western herring stocks.

**State of stock:** The trend in SSB since 1983 is uncertain but SSB is probably well above the minimum biologically acceptable level.

**Forecast for 1993:** Not reliable.

#### Management advice:

1. Continued fishing at recent levels is likely to provide catches in 1993 in the range 4,900 - 7,400 t.
2. ACFM recommends that the spawning and nursery area closures should be maintained.

**Special comments:** Results of tagging studies carried out in Division VIIa (N) in 1991 demonstrated the mixing of Celtic Sea and Division VIIa immature and mature 2-ring herring in the region of the Division VIIa (N) fisheries. The significance of this for the separate assessment of these stocks warrants further investigation.

Recruitment indices are required for this stock.

## 3.2 Industrial Fisheries in the North Sea and Adjacent Waters

### 3.2.1 Overview

#### Definition of industrial fisheries

The usual definition of industrial fisheries is that these are fisheries with small-mesh gear directed at catching fish for reduction purposes, but in terms of the Industrial Fisheries Working Group "industrial landings" derive from industrial fisheries with small-mesh trawl only. Data on such landings do not include a) fish caught by small-mesh trawl but used for human consumption, b) fish caught for human consumption but used for industrial purposes due to market conditions and c) fish caught by other small-mesh gears (e.g. purse seines) and used for reduction purposes.

Total catches are, however, used for the assessment of sprat, sandeel and Norway pout. Sandeel assessment areas are shown in Figure 3.2.1.

#### Data available

Data on landings, fishing effort and species composition are available from all industrial fisheries. However, the sampling schemes for length and age data, which had already been deteriorating over the last few years, broke down completely in 1990 in the most important fisheries. Although new sampling schemes were started in 1991, the problem of how to handle the lack of data for 1990 was not resolved. With the exception of a few of the smaller sandeel stocks, no analytical assessments or catch forecasts could, therefore, be carried out.

The stocks of these relatively short-lived species are inherently variable and, with the exception of some of the sprat stocks and the sandeel stock at Shetland, the available evidence suggests that the stocks can sustain fisheries at the present level of exploitation. Therefore, there does not seem to be an urgent need to impose management measures on these fisheries for conservation of those species. However, sandeel, Norway pout and sprat serve as fish food for many of the species caught in the human consumption fisheries and also as food for other top predators in the ecosystem. Multispecies assessment has clearly identified these interactions. For a proper evaluation of the status of all fish stocks in the North Sea, monitoring of the changes in the prey stocks in response to fishing and predation is extremely important. Further, by-catches in these fisheries can impact on other fisheries. Therefore, adequate sampling of the industrial catches is needed to obtain reliable information on length, weight and age distributions. In addition, fishery-independent information (i.e., research vessel surveys) is needed to clarify several important aspects of the population dynamics of these species which have a bearing on their assessment and management.

#### Trends in industrial landings

The total annual landings of sandeel, sprat and Norway pout together with by-catches of herring and blue whiting in Division IIIa during the period 1974-1990 have varied around a mean of 164,000 t (Table 3.2.1.1). Landings have been below the mean since 1987 and declined from 114,000 t in 1990 to 97,000 t in 1991. About 22,000 t of herring and 14,000 t of sprat were taken in the mixed clupeoid fishery in 1991.

Industrial landings from the North Sea (Table 3.2.1.2) over the same period have varied from 1.0 million to 1.9 million t. In 1991 the catch increased by 30% to 1.3 million t, mainly due to the sandeel catches. There is an increasing trend in the sprat landings which have been at a low level. Industrial landings of herring in the small-mesh trawl fishery increased slightly from 115,000 t in 1990 to 131,000 t in 1991. The Norway pout landings have been stable at about 150,000 t since 1989.

Landings from the industrial fisheries in Division VIa are given in Table 3.2.1.4.

#### By-catches of protected species

The annual landings of haddock, whiting and saithe taken in the industrial fisheries in the North Sea decreased to 44,000 t in 1991, of which an estimated 38,000 t was whiting (Tables 3.2.1.2 and 3.2.1.3).

### 3.2.2 Norway pout in Division IIIa

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991 <sup>2</sup>	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Official landings	86	32	49	46	17	42	49	-	86	17	41
Unallocated landings	-77	-26	-46	-38	-11	-15	-17	-			
Catch as used by WG	9	6	3	8	6	27	32	-	46	3	23

<sup>1</sup>Over period 1974-1991. <sup>2</sup>Preliminary. Weights in '000 t.

**Catches:** See Table 3.2.2

**Data and assessment:** Not available.

### 3.2.3 Norway pout in Sub-area IV

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC <sup>3</sup>	384	368	200	200	200	200	200	200			
Official landings	285	227	215	188	275 <sup>4</sup>	-	-	-			
Catch as used by WG	197	174	147	102	162	140	155 <sup>4</sup>	-	736	102	313
Recruitment (age 1) <sup>2</sup>	45	35	35	11	37	45	54	57 <sup>4</sup>			

<sup>1</sup>Over period 1974-1991. <sup>2</sup>Combined survey index. <sup>3</sup>TACs for Sub-area IV (EC zone), Divisions IIa (EC zone) and IIIa.

<sup>4</sup>Preliminary. Weights in '000 t.

**Catches:** The total landings remain well below the long-term mean, and have been fairly stable for the last 3 years (Table 3.2.3).

**Data and assessment:** The lack of age composition for the 1990 catches still precludes an analytical assessment. Standardized effort and survey indices available.

**Recruitment:** The combined survey index indicates that the 1990 and 1991 year classes appear to be the strongest since the 1983 year class.

**State of stock:** Uncertain

**Special comments:** Sampling has improved compared to 1990, but is still not satisfactory for all areas and seasons.

### **3.2.4 Norway pout in Division VIa**

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

**Catches:** Nominal landings increased to 4,348 t in 1991, but the catch is still at a very low level (Table 3.2.4).

**Data and assessment:** Not available.

### **3.2.5 Sandeel in Division IIIa**

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

**Catches:** The landings have shown considerable variation in the past, but have remained fairly stable in the last four years. The estimated catches in 1991 were 23,000 t (Table 3.2.5).

**Data and assessment:** Not available.

3.2.6 Sandeel in the southern North Sea

Source of information: Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC	-	-	-	-	-	-	-	-			
Catch as used by WG	514	457	403	488	525	366	459	-	533	356	444
Sp. stock biomass	963	486	1,994	1,227	493	-	-		1,994	328	813
Recruitment (age 1)	113	555	73	39	476	-	-		555	39	218
Mean F(1 - 2,u)	0.88	0.28	0.28	0.66	0.46	-	-	-	0.88	0.28	0.54

<sup>1</sup>Over period 1979-1991; assessment data 1979-1989. Weights in '000 t, recruitment in thousand millions.

**Catches:** In 1991, the catches increased by 25% compared to 1990, and are now close to the long-term mean (Table 3.2.6.2). Catches for the whole of the North Sea are given in Table 3.2.6.1.

**Data and assessment:** Insufficient information on the age composition of the 1990 catches still precludes an updated analytical assessment.

**State of stock:** Uncertain.

**Special comments:** Sampling has improved compared to 1990, but is still not satisfactory for all areas and seasons.



### 3.2.7 Sandeel in the northern North Sea

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC	-	-	-	-	-	-	-	-			
Catch as used by WG	87	375	396	385	490	219	372	-	490	74	246
Sp. stock biomass	157	99	294	682	161	-	-	- <sup>2</sup>	682	97	219
Recruitment (age 1)	21	115	188	29	135	-	-	- <sup>2</sup>	188	19	63
Mean F(1 - 2,u)	0.75	1.15	0.89	1.28	2.51	-	-	-	2.51	0.38	1.02

<sup>1</sup>Over period 1979-1991; assessment data 1979-1989. Weights in '000 t, recruitment in thousand millions.

**Catches:** The catch increased by 70% compared to 1990, and is now at the same level as in 1986-1988, which is well above the long-term mean (Table 3.2.6.2). Catches for the whole of the North Sea are given in Table 3.2.6.1.

**Data and assessment:** Insufficient information on the age composition of the 1990 catches still precludes and analytical assessment.

**Fishing mortality:** Fishing effort in recent years has fluctuated without trend but with a peak in 1989.

**State of stock:** Uncertain.

**Special comments:** Sampling has improved compared to 1990, but is still not satisfactory for all areas and seasons.

### 3.2.8 Sandeel in the Shetland area

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC	-	-	-	-	-	-	-	-			
Catch as used by WG	17.2	14.0	7.2	4.7	3.5	2.3	+	-	52.0	+	19.2
Sp. stock biomass	32.9	29.1	19.7	25.2	18.0	13.6	13.1	-	36.3	13.1	23.5
Recruitment (age 0)	18.1	22.8	2.2	3.6	6.9	1.7	37.9	-	37.9	1.7	14.9
Mean F(1 - 3,u)	0.25	0.37	0.11	0.13	0.08	0.08	0.00	-	0.48	0.00	0.18

<sup>1</sup>Over period 1974-1991; 1984-1991 assessment data. Weights in '000 t, recruitment in millions (1 July).

**Catches:** The fishery was closed for the whole of 1991 (Table 3.2.6.2).

**Data and assessment:** Catch at age and standardized effort is available. Trawl survey indices are available for 1984-1991. Analytical assessment was done utilizing survey indices and effort data.

**Fishing mortality:** Zero, due to closure of the fishery.

**Recruitment:** Recent year classes have been poor. The survey index indicates a large 1991 year class but the strength of this year class is still uncertain.

**State of stock:** Uncertain, but according to the assessment, spawning stock biomass is at the historical minimum.

**Management advice:** The spawning stock biomass will remain low until the 1991 year class matures in 1993. Therefore, ACFM considers it prudent not to re-open the fishery before there is substantial evidence of improved recruitment.

### 3.2.9 Sandeel in Division VIa

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC	-	-	-	-	-	-	-	-			
Official landings	18.6	24.5	14.5	24.5	18.8	14.4	7.8 <sup>2</sup>	-	24.5	7.8	16.7
Catch as used by WG	18.6	24.5	14.5	24.5	18.8	14.4	7.8	-	24.5	7.8	16.7
Sp. stock biomass	63.6	48.5	61.3	114.3	81.8	55.3	61.4		114.3	45.2	65.1
Recruitment (age 0)	88.8	173.1	35.0	23.9	66.2	42.8	82.8		173.1	23.9	68.0
Mean F(1 - 3,u)	0.16	0.20	0.09	0.18	0.14	0.09	0.05	-	0.20	0.05	0.13

<sup>1</sup>Over period 1983-1991. <sup>2</sup>Preliminary. Weights in '000 t, recruitment in thousand millions (1 July).

**Catches:** Reduced by 46% compared to 1990 (Table 3.2.9); lowest since 1981.

**Data and assessment:** Catch at age and effort data available. Analytical assessment was done utilizing effort data.

**Fishing mortality:** Gradually declining in time with effort. Fishing effort in 1991 was the lowest since 1980.

**Recruitment:** The 1990 year class is estimated to be somewhat below average strength. Estimate of 1991 year class not considered reliable.

**State of stock:** Virtually unexploited at present.

### 3.2.10 Sprat in Division IIIa

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>				
Agreed TAC <sup>2</sup>	-	80	80	80	80	65	50	50			
Official landings	67	62	68	63	62	43	46 <sup>4</sup>	-			
Catch as used by WG	20	11	14	9	10	10	14	-	101	9	46
Recruitment (age 1)(IYFS)	2,077	684	1,830	945	442	503	693	5,380	5,380	442	2,491

<sup>1</sup>Over period 1974-1991. <sup>2</sup>Mixed clupeoids TAC. <sup>3</sup>Lowest possible level. <sup>4</sup>Preliminary. Weights in '000 t.

**Catches:** Increased in 1991 compared to the three previous years, but still at a low level (Table 3.2.10).

**Data and assessment:** Recruitment indices from IYFS. No analytical assessment.

**Recruitment:** Very poor year classes 1988-1990. According to the IYFS index the 1991 year class is strong.

**State of stock:** The adult stock is at a very low level due to poor recruitment. The IYFS index indicates that the stock will increase. The state of the stock is uncertain, since the evaluation leans heavily on a single IYFS index.

**Forecast for 1993:** Forecast was attempted but was highly uncertain.

**Management advice:** Given the highly uncertain forecast, there is no basis to advise on a TAC for 1993.

**Special comments:** Sprat in Division IIIa are caught in both the "mixed clupeoid" fishery and the directed fisheries for human consumption.

The catches taken under the "mixed clupeoid" TAC consist of a mixture of industrial species (Norway pout and sandeel) and juveniles of "human consumption" species (herring and gadoids). The catches of sprat in this fishery have been at a lower level in recent years.

The catches of juvenile "human consumption" species have a negative effect on the yield per recruit for these species. The effect on the yield of herring is evaluated in Section 3.1.1.

A reduction of the catches of juvenile "human consumption" species will improve the yield per recruit of these species. This could be obtained by managing the "mixed clupeoid" TAC as a sprat TAC, allowing a fishery for sprat and reducing the catches of the other species to the lowest possible level.

### 3.2.11 Sprat in Sub-area IV

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	0	0	0	-	-	-				
Agreed TAC <sup>2</sup>	153	100	57	57	59	59	55	55			
Official landings	61	54	78	93	50	49	92 <sup>4</sup>	-			
Unallocated landings	-11	-38	-45	-6	13	22	18	-			
Catch as used by WG <sup>3</sup>	50	16	33	87	63	71	110 <sup>4</sup>	-	641	16	218
Recruitment (age 1) <sup>5</sup>	659	73	807	145	4,246	177	1,121	1,639 <sup>4</sup>	4,246	73	797

<sup>1</sup>Over period 1974-1991. <sup>2</sup>Division IIa (EC zone), Sub-area IV (EC zone). <sup>3</sup>Excluding Norwegian fjords. <sup>4</sup>Preliminary.

<sup>5</sup>Division IVb IYFS index. Weights in '000 t.

**Catches:** Total landings increased from 71,200 t to 109,500 t (Table 3.2.11).

**Data and assessment:** Catch-at-age data available for some of the fleets. No effort data available. Recruitment indices available from IYFS. Insufficient data for assessment or catch prediction.

**Recruitment:** The IYFS index indicated a very strong 1988 year class which never turned up in the catches. The 1991 year class appears to be above average.

**State of stock:** The stock is improving, but is at a low level compared to the early 1980s.

### 3.2.12 Sprat in Division VIa

**Source of information:** Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

**Catches:** Landings for 1982-1991 are given in Table 3.2.12.

3.2.13 Sprat in Divisions VIIId,e

Source of information: Report of the Industrial Fisheries Working Group, March 1992 (C.M.1992/Assess:9).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC	20	5	5	5	12	12	12	12			
Official landings	3.8	1.2	2.7	5.5	3.4	2.2	2.6 <sup>2</sup>	-	6.6	1.2	3.8

<sup>1</sup>Over period 1982-1991. <sup>2</sup>Preliminary. Weights in '000 t.

Catches: Total landings have increased in 1991 compared to 1990, but are still below average (Table 3.2.13).

Data and assessment: Catch-at-age data available for the UK fishery in Lyme Bay. No data available for the offshore fishery. Recruitment data not available. No assessment possible.

### **3.3 Demersal Stocks in Division IIIa**

#### **3.3.1 Overview**

The database for assessments of these stocks is generally poor. For various stocks the problems include misreporting or non-reporting of catches, lack of effort data with associated catch-at-age data, lack of discard data, and a series of years without age compositions from the industrial by-catch.

As a result of these deficiencies it is not possible to make satisfactory analytical assessments and there is thus little basis for management advice.

ACFM notes that, unless these data are routinely collected and made available, it will not be possible to provide improved assessments or advice in the future.

The main problem for cod in the Skagerrak is the lack of appropriate tuning data and discard data. The assessment made must be taken only as indicative of the general state of the stock. SSB is presently close to its long-term average.

For haddock, no tuning data are available and there are problems with age composition data for industrial by-catches in some years. An analytical assessment is not possible. Recruitment appears to be associated with recruitment to the North Sea stock.

For whiting, the only data available are total landings split into human consumption and industrial by-catch.

The plaice assessment is invalidated by an unknown level of non-reported catches and by the lack of appropriate tuning data. Furthermore, the stock composition has changed in the last decade; the Kattegat stock of plaice has decreased drastically and most of the catches in the Kattegat are from the northern part and may be considered to originate from the Skagerrak stock. Plaice in Division IIIa was formerly assessed as two separate units, but this has not been possible recently due to the decrease in the Kattegat stock.

**Management advice for cod in the Skagerrak and haddock, whiting and plaice in Division IIIa:** In recent years ACFM has advised a precautionary TAC based on recent catch levels. In view of the poor information available, there is no basis to alter this advice.

For cod, ACFM recommends that TACs be set separately for the Skagerrak and the Norwegian coastal areas.

### 3.3.2 Cod in the Kattegat

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the Baltic, April 1992 (C.M.1992/Assess:12).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	12.0	<sup>3</sup>	<13	<15	10.0	7.0	6.3	<sup>4</sup>			
Agreed TAC	16.0	17.0	15.5	15.0	12.5	8.5	6.65	6.65			
Catch as used by WG	12.7	9.1	11.5	5.5	8.6	5.9	6.8	-	21.9	5.5	13.3
Sp. stock biomass	16.4	12.6	9.1	8.3	9.1	7.4	4.9	<sup>2</sup>	38.1	4.9	21.1
Recruitment (age 1)	8.8	17.9	5.8	8.0	3.8	15.0	10.4	12.0 <sup>2</sup>	37.1	5.8	17.1
Mean F(2-6,u)	1.21	1.20	1.33	0.83	1.20	1.49	1.02	-	1.49	0.56	0.97

<sup>1</sup>Over period 1971-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Precautionary TAC based on recent catch levels. <sup>4</sup>Reduction in effort by 30% would reduce F to level which obtained before stock decline. Weights in '000 t, recruitment in millions.

**Catches:** The 1991 catch was about 50% of the long-term mean level (Table 3.3.2). Catches decreased in 1988 and have stayed at the lower level since then.

**Data and assessment:** Catch-at-age data available only from Denmark. Tuning of VPA using three sets of catch and effort data by fleets and IYFS-data. Danish age compositions used in tuning. Recruitment estimated from survey data.

**Fishing mortality:** Fishing mortalities high in 1982-1991 (Figure 3.3.2).

**Recruitment:** Recruitment very poor in 1987-1989. 1989 year class is average but 1990 and 1991 year classes are below average.

**State of stock:** The SSB has decreased since 1984 and it is at record low level in 1991. There is a mixing with Skagerrak cod in the northern part of the Kattegat. Although the precise value of fishing mortality could not be estimated, because of the low quality of input data, it is likely that it is still high.

**Forecast for 1993:** Not conducted, because of uncertainties in assessment data.

**Management advice:** Despite uncertainties, the available information indicates that the stock is below the minimum biologically acceptable level. In addition, this stock mixes to some extent with both the western Baltic and the North Sea cod stocks for which significant reductions in fishing mortality has been advised by ACFM. In order to allow the stock to increase, ACFM recommends that fishing effort on cod in the Kattegat in 1993 should be limited to at most 70% of the 1991 fishing effort.

**Special comments:** Assessment is uncertain, because of misreporting of catches, mixing of stocks and deficiencies in the sampling data.

### 3.3.3 Plaice in the Kattegat

The stock will be considered by ACFM in November 1992 when Plaice in the Skagerrak will also be considered (see Sections 3.3.1 and 3.3.8).



### 3.3.4 Sole in Division IIIa

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the Baltic, April 1992 (C.M.1992/Assess:12).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	< 800	600 <sup>3</sup>	600 <sup>3,4</sup>	1,000			
Agreed TAC	600	600	850	950	800	500	1000 <sup>7</sup>	1,200			
Official landings	548	783	830	705	816	629		-			
Unallocated landings	-151	-140	-108	1	8			-			
Catch as used by WG	397	643	722	706	824	1050 <sup>5</sup>	1011	-	1050	337	711
Sp. stock biomass	1074	1718	1847	1953	1950	2373 <sup>6</sup>	2614 <sup>6</sup>	-	2614	830	1795
Recruitment (age 2)	5991	4879	4896	3413	5733	7012	3838	-	7012	2903	4833
Mean F(3-9,u)	0.24	0.38	0.47	0.32	0.38	0.34	0.47	-	0.47	0.22	0.37

<sup>1</sup>Over period 1984-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Precautionary TAC. <sup>4</sup>Revised in May 1991 to 1,000 t. <sup>5</sup>Qualified guess.

<sup>6</sup>Estimates highly uncertain because of the quality of assessment. <sup>7</sup>EEC TAC. Weights in t, recruitment in '000.

**Catches:** Increasing since 1985 (Table 3.3.4). Catches in 1991 highest on record. Catch figures in 1989-1991 uncertain, because of restrictions in the fisheries. Unreported landings may have taken place.

**Data and assessment:** Assessment based on Danish data. Some uncertainty in the catch figures. No discards data available. No tuning data available.

**Fishing mortality:** Fishing mortality has been variable (Figure 3.3.4).

**Recruitment:** Recruitment above average in 1989 and 1990. In 1991 recruitment was, however, below average. Indices are uncertain and reliability of indices is unknown.

**State of stock:** SSB appears to be increasing. Stock is not heavily exploited.

**Forecast for 1993:** Not reliable, because of uncertainties in assessment data.

**Management advice:** Despite uncertainties, the available information indicates that this stock has been increasing. ACFM suggests that if a TAC is set, it could reflect catch levels in recent years.

**Special comments:** There are uncertainties in the catch figures and recruitment estimates are highly uncertain. Separable VPA indicates that the data are rather noisy.

3.3.5 Cod in the Skagerrak

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC <sup>3</sup>	20.0	- <sup>4</sup>	<21	- <sup>4</sup>	<23	21.0	15.0	- <sup>5</sup>			
Agreed TAC <sup>3</sup>	29.0	29.0	22.5	21.5	20.5	21.0	15.0	15.0			
Catch as used by WG <sup>3</sup>	16.6	20.1	19.9	16.9	18.8	17.8	12.1	-	28.9	12.1	20.2
Sp. stock biomass	21.6	20.0	14.3	23.5	20.7	21.5	17.5	19.2 <sup>2</sup>	32.5	14.2	22.7
Recruitment (age 1)	12.1	33.0	10.9	17.8	16.9	16.6	10.2	20.7 <sup>2</sup>	33.0	10.2	18.6
Mean F(3 - 6,u)	0.96	1.42	1.02	0.83	0.95	0.86	0.75	-	1.42	0.50	0.95

<sup>1</sup>Over period 1978-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Not including Norwegian fjords. <sup>4</sup>Precautionary TAC based on recent catch levels. <sup>5</sup>Effort should be reduced, preferably by 30%. Weights in '000 t. Recruitment in millions.

**Catches:** Landings have been fairly stable, but the 1991 landings are the lowest in the time series (Table 3.3.5).

**Assessment and Management Advice:** See Section 3.3.1.

### 3.3.6 Haddock in Division IIIa

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	4.6 <sup>4</sup>	4.6 <sup>4</sup>			
Agreed TAC	11.5	11.5	11.5	10.0	10.0	10.0	4.6	4.6			
Official landings	7.2	3.6	3.8	2.9	4.1	4.1	4.1 <sup>5</sup>	-			
Unallocated landings <sup>6</sup>	0.9	1.7	1.4	1.5	0.4	2.0	2.6	-			
Catch as used by WG	8.1	5.3	5.3	4.4	4.5	6.1	6.7	-	15.2	4.4	7.7

<sup>1</sup>Over period 1975-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Precautionary TAC based on recent catch levels. <sup>4</sup>Precautionary.

<sup>5</sup>Preliminary. <sup>6</sup>Industrial by-catch. Weights in '000 t.

**Catches:** Landings have been increasing in recent years due to increased industrial by-catches (Table 3.3.6).

**Assessment and Management Advice:** See Section 3.3.1.

3.3.7 Whiting in Division IIIa

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	- <sup>4</sup>	-			
Agreed TAC	22.15	22.15	17.0	17.0	17.0	17.0	17.0	17.0			
Official landings	3.6	1.2	1.1	0.9	1.5	1.4	1.6 <sup>2</sup>	-			
Unallocated landings <sup>3</sup>	9.6	11.8	15.6	10.9	11.7	17.8	12.5	-			
Catch as used by WG	13.2	13.0	16.7	11.8	13.2	19.2	14.1	-	49.9	11.7	21.0

<sup>1</sup>Over period 1975-1991. <sup>2</sup>Preliminary. <sup>3</sup>Industrial by-catch. <sup>4</sup>Precautionary TAC based on recent catch levels. Weights in '000 t.

**Catches:** Landings have fluctuated at a lower level during the last ten years than before. The major part of the landings are industrial by-catches (Table 3.3.7).

**Assessment and Management Advice:** See Section 3.3.1.

### 3.3.8 Plaice in Division IIIa

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC Kattegat	4.0	2	2	≤3.7	≤2.9	1.3	1.1 <sup>3</sup>	} 14.0			
Skagerrak	9.0	2	2	2	2	10.0	10.0 <sup>3</sup>				
Agreed TAC Kattegat	5.5	5.5	4.75	4.75	4.0	2.0	1.3				
Skagerrak	12.0	14.5	14.5	15.0	15.0	11.0	10.0				
Landings as used by WG	13.5	14.9	15.8	12.9	7.7	12.1	8.7	-	26.5	7.7	15.1

<sup>1</sup>Over period 1978-1988. <sup>2</sup>Precautionary TAC based on recent catch levels. <sup>3</sup>In May 1991 ACFM revised its advice to 12.0 for both areas combined. Weights in '000 t.

**Catches:** The catches in 1991 are the second lowest in the historical time series (Table 3.3.8).

**Assessment and Management Advice:** See Section 3.3.1.

### **3.4        *Pandalus borealis* in Division IIIa and the North Sea**

Figure 3.4 shows the management units for *Pandalus* in the North Sea and Division IIIa. Table 3.4.1.2.1 summarizes the landings by country.

#### **3.4.1        *Pandalus borealis* in Division IIIa and Division IVa East (Skagerrak and Norwegian Deeps)**

##### **3.4.1.1        Advice from the May 1992 ACFM Meeting**

A large part of the 1993 catch will consist of the 1991 year class. So far only an 0-group estimate of this year class is available. Additional information on this recruitment will be obtained from the October 1992 Norwegian trawl survey. Therefore, ACFM postpones its advice on this stock until the November 1992 ACFM meeting when the October 1992 survey results should be available.

### 3.4.1.2 Advice from the October/November 1992 ACFM Meeting

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8); Working Document to ACFM.

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	10.0	12.0	- <sup>5</sup>			
Agreed TAC	-	-	-	-	3.1 <sup>3</sup>	2.75 <sup>3</sup>	8.55 <sup>4</sup>	10.5 <sup>4</sup>			
Discards/slipping	Discarding occurs, but no data are available										
Catch as used by WG	12.0	12.8	14.3	12.0	11.0	10.2	11.6	-	14.3	7.6	10.9
Sp. stock biomass	19.3	12.8	17.8	12.0	10.4	12.0	18.0	22.1 <sup>2</sup>	19.3	10.4	14.6
Recruitment (age 1)	12.4	7.2	5.9	3.8	8.2	11.3	9.5	7.2 <sup>2</sup>	12.4	3.8	9.7
Mean F(1 - 3,u)	0.45	0.38	0.46	0.62	0.65	0.43	0.40	-	0.65	0.38	0.57

<sup>1</sup>Over period 1981-1991 for catch; 1985-1991 for SSB, recruitment and F. <sup>2</sup>Predicted or assumed. <sup>3</sup>Division IIIa (Skagerrak); EC only. <sup>4</sup>Division IIIa (Skagerrak) only. <sup>5</sup>Inside safe biological limits. Weights in '000 t, recruitment in billions.

**Catches:** Have declined from peak level in 1987, but increased in 1991 (Tables 3.4.1.2.1 and 3.4.1.2.2).

**Data and assessment:** Age-based VPA on an annual basis. Data on age compositions obtained by transforming quarterly length compositions into age groups. VPA tuned with effort data from Danish, Norwegian and Swedish fleets.

**Fishing mortality:** Fishing mortality has declined from peak levels in 1988-1989. Fishing mortality is about one-half the natural mortality rate.

**Recruitment:** Has improved in recent years compared to 1987-1988. Estimates of abundance of the 1990-1992 year classes are based on indices from trawl surveys. The 1992 year class appears to be very strong.

**State of stock:** SSB has increased markedly from 1988-1990 levels.

#### Forecast for 1993:

Assuming  $F(92) = 0.40$ , Basis:  $F(92)=F(91)$ , Catch(92) = Not calculated, Landings (92) = 12.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.8 F(91)	0.33	20	10	10	26	SSB increases to record high.
B	1.0 F(91)	0.41	20	13	13	24	SSB increases to record high.
C	1.2 F(91)	0.49	19	15	15	22	SSB stable.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to an increase in catch and an increase in SSB to a record high level.

**Management advice:** ACFM considers that exploitation of this stock is inside safe biological limits.

### 3.4.2 *Pandalus borealis* in Division IVa - Fladen Ground

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC	-	-	-	-	-	-	-	-			
Discards/slipping	Discarding occurs, but no data are available										
Catch as used by WG	5.0	3.7	8.0	1.2	3.0	2.0	0.5	-	8	0.3	2.7

<sup>1</sup>Over period 1982-1991. Weights in '000 t.

**Catches:** Catches declined drastically in 1991 due to the lowering of the market price for Pandalid shrimps (Table 3.4.2). 80% of the catches were taken in the second quarter.

**Data and assessment:** Age-based VPA. Data on age composition obtained by transforming length frequency distributions into age groups. The VPA was run on an annual basis. The VPA results are not entirely reliable due to the short lifespan and very high natural mortality rate of Fladen shrimp.

**Fishing mortality:** The estimated 1991 fishing mortalities are extremely low, reflecting the low level of effort in 1991. Fishing mortality has probably been much lower than natural mortality.

**Recruitment:** No adequate estimates of recent recruitment are available.

**State of stock:** The SSBs estimated for 1990 and 1991 seem to be at a relatively high level and stable.

**Forecast for 1993:** Not available.

**Special comments:** As before, a lack of adequate recruitment indices precludes any short-term predictions for this stock. Without such data, and given the short lifespan of Fladen shrimp, annual assessment of this stock will continue to be imprecise and unreliable.

### 3.4.3 *Pandalus borealis* in Division IVb - Farn Deep

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

This is a sporadic fishery which reached a peak in the mid to late 1980s but declined rapidly to an extremely low level (3 t) in 1991 (Table 3.4.3). The reason is not thought to be the low stock level but rather a lowering of market price and a drop in demand.

Few data are available for this fishery and no assessment has been attempted. Fluctuations in catches appear to be market-driven.



### 3.5 Demersal Stocks in the North Sea

#### 3.5.1 Overview

The main demersal stocks harvested for human consumption purposes in the North Sea (cod, haddock, whiting, saithe, sole and plaice) are, according to the assessments carried out this year, developing in very different directions.

The cod stock continues to decrease. Recruitment in 1992 is for the seventh consecutive year below the long-term average and spawning stock biomass (SSB) is presently only one third of the level of 150,000 t which is and has in the past been considered by ACFM to be the lowest desirable biological level.

The haddock stock, which had been reduced to one half of the lowest desirable biological level of 100,000 t of SSB in 1991, is expected to increase to 200,000 t in 1993 following the recruitment of two consecutive year classes of above-average abundance.

The SSB of saithe has continued to decline to a new record-low level in 1991.

The SSB of whiting appears to have stabilised at a level somewhat below the long-term average and is likely to remain so in the near term at current fishing mortality.

The plaice stock is likewise stable, as the result of a series of average or large year classes. SSB is on a relatively high level, well above minimum desirable level (300,000 t). However, some contrary evidence gives reason to suspect that the present projection of this stock may be too optimistic.

The SSB of sole has increased considerably in recent years and is now well above the minimum desirable level due to recruitment to the fishery of the strong year class of 1987. This assessment is, however, flawed by uncertainties about the quality of landings data.

Fishing mortality rates in recent years for all of these stocks are among the highest in their respective historical series.

For cod, continued fishing at these high  $F$  levels is likely to result in continued low levels of SSB which, in conjunction with the recent series of poor recruitment, gives rise to serious concern that the stock is no longer able to replenish itself.

For haddock, the recent appearance of successive year classes of above-average abundance has given rise to an increase in the size of the stock. However, on historical grounds it appears very unlikely that this succession of above-average recruitment will be maintained. A continuation of the current high fishing mortality rate will cause the stock to revert rapidly to its recent depleted state if two poor year classes recruit successively.

For saithe, a continuation of the high fishing mortality rate will not lead to a significant improvement in SSB.

ACFM considers that the stocks of cod and saithe are at present outside safe biological limits. In the short term, the stock of haddock will be within safe biological limits but, for the reasons indicated above, it is by no means sure that this position will be maintained in the medium term. ACFM has, therefore, **recommended** appropriate remedial action for these stocks.

For whiting, plaice and sole recent high recruitments have maintained the respective SSBs above levels deemed to be the lowest desirable, and it seems likely that SSBs will remain above the lowest desirable level in the medium term.

Management considerations for all of these demersal stocks are complicated because, to varying degrees, they are caught simultaneously by various fleets in mixed fisheries.

ACFM has long recommended reductions in fishing mortality, particularly in view of the critical situation for both cod and haddock. These recommendations were translated into TACs. However, this procedure did not result in decreases in fishing mortality rates. The reasons for this are discussed at length in the 1990 and 1991 reports of ACFM.

Therefore, in 1990 and 1991, ACFM recommended that "fishing effort in the directed fisheries on North Sea roundfish stocks, except saithe, should be limited to 70% of the 1989 fishing effort". In its 1991 report ACFM also indicated that a reduction in effort should be seen as "a long-term strategy which should remain in place for several years, regardless of the short-term fluctuation in fishing mortality, in order to reduce overall effort".

Regulations were implemented by the EC as a consequence of the ACFM recommendations. After two years it is now possible to evaluate the effect of the implemented effort regulations in terms of reduced fishing mortalities more comprehensively. Fishing mortalities have not decreased over the two years and are even increasing for some stocks. Therefore, it appears necessary that measures of greater effectiveness should be applied.

In view of the critical state of the cod stock and the fact that continued haddock recruitment on the high level seen in two recent years is without precedent, ACFM does not see any reason to deviate from effort reduction as a long-term strategy.

Remedial action for the species in a "critical" state must necessarily be directed towards the fisheries by controlling their fishing effort and not towards individual stocks by implementation of TACs.

ACFM, therefore, reiterates its view that TACs alone as implemented have not and will not achieve the required reductions in fishing mortality on demersal North Sea stocks, and has again refrained from proposing such advice. Instead, ACFM restates that only an overall comprehensive approach to effort reduction will achieve the desired reductions in fishing mortality for all relevant stocks.

It is necessary that effort reductions which will result in reductions in fishing mortality rates are achieved. Seen in isolation, fishing effort on cod should be reduced to zero. This is, however, not feasible due to other factors, especially the technical interactions with haddock, plaice, sole and whiting. It is also still necessary to reduce the fishing effort on haddock to prevent a return of this stock to its recent depleted state when average or below average recruitment occurs.

ACFM, therefore, **recommends**, that fishing effort in the directed fisheries on North Sea roundfish stocks, except saithe, in 1993 should be limited to 70% of the 1989 fishing effort.

Recommendations concerning other stocks are given in the summary sections where applicable.

3.5.2 Cod in Sub-area IV (North Sea)

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	<259	<130	<125	≤148	<124	113	- <sup>2</sup>	- <sup>2</sup>			
Agreed TAC	250	170	175	160	124	105	100	100			
Official landings <sup>3</sup>	188	157	167	142	111	105	84	-			
Unallocated landings	6	6	8	8	5	-	2	-			
Landings as used by WG	193	163	175	150	116	105	86	-			
Industrial by-catch	-	-	-	-	-	-	-	-			
Discards	-	-	-	-	-	-	-	-			
Catch as used by WG	193	163	175	150	116	105	86	-	341	86	207
Sp. stock biomass	107	95	86	79	73	62	56	51 <sup>2</sup>	263	56	160
Recruitment (age 1)	109	568	238	143	246	137	155	342	847	109	373
Mean F(2 - 8,u)	0.83	0.88	0.89	0.89	1.00	0.78	0.93	-	1.00	0.47	0.73

<sup>1</sup>Over period 1963-1991. <sup>2</sup>30% reduction in fishing effort relative to 1989. <sup>3</sup>Not including some cod caught as industrial by-catch. Weights in '000 t, recruitment in millions.

Catches: These have fallen sharply since 1981 (Table 3.5.2) and landings in 1991 were the lowest since 1956.

Data and assessment: Analytical assessment of catch-at-age data, using CPUE and research vessel data. Discard data only available for Scottish fleets, and not used in assessment.

Fishing mortality: Increased continuously since the start of the time series to reach 0.9 in 1982, and appears to have stabilised at record-high levels subsequently (Figure 3.5.2). The exploitation pattern is far from optimal with landings dominated by 2-year old immature fish.

Recruitment: No strong year classes since 1985 but the 1991 year class appears to be about average, while that of 1992 is estimated to be small.

State of stock: Spawning stock biomass has declined sharply since 1970, to reach a record-low value at the start of 1992.

Forecast for 1993:

Assuming F(92) = 0.93, Basis: F(92) = F(91), Catch(92) = Not calculated, Landings (92) = 100.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0	0	46	-	0	121	} Increase in SSB, but below minimum desirable level.
B	0.2 F(91)	0.19		-	32	101	
C	0.4 F(91)	0.37		-	59	84	
D	0.6 F(91)	0.56		-	82	71	
E	0.8 F(91)	0.74		-	101	59	} SSB stabilises or increases slightly but still at historically low level
F	1.0 F(91)	0.93		-	118	50	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to no increase in the current low level of SSB.

**Management advice:** SSB is presently at a record-low level and is expected to decline even further at the currently high level of fishing mortality. The stock is outside safe biological limits. Seen in isolation the fishing effort on cod should be reduced to zero in order to increase the stock towards its "lowest desirable level" (150,000 t SSB) at the fastest possible rate. Recovery of the cod stock would require, at minimum, a marked and sustained reduction of effort or even a closure of the fishery. Considering that the effort on cod is to a large extent directed through mixed demersal fisheries, ACFM, therefore, recommends that fishing effort in the directed fisheries on North Sea roundfish stocks except saithe in 1993, should be limited to 70% of the 1989 fishing effort.

An improvement of the present sub-optimal exploitation pattern is also desirable to enhance stock recovery. It is further recommended that effort reduction be supplemented with measures to protect juvenile cod.

**Special comments:** The latest assessment confirms the severity of the situation for cod, as demonstrated in previous assessments. Fishing mortalities reached record-high levels in the early 1980s and have remained close to these levels since, except for a slight temporary decrease in 1990. The last seven year classes are all well below the long-term average except the 1991 year class which is just below average. If the fishing mortality of recent years is maintained, the size of the stock and the catches taken from it will remain low unless recruitment returns to the high levels of the 1970s for a protracted period. Risk analysis indicates that, with the current level of  $F$ , there is a 90% probability that the SSB will fall below the 1991 level (56,000 t) in 1994.

Detailed data for North Sea cod exist from 1963 onwards. Spawning stock biomass was low (somewhat less than 150,000 t) between 1977 and 1979 but recovered briefly in the period 1980-1982. Since then the spawning stock biomass has declined to historically low levels (below 80,000 t) in the last 5 years. Having observed a recovery of the spawning stock biomass from levels slightly less than 150,000 t, ACFM in conformity with its previous advice, advises this level as the "lowest desirable". The present level is only one-third of this level, and the stock must, therefore, be considered to be in an extremely critical state. A danger of the present situation is that the low egg production associated with the current very low spawning stock biomass will require high survival of eggs to produce even an average year class. The sequence of poor year classes in recent years gives reasons for concern in this respect.

With the present exploitation pattern and effort level less than 1% of the recruits at age 1 survive to become mature.

Future enhancement of the spawning biomass may be achieved by protecting juvenile cod in areas where they are most abundant. ACFM considers that a quantitative evaluation of appropriate technical measures should be undertaken as soon as possible.

### 3.5.3 Haddock in Sub-area IV (North Sea)

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	<209	<239	<120	<185	<68	50	- <sup>2</sup>	- <sup>2</sup>			
Agreed TAC	207	230	140	185	68	50	50	60			
Official landings <sup>3</sup>	168	167	109	104	64	n/a	44	-			
Unallocated landings	-3	2	3	5	14	-	5	-			
Landings as used by WG <sup>4</sup>	165	169	112	109	78	54	49	-	223	49	144
Industrial by-catch	6	3	4	4	2	3	5	-	48	2	17
Discards	86	52	59	62	26	33	40	-	260	26	84
Catch as used by WG	251	220	172	171	104	87	90	-	448	87	228
Sp. stock biomass	231	213	150	149	119	71	55	105	290	55	193
Recruitment (age 0)	22	46	4	7	8	34	67	57	122	4	35
Mean F(2 - 6,u)	0.94	1.06	1.01	1.03	0.91	1.10	1.23	-	1.23	0.62	0.95

<sup>1</sup>Over period 1972-1991. <sup>2</sup>30% reduction in fishing effort relative to 1989. <sup>3</sup>Not including some haddock caught as industrial by-catch. <sup>4</sup>Includes industrial by-catch. Weights in '000 t, recruitment in '000 millions.

**Catches:** A further decline in human consumption landings to a new historic low (Table 3.5.3). Slight increase in discards and by-catch.

**Data and assessment:** Data still subject to mis-reporting/non-reporting problems. VPA tuned using commercial catch and effort data and research vessel survey data.

**Fishing mortality:** Reached a record high level in 1991 (Figure 3.5.3.1). The exploitation pattern is far from optimal, with large catches of immature fish.

**Recruitment:** The 1991 year class is above average and survey results suggest that the 1992 year class may also be strong, but this estimate is subject to high uncertainty.

**State of stock:** Although SSB reached a record low level in 1991, a short-term recovery is expected. The increase in fishing mortality in 1991 is cause for concern.

### Forecast for 1993: (Figure 3.5.3.2)

Assuming  $F(92) = 1.18^1$ , Basis:  $F(92)=F(91)$ ,  $Catch(92) = 232$ ,  $Landings(92) = 102$  (91 human consumption; 11 industrial by-catch).

Option	Basis <sup>1</sup>	F(93) <sup>1</sup>	SSB(93)	Catch(93)			Discards	SSB(94)	Consequences/ implications
				Total Catch	Human consumption landings	Industrial by-catch			
A	0	0	201	17	0	17	0	478	Increase in catch and landings, and SSB above minimum desirable level for all options.
B	0.2 F(91)	0.24		109	52	16	41	408	
C	0.4 F(91)	0.47		186	94	15	76	350	
D	0.6 F(91)	0.71		252	129	14	108	304	
E	0.8 F(91)	0.94		309	158	14	137	266	
F	F(91)	1.18		358	182	13	163	235	

<sup>1</sup>Applies to human consumption landings and discards; an additional constant F is assumed for the industrial fishery in all options. Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a short-term increase in catches and SSB due to recent good recruitment, but recurrence of intermittent crises if subsequent recruitment is poor.

**Management advice:** The SSB in 1991 was at a record low level and the fishing mortality is at a record-high level. As a result of the two large year classes, the stock is expected to recover in the short-term above 100,000 t, the lowest desirable level previously advised by ACFM. However, with the present exploitation level, two or three successive below-average year classes will bring the stock right back below the lowest desirable level and the stock cannot be considered to be within safe biological limits in the long-term. ACFM, therefore, recommends that fishing effort in the directed fisheries on North Sea roundfish stocks, except saithe, in 1993 should be limited to 70% of the 1989 fishing effort.

**Special comments:** The estimate of the abundance of the 1992 year class is based on only one survey index and is subject to considerable uncertainty because this index is the highest in the series and the estimate had to be obtained by extrapolation. The value used in the forecast may be an under-estimate. If the true abundance of the 1992 year class is much larger, the predicted quantities of discards and industrial by-catch may be seriously under-estimated. The predicted human consumption landings, however, would be only slightly affected.

The lowest desirable level of 100,000 t previously advised by ACFM is the lowest SSB from which a sustained recovery has been observed. The recent occurrence of above-average recruitment from a lower SSB is an indication of recovery, but there is still no indication of sustained recovery. The present levels of fishing mortality are at a record high and, if anything, increasing.

Given the present high fishing mortality rate and the suboptimal exploitation pattern, only 0.2% of the fish recruiting to the stock at age 0 survive to reach maturity and the spawning stock is largely composed of one or two year classes. The SSB is thus expected to vary in the short-term in accordance with the recruitment of individual year classes, i.e., with recurrent low levels of SSB following only two or three below-average year classes. The stock can thus only be expected to reach and stay within safe biological limits in the long-term if the exploitation level is reduced, so that SSB is maintained above the lowest desirable level independently of short-term recruitment variation.

3.5.4 Whiting in Sub-area IV (North Sea)

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	<118	<135	<127	<134	<115	130	- <sup>2</sup>	- <sup>2</sup>			
Agreed TAC	160	135	135	120	115	125	141	135			
Official landings	72	67	65	66	40	n/a	46	-			
Unallocated landings	-3	9	13	34	43	-	38	-			
Landings as used by WG <sup>3</sup>	69	76	78	100	83	93	84	-			
Industrial by-catch	15	18	16	49	43	51	38	-			
Discards	28	78	53	28	35	54	33	-			
Catch as used by WG	97	154	132	127	118	147	117	-	361	97	193
Sp. stock biomass	242	263	273	267	243	264	291	305 <sup>2</sup>	581	243	366
Recruitment (age 0)	47	39	26	46	38	45	44	38	92	21	46
Mean F(2 - 6,u)	0.82	0.88	1.10	0.82	0.79	0.87	0.96	-	1.2	0.59	0.81

<sup>1</sup>Over period 1972-1991. <sup>2</sup>30% reduction in fishing effort relative to 1989. <sup>3</sup>Includes industrial by-catch. Weights in '000 t, recruitment in '000 millions.

Catches: Human consumption landings stable at lower level than in the 1980s. Industrial by-catch and discards each lower than human consumption landings (Table 3.5.4).

Data and assessment: Analytical assessment of catch-at-age data using CPUE and recruit survey indices. Age composition in industrial by-catches estimated from direct sampling in 1991.

Fishing mortality: Human consumption F has increased in 1991 while discard F and industrial by-catch F have decreased (Figure 3.5.4.1). Human consumption F at its highest level since 1987.

Recruitment: The recruitment since 1988 has been stable at the level of the long-term mean over the last 20 years.

State of stock: SSB is at its highest level since 1984.

Forecast for 1993: (Figure 3.5.4.2)

Assuming F(92) = 0.96<sup>1</sup>, Basis: F(92)=F(91), Catch(92) = 154, Landings (92) = 106 (57 human consumption; 49 industrial by-catch).

Option	Basis <sup>1</sup>	F(93) <sup>1</sup>	SSB(93)	Catch(93)				SSB(94)	Consequences/implications
				Total catch	Human consumption landings	Industrial by-catch	Discards		
A	0.6 F(91)	0.59	308	121	41	50	31	317	} Slight increase in SSB
B	0.8 F(91)	0.78		139	52	48	39	301	
C	F(91)	0.98		155	61	47	47	286	} Decline in SSB

<sup>1</sup>Applies to human consumption landings and discards; an additional constant F is assumed for the industrial fishery in all options. Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a slight increase in landings and decrease in SSB.

**Management advice:** ACFM recommends that fishing effort in the directed fisheries on North Sea roundfish stocks, except saithe in 1993 should be limited to 70% of the 1989 fishing effort.

**Special comments:** It has for some years been realized by ACFM that the assessment of this stock is less reliable than those for cod and haddock due to uncertainties about the age composition of industrial by-catches. It is estimated that a universally-adopted minimum landing size of 23 cm could result in 27,000 t being transferred from discards to landings in 1993 at *status quo* fishing mortality.

The whiting stock is presently close to the long-term average both in terms of SSB and recent recruitment. The exploitation level is high and above the long-term average. There is in principle no requirement at present to reduce fishing mortality on North Sea whiting. However, due to the technical interaction in the fisheries for cod, haddock and whiting, a reduction in the fishing effort for cod and haddock cannot be considered independently of fishing effort for whiting.

ACFM notes that the EC has instituted regulations intended to encourage directed fishing on whiting. At present ACFM is not able to comment on the effect of such regulations on the stock.



### 3.5.5 Saithe in Sub-area IV and Division IIIa (North Sea)

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	<195	195	<198	<156	170	120	125	≤102			
Agreed TAC	200	240	173	165	170	120	125	110			
Official landings <sup>3</sup>	194	167	154	113	93	n/a	n/a	-			
Unallocated landings	6	-3	-5	-8	-1	-	-	-			
Industrial by-catch	8	1	4	1	2	2	-	-			
Catch as used by WG	200	164	149	105	92	88	96	-	320	88	178
Sp. stock biomass	106	100	102	102	82	66	56	68 <sup>2</sup>	465	56	213
Recruitment (age 1)	150	173	85	168	308	214 <sup>2</sup>	214 <sup>2</sup>	214 <sup>2</sup>	636	85	240
Mean F(3 - 6,u)	0.81	0.93	0.68	0.67	0.75	0.65	0.73	-	0.93	0.29	0.55

<sup>1</sup>Over period 1972-1991. <sup>2</sup>Assumed. <sup>3</sup>Includes industrial by-catch. Weights in '000 t, recruitment in millions.

**Catches:** Since 1986, the catches (Table 3.5.5) have been considerably less than the agreed TAC.

**Data and assessment:** Analytical assessment of catch-at-age data using CPUE. No independent estimates of year-class strength. Interpretation of data difficult and uncertain.

**Fishing mortality:** Increased up to 1986 with a shift towards heavy exploitation on fairly young fish. Fishing mortality has decreased since 1986 (Figure 3.5.5).

**Recruitment:** Has fluctuated without trend for many years.

**State of stock:** The stock is declining and is now at a historically low level.

#### Forecast for 1993:

Assuming  $F(92) = 0.73$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 124.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.7 F(91)	0.51	83	-	93	100	SSB increases
B	0.8 F(91)	0.59		-	103	92	
C	1.0 F(91)	0.73		-	121	79	SSB is reduced

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a reduction in SSB.

**Management advice:** The SSB is at a record low level and has been declining for several years. Fishing mortality is high, and average recruitment will be insufficient to maintain the SSB. The stock is thus developing further into a state which is without precedent and for which advice can not be based on historical experience. Furthermore, there are no measures of recent recruitment on which to base a forecast of the SSB. ACFM is concerned that this stock is close to or outside safe biological limits and, to allow the SSB to return to 100,000 t, recommends that the fishing mortality in 1993 be reduced by 30% from the 1991 level ( $F_{93} = 0.51$ ) corresponding to a TAC in 1993 of 93,000 t.

3.5.6 North Sea plaice

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	130	<160	120	150	<175	171	169	- <sup>3</sup>			
Agreed TAC	200	180	150	175	185	180	175	175			
Official landings	148	128	131	138	152	76 <sup>4</sup>	135	-			
Unallocated landings	12	37	29	24	18	92	19	-			
Catch as used by WG	160 <sup>2</sup>	165	160	162	170	168	154	-	170	73	125
Sp. stock biomass	345	350	392	377	433	402	346	385	508	299	373
Recruitment (age 1)	551	1396	558	569	581	598	750	687	1396	234	503
Mean F(2-10,u)	0.39	0.46	0.43	0.44	0.39	0.39	0.45	-	0.46	0.21	0.34

<sup>1</sup>Over period 1958-1991. <sup>2</sup>Minimum estimate. <sup>3</sup>No long-term gain from increasing F. <sup>4</sup>Not reported for all countries. Weights in '000 t, recruitment in millions.

**Catches:** Catches since 1985 have been the highest in the 1958-1991 time series (Table 3.5.6). Actual levels in recent years uncertain due to unreported catches.

**Data and assessment:** Quality of the database is still poor due to uncertainties about catch levels, age composition and effort. Results of the VPA should be treated with caution. Fishery-independent data from egg surveys and trawl surveys.

**Fishing mortality:** F increased in 1991 (Figure 3.5.6). F levels in recent years are lower than those estimated in the previous assessment.

**Recruitment:** Well above average with exceptionally strong year classes of 1981 and 1985.

**State of stock:** SSB rather stable at a level above the long-term mean.

**Forecast for 1993:**

Assuming F(92) = 0.46, Basis: F(92) = F(91), Catch(92) = Not calculated, Landings (92) = 171.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.8 F(91)	0.36	378	-	142	395	SSB will increase
B	1.0 F(91)	0.46		-	170	369	SSB more or less stable
C	1.2 F(91)	0.55		-	196	345	SSB decreasing

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a SSB in 1994 around the long-term mean.

**Management advice:** The SSB is well above the target minimum level of 300,000 t and the stock is therefore considered to be within safe biological limits. Fishing mortality is at a historically high level, however, and well above F<sub>max</sub> (0.23). No benefit in terms of long-term yield can be gained by increasing fishing mortality above the present level.

**Special comments:** There are indications from the discrepancy between predicted and observed catches and catch rates in 1991 that fishing mortality is under-estimated and (as a consequence) the SSB over-estimated.

3.5.7 North Sea sole

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	15.0	12.0	11.0	11.0	14.0	25.0	27.0	21.0			
Agreed TAC	22.0	20.0	14.0	14.0	14.0	25.0	27.0	25.0			
Official landings	19.9	12.9	13.8	13.4	14.4	n/a <sup>3</sup>	26.4	-			
Unallocated landings	4.3	5.3	3.6	8.2	7.4	-	11.6	-			
Catch as used by WG	24.2 <sup>2</sup>	18.2	17.4	21.6	21.8	35.1	38.0	-	38.0	11.3	22.1
Sp. stock biomass	43	37	32	43	38	94	80	74	149	26	65
Recruitment (age 1)	84	161	81	454	105	147	51	275	552	12	134
Mean F(2 - 8,u)	0.50	0.48	0.41	0.46	0.36	0.40	0.47	-	0.54	0.13	0.36

<sup>1</sup>Over period 1957-1991. <sup>2</sup>Minimum estimate. <sup>3</sup>Not reported for all countries. Weights in '000 t, recruitment in millions.

**Catches:** Estimated landings increased sharply in 1990 and 1991 to historically high levels (Table 3.5.7).

**Data and assessment:** Analytical assessment based on catch-at-age, CPUE data and survey indices. Adequate sampling of age compositions and weight at age. Recruitment survey data available. Level of landings uncertain and is cause for concern.

**Fishing mortality:** Declined since 1985 and increased in 1990 and 1991 (Figure 3.5.7). Levels in recent years are estimated to be lower than in previous assessments.  $F_{91}$  is well above  $F_{max}$  and above  $F_{med}$ .

**Recruitment:** Year classes of 1987 and 1991 are very strong. Year classes of 1988 and 1989 are around average. The 1990 and 1992 year classes appear to be poor.

**State of stock:** Assessment indicates SSB has increased considerably and is well above the lowest desirable level of 40,000 t. Egg and trawl surveys support this. The exact size of the SSB is uncertain because of uncertainties in the assessment.

**Forecast for 1993:**

Assuming  $F(92) = 0.47$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 32.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{max}$	0.28	54	-	19	81	
B	$0.8 F(91) \approx F_{med}$	0.39		-	24	75	SSB will increase for all these options.
C	$1.0 F(91)$	0.47		-	29	70	
D	$1.2 F(91)$	0.57		-	33	65	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to an increase in SSB for all levels of F below 1.8  $F(91)$ .

**Management advice:** The stock is considered to be within safe biological limits. There is no benefit to be gained in terms of long-term yield by increasing fishing mortality above the present level.

**Special comments:** In the past decade, the target minimum SSB of 50,000 t was used as a guideline. This target comprised a buffer of 10,000 t to allow for two successive poor year classes and was based on the recruitment of average year classes from SSBs of around 40,000 t in the late 1970s. Experience from the late 1980s has confirmed that the stock can recover from 40,000 t and a case of strong recruitment has been observed from a spawning stock biomass of 32,000 t. All projections indicate that SSB levels above the minimum desirable level will be maintained in the short term. There is some basis for reservation as to the uncertainty about landings data, and thus about the assessment, including the risk of underestimating the fishing mortality and overestimating SSB.

## 3.6 Demersal Stocks in Sub-area VI

### 3.6.1 Overview

The assessments of roundfish stocks in Sub-area VI continue to be hampered by the deterioration in the quality of data upon which the assessments are based. Nevertheless, it is apparent that the stocks continue to be in a poor state. Fishing mortality rates are high and the 1991 SSB for all assessed roundfish stocks in Divisions VIa and VIb were near to or at the lowest levels on record. For cod, haddock and whiting, estimates of recent recruitment indicate single strong year classes (1990 or 1991 cohorts) but, given the continuation of recent high levels of fishing mortality, such cohorts are likely to be fished out rapidly and any benefits to SSB will be very short-lasting. No recruitment estimates are available for saithe, but, assuming average recruitment and *status quo* effort, the dramatic decline in SSB will continue and a reduction in fishing mortality is required.

Recent ACFM advice, that fishing effort in directed fisheries for cod, haddock and whiting in Division VIa should be permanently reduced to 70% of the level in 1989, has not been effectively implemented. The current assessments indicate that the stock perspective upon which ACFM based its previous advice has not changed and this advice is reiterated.

Data for assessments are not complete for all stocks in Sub-area VI and Division VIIa and biological parameters must frequently be inferred from other stocks. Tables 3.6.1.1 and 3.6.1.2 summarize the national contributions to the provision of data, and national authorities are requested to consider whether data provision can be improved.

### 3.6.2 Cod in Division VIa (West of Scotland)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	27.0	25.0	22.0	16.0	16.0	15.0	<sup>2</sup>	<sup>2</sup>			
Agreed TAC <sup>3</sup>	25.0	25.0	22.0	18.4	18.4	16.0	16.0	13.5			
Official landings	19	12	19	19	n/a	n/a	n/a	-			
Unallocated landings	-	-	-	1	-	-	-	-			
Catch as used by WG	19	12	19	20	17	12	12	-	24	11	17
Sp. stock biomass	24	18	20	26	22	18	17	19	50	17	30
Recruitment (age 1)	6	13	29	4	13	9	12	15	29	4	11
Mean F(2-5,u)	1.02	0.85	0.98	0.91	1.04	0.83	0.89	-	1.04	0.50	0.73

<sup>1</sup>Over period 1966-1991. <sup>2</sup>30% reduction in fishing effort relative to 1989. <sup>3</sup>TAC is for the whole of Sub-area VI. Weights in '000 t, recruitment in millions.

**Catches:** Averaged 23,000 t during 1967-1969, and 20,000 t during 1981-1988 (Table 3.6.2). Reduced levels of 12,000 to 14,000 t taken during the 1970s. Recent catches have declined from 20,000 t 1988 to 12,000 t in 1990 and 1991.

**Data and assessment:** Analytical assessment based on catch-at-age data, CPUE data, and research vessel recruitment indices from Division VIa. Catch and effort data considered to be of reduced quality due to misreporting.

**Fishing mortality:** Ranged from 0.5 to 0.7 during 1966 - 1978 (Figure 3.6.2.1). Increased from 0.8 to a record high level of 1.0 between 1979 and 1985, and remained at about 1.0 until 1989. Declined to 0.8-0.9 in 1990 and 1991.

**Recruitment:** Generally ranged from 8 million to 15 million. Record-high 1986 year class (29 million) followed by record-low 1987 year class (3.8 million). The 1990 and 1991 year classes are at or above the long-term average (11 million).

**State of Stock:** SSB at historically low level.

#### Forecast for 1993: (Figure 3.6.2.2)

Assuming  $F(92) = 0.89$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 14.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{max}$	0.26	21	-	6	36	Lowest catch, SSB above mean
B	$0.6F(91)$	0.54		-	11	28	SSB increases but remains at a low level
C	$0.8F(91) \approx F_{med}$	0.72		-	13	25	
D	$1.0F(91)$	0.89		-	15	22	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a small increase in landings and SSB but both will remain at a low level.

**Management advice:** The spawning stock biomass was at its lowest recorded level in 1991. It is expected to rise a little in the short term but under the currently high level of fishing mortality the stock will decline further in the long term. As such, there is a high probability that the stock will be outside safe biological limits in the near future. Problems with misreporting and non-reporting of catch add to concerns over the stock. Consequently, there is no basis to change the ACFM recommendation of the last two years that fishing effort in the directed roundfish stocks in Division VIa be reduced to 70% of the 1989 level.

### **3.6.3 Cod in Division VIb (Rockall)**

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

**Special comments:** Landings of cod from Division VIb have ranged between 400 and 2,000 t since 1980 (Table 3.6.3). The more recent, and higher values, are thought to be due to misreporting.

A TAC of 1,000 t for Division VIb could be combined with management measures agreed for Division VIa to provide management measures for the whole of Sub-area VI.

### 3.6.4 Haddock in Division VIa (West of Scotland)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	<25.0	-	<23.0	25.0	15.0	14.0	- <sup>4</sup>	- <sup>4</sup>			
Agreed TAC <sup>3</sup>	36.0	34.5	32.0	35.0	35.0	24.0	15.2	12.5			
Official landings	25	20	27	21	n/a	n/a	n/a	-			
Unallocated landings	-1	-	-	-2	-	-	-	-			
Landings as used by WG	24	20	27	19	17	10	10.6	-			
Discards/slipping	17	7	16	9	3	5	9.1	-			
Catch as used by WG	42	27	43	28	20	16	19.7	-	58	16	35
Sp. stock biomass	70.2	63.3	50.2	43.6	37.1	21.7	18.7	22.6	161.5	18.7	65.6
Recruitment (age 0)	64.7	314.3	25.5	27.8	121.5	147.9	292.8	93.9 <sup>2</sup>	1240.0	19.3	203.6
Mean F(2-6,u)	0.66	0.44	0.90	0.72	0.85	0.75	0.85	-	0.97	0.39	0.69

<sup>1</sup>Over period 1966-1991. <sup>2</sup>Assumed. <sup>3</sup>TAC is set for Divisions VIa and VIb combined. <sup>4</sup>30% reduction in fishing effort relative to 1989. Weights in '000 t, recruitment in millions.

**Catches:** Averaged 49,000 t during 1968-1973, declining to an average of 22,000 t during 1977-1980. Catches exceeded 40,000 t in 1984-1985 and 1987, but have declined to record low levels since 1989 (Table 3.6.4).

**Data and assessment:** Analytical assessment based on catch, effort and survey data. Continued uncertainty about the true level of catch and effort due to misreporting and non-reporting of landings.

**Fishing mortality:** Close to 1.0 during 1968-1969 and 1972, declining to 0.4-0.5 during 1980-1983 (Figure 3.6.4.1). Fishing mortality has ranged from 0.7 to 0.9 since 1987, equalling 0.85 in 1991, close to a record-high level.

**Recruitment:** Highly variable, generally ranging from 50 million to 300 million, occasionally greater than 500 million or less than 20 million. The three most recent year classes have exceeded 100 million, and the 1991 year class (293 million) is estimated to be above the long-term mean.

**State of stock:** Spawning stock biomass has risen slightly above the lowest recorded level and is predicted to increase further in 1993. However, the above-average 1991 year class will soon be fished out at the current level of fishing mortality and the stock will then resume its decline.

#### Forecast for 1993: (Figure 3.6.4.2)

Assuming  $F(92) = 0.85$ , Basis:  $F(92) = F(91)$ ,  $Catch(92) = 29.0$ ,  $Landings(92) = 14.3$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{max}$	0.20	33.3	9.1	5.8	51.7	Historically low catch, below average SSB.
B	$F_{med}$	0.27		11.9	7.6	48.5	
C	0.6F(91)	0.51		20.5	13.1	38.7	Spawning biomass increases from very low level, but this does not imply a recovery
D	0.7F(91)	0.60		23.1	14.6	36.0	
E	0.8F(91)	0.68		25.5	16.2	33.1	
F	1.0F(91)	0.85		29.8	18.8	28.4	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a continuation of the low level of SSB although at a higher level than in recent years.

**Management advice:** The spawning biomass in 1991 was at its lowest recorded level. A small increase is predicted under the *status quo* option but still to one of the lowest levels in the past 25 years. Current fishing mortality rates are very high (much in excess of  $F_{max}$ ). As such, there is a high probability that the stock will be outside safe biological limits in the near future. Problems with misreporting and non-reporting of catch add to concerns over the stock. Consequently there is no basis to change the ACFM recommendation of last year that fishing effort in the directed fisheries on roundfish stocks in Division VIa be reduced to 70% of the 1989 level.



### 3.6.5 Haddock in Division VIb (Rockall)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	8.0	5.0	10.0	10.0	18.0	5.5	5.5	3.8 <sup>3</sup>			
Agreed TAC	Included in Sub-area VI combined TAC										
Official landings	9.3	4.8	8.0	7.6	6.3 <sup>4</sup>	7.5 <sup>4</sup>	n/a	-			
Unallocated landings	0.6	0.2	0.4	0.3	0.4	-3.6	-	-			
Discards/slipping	Not known										
Catch as used by WG	9.9	5.0	8.4	7.9	6.7	3.9	5.4	-	9.9	3.9	6.8
Sp. stock biomass	19.6	11.1	22.1	13.0	8.7	5.4	4.8	4.2	22.1	4.8	12.1
Recruitment (age 1)	77	9	17	12	11	12.2	12.3	17 <sup>2</sup>	77	9	21.5
Mean F(2 - 5,u)	0.49	0.48	0.47	0.56	1.10	1.01	0.85	-	1.10	0.47	0.71

<sup>1</sup>Over period 1985-1991. <sup>2</sup>Assumed. <sup>3</sup>Precautionary. <sup>4</sup>Preliminary. Weights in '000 t, recruitment in millions.

**Catches:** Catches have varied between 9,900 in 1985 and 3,900 t in 1990 (Table 3.6.5). 1991 catches increased to 5,400 t, but remained slightly below the average.

**Data and assessment:** Analytical assessment for the first time. Assessment tuned using catch data reconstructed to allow disaggregation by fleet.

**Fishing mortality:** Increased from 0.5-0.6 during 1985-1988 to 1.0 in 1989 and 1990 (Figure 3.6.5.1). Fishing mortality in 1991 declined slightly from record high level. Series too short for trends to be considered.

**Recruitment:** Except for the extremely large 1984 year class (77 million), recruitment generally ranged from 10 to 20 million. The 1989 and 1990 year classes (12 million) were well below the 1985-1991 average.

**State of stock:** Spawning stock biomass has declined sharply since 1987 due to the high level of fishing mortality and relatively poor recruitment since the 1984 year class.

#### Forecast for 1993: (Figure 3.6.5.2)

Assuming F(92) = 0.85, Basis: F(92) = F(91), Catch(92) = Not calculated, Landings (92) = 3.1.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.6F(91)	0.51	4.4	-	2.4	6.6	Decreased catch, small increase in SSB. SSB will remain at a low level.
B	0.8F(91)	0.68		-	3.0	6.0	
C	1.0F(91)	0.85		-	3.5	5.5	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a slight increase in SSB from its current low level.

**Management advice:** Last year ACFM noted the highly variable character of this stock and the fishery and advised that a precautionary TAC was appropriate. The assessment this year is more reliable and has confirmed that this stock has recently experienced high fishing mortalities which may ultimately reduce the stock to outside safe biological limits. ACFM, therefore, recommends that fishing mortality be reduced by 20% to 0.68, corresponding to a TAC for this stock in 1993 of 3,000 t.

### 3.6.6 Whiting in Division VIa (West of Scotland)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	12.0	13.0	15.0	15.0	13.0	11.0	- <sup>4</sup>	- <sup>4</sup>			
Agreed TAC <sup>3</sup>	16.4	16.4	16.4	16.4	16.4	11.0	9.0	7.5			
Official landings	12.6	8.4	12.4	11.9	7.7 <sup>2</sup>	n/a	n/a	-			
Unallocated landings	0.3	-	-0.9	-0.6	-0.2	-	-	-			
Catch as used by WG	12.9	8.4	11.5	11.3	7.5	5.6	6.7	-	25	6	14
Sp. stock biomass	23.7	21.1	22.2	22.0	12.6	13.6	15.0	18.7	52.4	12.6	31.0
Recruitment (age 1)	63.2	51.2	66.9	17.2	43.2	45.3	62.9	66.4	208.7	17.2	74.5
Mean F(2-4,u)	0.91	0.67	0.77	0.92	0.92	0.67	0.84	-	1.32	0.36	0.75

<sup>1</sup>Over period 1965-1991. <sup>2</sup>Preliminary. <sup>3</sup>TAC is set for Divisions VIa and VIb combined. <sup>4</sup>30% reduction in fishing effort relative to 1989. Weights in '000 t, recruitment in millions.

**Catches:** Ranged from 15,000 t to 20,000 t between 1965 and 1985, occasionally as low as 11,000 t. Since 1986, catches have seldom exceeded 10,000 t, declining to a record-low level of 5,600 t in 1990 and 6,700 t in 1991 (Table 3.6.6).

**Data and assessment:** Analytical age-based assessment, tuned with five fleets. Recruitment indices from research vessel surveys. Estimates of discards not included in the analysis.

**Fishing Mortality:** Generally ranged from 0.9 to 1.3 during 1971 to 1976, declining to 0.4 to 0.5 during 1980-1983 (Figure 3.6.6.1). F has increased in recent years to 0.7-0.9, and is currently above the 1965-1991 mean.

**Recruitment:** Occasionally greater than 150 million and as low as 20 million. Between 1968 and 1980, 5 of 13 year classes exceeded 100 million, and 3 were approximately 200 million. Recruitment has been below the long-term mean since 1980, reaching a record low with the 1987 year class (17 million). The 1990 and 1991 year classes are estimated to be slightly below average.

**State of Stock:** The spawning stock biomass continues to be below the mean.

#### Forecast for 1993: (Figure 3.6.6.2)

Assuming F(92) = 0.84, Basis: F(92) = F(91), Catch(92) = Not calculated, Landings (92) = 9.6.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	F(93)=0.6F(91)	0.50	20.9	-	7.2	23.6	SSB remains below average but at a higher level than the recent lowest-on-record level.
B	F <sub>med</sub>	0.60		-	8.2	22.4	
C	F(93)=0.8F(91)	0.67		-	9.0	21.6	
D	F(93)=1.0F(91)	0.84		-	10.5	19.9	

Weights in '000 t.

**Management advice:** The spawning stock biomass was at its lowest level in 1989 and has recovered slightly since then. However, fishing mortality rates are high and will keep SSB at a relatively low level. Consequently, there is no basis to change the ACFM recommendation of the last two years that the fishing effort in the directed roundfish stocks in Division VIa be reduced to 70% of the 1989 level.

### 3.6.7 Whiting in Division VIb (Rockall)

**Special comments:** Landings of whiting from Division VIb are negligible (Table 3.6.7).

### 3.6.8 Saithe in Sub-area VI (West of Scotland and Rockall)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	26	20	23	35	20	24	21	<16			
Agreed TAC	27.8	27.8	27.8	35	30	29	22	17			
Official landings	26	35	33	33	n/a	n/a	n/a	-			
Unallocated landings	1	5	-2	1	-	-	-	-			
Catch as used by WG	27	40	31	34	26	20	17	-	42	17	27
Sp. stock biomass	62	59	54	45	29	22	19	15	87	19	54
Recruitment (age 1)	23	30	30	22	19	24	28 <sup>2</sup>	27 <sup>2</sup>	43	17	27
Mean F(3-6,u)	0.28	0.58	0.49	0.54	0.76	0.64	0.63	-	0.76	0.24	0.44

<sup>1</sup>Over period 1975-1991. <sup>2</sup>Assumed. Weights in '000 t, recruitment in millions.

**Catches:** Greater than 40,000 t during the mid-1970s, declining to 20,000 t in 1980. Catches increased to 40,000 t in 1986 but have since declined, reaching a record-low level of 17,000 in 1991 (Table 3.6.8).

**Data and assessment:** Analytical assessment of catch-at-age data using CPUE data tuned with five fleets. No independent estimates of year-class strength.

**Fishing mortality:** Remained less than 0.5 between 1975 and 1985, increasing sharply to 0.76 in 1989 and declining slightly in 1990 and 1991 (Figure 3.6.8.1). Since 1986, fishing mortality has exceeded the long-term mean and been above  $F_{high}$  (= 0.38).

**Recruitment:** Variable, generally between 20 million and 40 million.

**State of stock:** SSB has declined since 1985 and is currently at a record-low level.

#### Forecast for 1993: (Figure 3.6.8.2)

Assuming  $F(92) = 0.63$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 15.5.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$SSB_{94} = SSB_{91}$	0.21	12.6	-	6.3	19.0	SSB at record low level of 1991.
B	$F_{max}$	0.23		-	7.0	18.6	
C	$F_{med}$	0.28		-	8.1	17.6	
D	$F_{high}$	0.38		-	10.7	15.8	
E	0.8F(91)	0.50		-	13.5	13.8	SSB below record low level of 1991.
F	1.0F(91)	0.63		-	16.0	12.0	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a continuing decline in SSB to new record low levels.

**Management advice:** The spawning biomass was at its historical minimum in 1991 and is expected to decline further in 1992 and 1993. The stock is considered to be outside safe biological limits and current fishing mortality exceeds  $F_{high}$ . ACFM recommends that, as a first step, the spawning biomass be rebuilt to the 1991 level of 19,000 t. This would correspond to  $F = 0.21$  and a catch in 1993 of 6,300 t.

### 3.6.9 Megrim in Sub-area VI

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-	-	-	-
Agreed TAC	-	3.9	4.4	4.84	4.84	4.84	4.84	4.84	4.84	3.90	4.6
Official landings	3.8	2.8	3.9	4.5	n/a	n/a	n/a	-	4.20	2.80	3.7
Catch as used by WG <sup>2</sup>	-	-	-	-	-	2.9	2.7	-	-	-	-

<sup>1</sup>Over period of available data above. <sup>2</sup>Division VIa. Weights in '000 t.

**Catches:** Catches comprise two species: *Lepidorhombus whiffiagonis* and *L. boscii*. Official landings (Table 3.6.9) are not considered to be representative of actual landings, due to misreporting.

**Data and assessment:** Age-based data available for 2 years. Steady-state VPA of average age composition was performed and used as input to a yield-per-recruit analysis. Results must be viewed cautiously.

**Fishing mortality:** Indicated to be between 0.6 and 0.8 on older age groups and is currently at or above  $F_{max}$ .

**Recruitment:** No information.

**State of stock:** The analysis is rudimentary and the status of the stocks is not known with certainty. Nevertheless, it does indicate that the stocks are fully exploited on the basis of yield-per-recruit considerations.

**Forecast for 1993:** Not available.

**Management advice:** Megrim are taken in a mixed fishery and any increase in fishing effort on megrim would adversely affect other stocks. ACFM notes that no gains in long-term yield will be obtained from an increase in fishing mortality.

### 3.6.10 Anglerfish in Sub-area VI

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-	-	-	-
Agreed TAC	-	7.5	7.8	8.6	8.6	8.6	8.6	8.6	8.6	7.5	8.3
Official landings	5.1	4.4	5.2	7.7	n/a	n/a	n/a	-	7.7	4.4	5.6
Catch as used by WG <sup>2</sup>	-	-	-	-	-	5.8	5.4	-	-	-	-

<sup>1</sup>Over period of available data above. <sup>2</sup>Division VIa. Weights in '000 t.

**Catches:** Catches comprise two species: *Lophius piscatorius* and *L. budegassa*. Official landings are not considered to be representative of actual landings, due to misreporting (Tables 3.6.10.1 and 3.6.10.2).

**Data and assessment:** Age- and length-based steady-state VPA was used to provide input to age- and length-based yield-per-recruit analyses.

**Fishing mortality:** Indicated to be between 0.55 and 0.75 on older age groups and is above  $F_{max}$ .

**Recruitment:** No information.

**State of stock:** The analysis is rudimentary and the status of the stocks are not known with certainty. Nevertheless, it does indicate that the stocks are fully exploited on the basis of yield-per-recruit considerations.

**Forecast for 1993:** Not available.

**Management advice:** Anglerfish are taken in a mixed fishery and any increase in fishing effort on anglerfish would adversely affect other stocks. ACFM notes that no gains in long-term yield will be obtained from an increase in fishing mortality.

### 3.6.11 Blue ling, ling and tusk stocks in Sub-areas V, VI and XIV

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

**Special comments:** Catch data are presented in Tables 3.6.11.1 - 3.6.11.14.

It is at present not possible to conduct any assessments of these stocks. Improved data on catch and effort should be made available, if at all possible.

### 3.7 Demersal Stocks in the Irish Sea

#### 3.7.1 Overview

Current fishing mortalities are very high for cod and whiting stocks in Division VIIa, and SSB in 1991 was at its lowest level on record for cod and close to its lowest recorded level for whiting. For cod, the strong 1990 year class will lead to an increase in SSB, but continuing high fishing mortality will cause this effect to be short-lived (as occurred with the very strong 1986 year class at similar levels of F). The predictions for whiting in 1993 are of low quality because of the poor assessment data and uncertainties about the effect on discards of the introduction of square mesh panels.

For plaice, fishing mortality has been above the long-term mean since 1986 and catches have declined continuously from the highest on record in 1987 to the lowest on record in 1991. Spawning biomass in 1991 was close to the lowest recorded value but, as with catches, is expected to rise at *status quo* fishing mortality. It should be noted that the predictions of catch and biomass are based upon the assumption that the 1990 and subsequent year classes are all at average levels.

The spawning stock biomass of sole was at a low level in 1991 but the fishing mortality in 1991 was reduced to a level that would allow the stock to rebuild, without loss of yield in the long term. In the short term, the spawning biomass is expected to remain at a low level, and ACFM recommends that fishing mortality should not be allowed to increase.

The current status of the demersal stocks in the Irish Sea thus gives cause for great concern. In almost all of the stocks, spawning stock biomass is at or near record-low levels and fishing mortality is high and excessive. Recent recruitment has generally been below-average or poor. In the few instances where strong year classes have occurred, these cohorts have been rapidly fished down and the potential that these year classes offered for rebuilding spawning stock biomass has been sacrificed for increased short-term yields. As a consequence of all of these factors, the present condition of all of the Irish Sea demersal stocks is such that they are now considered to be outside safe biological limits or close to being so. To rectify this situation, ACFM this year has given firm recommendations in its advice for each of the stocks. These recommendations are aimed at averting the danger of recruitment overfishing and restoring the size of the spawning stock to higher and safer levels.

Concerns over data are described in Section 3.6.1.

3.7.2 Cod in Division VIIa (Irish Sea)

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	8.8	10.7	10.3	10.1	≤13.4	15.3	6.0	10.0			
Agreed TAC	15.0	15.0	15.0	15.0	15.0	15.3	10.0	10.0			
Official landings	11.1	10.1	13.2	15.8	11.3 <sup>3</sup>	n/a <sup>2</sup>	n/a <sup>2</sup>	-			
Unallocated landings	-0.6	-0.2	-0.3	-1.7	1.5	-	-	-			
Discards/slipping	None recorded										
Catch as used by WG	10.5	9.9	12.9	14.2	12.8	7.4	6.7	-	14.9	6.3	9.9
Sp. stock biomass	6.2	5.8	6.2	6.0	6.0	3.7	2.5	3.4	10.2	2.5	7.0
Recruitment (age 1)	6.5	5.3	15.1	7.1	3.0	3.7	11.9	7.5	15.1	2.7	6.7
Mean F(2-5,u)	0.88	0.91	0.95	1.00	1.21	1.20	1.14	-	1.21	0.53	0.82

<sup>1</sup>Over period 1968-1991. <sup>2</sup>Incomplete. <sup>3</sup>Preliminary. Weights in '000 t, recruitment in millions.

Catches: Variable, ranging from 6,000 t to 15,000 t during 1968-1991. Catches declined sharply in 1990 and 1991 t to about 7,000 t (Table 3.7.2).

Data and assessment: Analytical age-based assessments tuned with CPUE data for two fleets. CPUE data have been revised. Inconsistencies in the tuning CPUE series, noted for the past two years, have been ameliorated. Recruitment for 1990 and 1991 year classes estimated from survey data.

Fishing mortality: Ranged from 0.5 to 0.8 between 1968 and 1981, increasing to over 1.0 since 1988 (Figure 3.7.2). Fishing mortalities since 1988 have been the highest on record.

Recruitment: Generally ranged from 5 million to 10 million, occasionally up to 15 million and as low as 3 million. The 1988 and 1989 year classes were among the poorest recorded, but the 1990 and 1991 year classes are estimated to be above average.

State of stock: Spawning stock biomass has declined sharply since 1989 and reached a historically low level in 1991.

Forecast for 1993:

Assuming F(92) = 0.94, Basis: TAC, Catch(92) = Not calculated, Landings (92) = 10.0.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	F <sub>med</sub>	0.80	6.6	-	10.2	7.8	SSB and F at average levels
B	F(92)	0.94	6.0	-	11.5	6.5	Short-term increase in catch and SSB
C	1.00 F(91)	1.14	5.6	-	13.1	4.9	Short-term increase in catch, decline in SSB after 1993

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a small and temporary increase in catch and SSB due to the strong 1990 year class.

Management advice: The spawning biomass was at its lowest historical level in 1991, but is expected to increase in 1993 and 1994 due to the 1990 year class. Nevertheless, the current very high fishing mortality rates will cause the stock to decline and there is a high probability that the stock will be outside safe biological limits in the near future. ACFM, therefore, recommends that fishing mortality in 1993 be reduced to F<sub>med</sub> (F = 0.8) corresponding to the TAC in 1993 of 10,200 t.

**Special comments:**

- 1) The relatively large 1990 year class gives an opportunity to simultaneously decrease fishing mortality whilst increasing catches and spawning stock biomass. The high fishing mortalities did not allow the bigger 1986 year class to make a significant contribution to spawning biomass.
- 2) Multispecies studies indicate that large reductions in the mortality of cod will decrease the yield of *Nephrops* and the combined yield. Nevertheless, to ensure a sustained recovery of cod, fishing mortality rates need to be significantly reduced.



### 3.7.3 Whiting in Division VIIa (Irish Sea)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	13.4	16.0	16.0	12.0	≤11.0	8.3 <sup>3</sup>	6.4 <sup>3</sup>	9.7 <sup>3</sup>			
Agreed TAC	18.2	18.2	18.2	18.2	18.2	15.0	10.0	10.0			
Official landings	16.8	10.0	11.7	11.5	11.3	n/a <sup>4</sup>	n/a <sup>4</sup>	-			
Unallocated landings	-0.8	+	-1.0	-1.5	0.1	-	-	-			
Discards from <i>Nephrops</i> fishery	2.3	2.3	3.7	1.9	2.0	2.7	2.7	-	3.7	0.9	1.4
Catch as used by WG	18.2	12.4	14.4	11.9	13.2	10.7	9.6	-	20.6	9.6	14.4
Sp. stock biomass	9.4	7.0	7.5	9.5	6.5	5.3	5.7	6.1	15.4	5.3	8.8
Recruitment (age 0)	120	174	91	100	126	104	110 <sup>2</sup>	110 <sup>2</sup>	184	63	117
Mean F(2-5,u)	1.25	1.32	1.04	1.03	1.64	1.35	1.21	-	1.64	0.82	1.16

<sup>1</sup>Over period 1980-1991. <sup>2</sup>Assumed. <sup>3</sup>Not including discards from the *Nephrops* fishery. <sup>4</sup>Incomplete. Weights in '000 t, recruitment in millions. + less than 50 t.

**Catches:** Declining gradually since 1981; in 1991 catches reduced to 9,600 t, the lowest level recorded (Table 3.7.3).

**Data and assessment:** Analytical age-based assessments tuned with CPUE data for three fleets. CPUE data have been revised. Inconsistencies in the tuning CPUE series, noted for the past two years, have been ameliorated. Effects of square mesh introduction included in predictions.

**Fishing mortality:** Since 1982 fishing mortality has remained high, i.e., above 1.0 (Figure 3.7.3).

**Recruitment:** Ranged from 63 million to 184 million. The 1989 and 1990 year classes are near average.

**State of stock:** Spawning stock biomass has shown a decline since 1981 to a historic low level in 1990. SSB increased slightly in 1991, but remains below the long-term average.

#### Forecast for 1993:

Assuming  $F(92) = 1.18^1$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = NSM 7.6; SM 7.8

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.7xF(91) NSM	0.83	7.1	-	6.5	8.6	SSB near average, low landings.
	SM	0.83	8.3	-	7.7	11.0	SSB well above average, low landings.
B	0.8 F(91) NSM	0.95	7.0	-	7.2	7.8	Small increase in SSB.
	SM	0.95	8.1	-	8.5	10.1	Large increase in SSB.
C	1.0 F(91) NSM	1.18	6.4	-	8.4	6.6	SSB remains at below-average.
	SM	1.18	7.5	-	9.9	8.5	Rise in SSB and landings.

Weights in '000 t. <sup>1</sup>The prediction is based on landings only.

SM = Square mesh prediction (to all *Nephrops* fleets). NSM = No square mesh prediction.

Continued fishing at current levels of fishing mortality will lead to a slight increase in landings and maintain SSB at below-average values for the "no square mesh prediction", and result in an increase in SSB and landings with the introduction of square mesh. (The "no square mesh" option is likely to be nearer to the correct value.)

**Management advice:** The fishing mortality rates on this stock are extremely high and there is a high probability that the stock is currently outside safe biological limits or will become so in the near future. To reduce fishing mortality rates and to bring the spawning stock biomass to near its average level, ACFM recommends that fishing mortality in 1993 be reduced by 30% to  $F = 0.83$  corresponding to a TAC in 1993 of 6,500 t.

**Special comments:** Predictions with square mesh assume a 50% reduction in discard fishing mortality and are intended to provide a possible upper limit to the benefits resulting from the use of square-mesh panels (Figure 3.7.3 C-F). Predictions without square mesh are intended to provide a lower limit. However, the extent of usage of the square mesh in the UK and its commercial efficiency is uncertain, and Ireland has not adopted the square mesh panels. Consequently it is thought that the NSM option provides the more probable estimates.

### 3.7.4 Plaice in Division VIIa (Irish Sea)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	4.0	5.0	5.0	4.8	5.8	5.1	3.3	3.0			
Agreed TAC	5.0	5.0	5.0	5.0	5.8	5.1	4.5	3.8			
Official landings	6.1	4.6	5.6	4.4	4.2	n/a	n/a	-			
Unallocated landings	-1.0	+	0.4	0.4	0.2	-	-	-			
Discards/slipping	-	0.3	0.3	0.2	-	-	-	-			
Catch as used by WG	5.1	4.8	6.2	5.0	4.4	3.3	2.5	-	6.2	2.5	4.1
Sp. stock biomass	6.4	7.0	6.5	6.5	5.8	4.6	3.4	3.5	10.3	3.1	6.6
Recruitment (age 1)	16.2	19.0	20.0	10.9	5.8	12.8	15.8 <sup>2</sup>	15.8 <sup>2</sup>	33.8	5.8	16.7
Mean F(3-6,u)	0.55	0.54	0.78	0.75	0.62	0.67	0.69	-	0.81	0.29	0.58

<sup>1</sup>Over period 1964-1991. <sup>2</sup>Assumed. Weights in '000 t, recruitment in millions. + less than 50 t.

**Catches:** Variable, ranging from 2,500 t to 6,200 t; recent catches have declined sharply from 6,200 t in 1987 to 2,500 t in 1991, the lowest level recorded (Table 3.7.4).

**Data and assessment:** Analytical assessment based on catch-at-age and commercial CPUE data. Recruitment indices from surveys.

**Fishing mortality:** Variable, ranging from 0.3-0.5 during 1964-1970, increasing to 0.7-0.8 during 1973-1977 and 1987-1988 (Figure 3.7.4). F is currently slightly below the recent high levels, but remains above the long-term mean.

**Recruitment:** Variable, generally fluctuating between 10 million and 20 million. Recent year classes have been relatively poor following above-average recruitment from the 1981-1983 and 1985-1986 year classes.

**State of stock:** Spawning stock biomass has gradually declined since 1986 to be just above the historic low 1977 level.

#### Forecast for 1993:

Assuming  $F(92) = 0.69$ , Basis:  $F(91)$ , Catch(92) = Not calculated, Landings (92) = 2.9 t.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{\max}(=0.6 \times F91)$	0.42	4.0	-	2.2	5.2	Increase in SSB to above 1990 level.
B	$F_{\text{med}}(=0.72 \times F91)$	0.50	4.0	-	2.6	4.8	
C	0.8 F(91)	0.55	3.9	-	2.8	4.6	SSB increases to 1990 level.
D	1.0 F(91)	0.69	3.8	-	3.3	4.1	Increase in SSB.
E	1.2 F(91)	0.83	3.7	-	3.8	3.7	Continued decline in SSB.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to catches around recent levels and a slow recovery of the spawning stock.

**Management advice:** Current fishing mortality rates are high and the SSB is near a historically low level. As a result, there is a high probability that the stock will be outside safe biological limits in the near future. To restore the biomass to its 1990 level (4,600 t), ACFM recommends that fishing mortality in 1993 be no more than 0.55 corresponding to a TAC in 1993 of 2,800 t.

### 3.7.5 Sole in Division VIIa (Irish Sea)

**Source of information:** Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:2).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	1.1	1.65	1.9	1.6	<1.48	1.5	1.3	- <sup>3</sup>			
Agreed TAC	1.25	1.9	2.1	1.75	1.48	1.5	1.5	1.35			
Official landings	1.7	1.9	2.0	1.9	1.8	n/a	n/a	-			
Unallocated landings	-0.5	0.1	0.8	0.1	0.0	-	-	-			
Discards/slipping	None recorded										
Catch as used by WG	1.1	2.0	2.8	2.0	1.8	1.6	1.2	-	2.8	1.1	1.6
Sp. stock biomass	4.5	6.0	7.8	6.4	5.1	4.2	3.5	3.8	7.8	3.2	4.9
Recruitment (age 2)	16.7	25.2	3.7	3.9	6.0	4.6	8.8	5.7	25.2	2.4	8.6 <sup>2</sup>
Mean F(4-7,u)	0.34	0.44	0.82	0.52	0.49	0.53	0.36	-	0.82	0.34	0.46

<sup>1</sup>Over period 1970-1991. <sup>2</sup>1970-1988. <sup>3</sup>No long-term gains in yield by increasing F. Weights in '000 t, recruitment in millions.

<sup>4</sup>1970-1988.

**Catches:** Landings in 1991 were less than half the peak level of 1987 and near record low (Table 3.7.5).

**Data and assessment:** Analytical age-based assessment tuned with CPUE data for two fleets. Recruitment indices based on commercial and survey data.

**Fishing mortality:** Fishing mortality in recent years has been close to the long-term average, which is just above  $F_{med}$  and  $F_{max}$  (Figure 3.7.5).

**Recruitment:** The year classes of 1982-1984 were all high. Subsequently, all year classes have been poor except for that of 1989 which is estimated at just above average.

**State of stock:** The spawning stock biomass in 1991 was at a record-low level.

#### Forecast for 1993:

Assuming  $F(92) = 0.51$ , Basis: TAC, Catch(92) = Not calculated, Landings (92) = 1350 t.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.6xF(91)	0.22	3500	-	590	4100	Well below average catch. SSB in 1994 above minimum.
B	0.8xF(91)	0.29	3400	-	760	3800	
C	1.0xF(91)	0.36	3400	-	920	3600	
D	F(92)	0.51	3400	-	1210	3300	Below average catch. SSB in 1994 just above historical minimum.
							SSB at historical minimum level.

Weights in t.

Continued fishing at current levels of fishing mortality will lead to slight declines in both catches and SSB. SSB currently low but will recover in the longer term under average recruitments.

**Management advice:** SSB has declined since 1987 and is currently near a record-low level. In order to prevent further decline of SSB which may bring the stock outside safe biological limits, ACFM recommends that fishing mortality in 1993 should not be above the level of 1991 ( $F = 0.36$ ), corresponding to a TAC in 1993 of not more than 920 t.

### 3.8 Demersal Stocks in the Celtic Sea and Western English Channel

#### 3.8.1 Celtic Sea cod (Divisions VIIf and g)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	≤7.0	5-6	<6.4	7.0	8.6	9.2	4.5	- <sup>3</sup>			
Agreed TAC	TAC covers Sub-areas VII (except Division VIIa) and VIII										
Catch as used by WG	6.2	8.0	7.9	12.0	15.3	8.7	6.0	-	15.3	2.1	5.9
Sp. stock biomass	6.9	7.6	5.6	5.3	13.2	9.8	5.0	4.6	13.2	3.0	5.8
Recruitment (age 1)	2.5	2.1	12.9	5.6	1.7	2.7	5.9	2.9 <sup>2</sup>	12.9	0.4	2.9
Mean F(2 - 5,u)	0.60	0.93	0.92	0.80	0.92	0.97	0.96	-	0.97	0.39	0.71

<sup>1</sup>Over period 1971-1991. <sup>2</sup>Assumed. <sup>3</sup>Reduce fishing mortality. Weights in '000 t, recruitment in millions.

**Catches:** Decreased sharply in 1990 and 1991 as a result of the 1986 and 1987 year classes being fished down (Table 3.8.1).

**Data and assessment:** Age-based analytical assessment, using catch-per-unit effort data from one fleet. Recruitment estimated from commercial CPUE of 2-year-olds.

**Fishing mortality:** At the highest level ( $F \approx 1.0$ ) in the series in 1989 and 1991 (Figure 3.8.1).  $F_{\max}$  estimated to be at 30% of current F.

**Recruitment:** After the very good 1986 year class, returns to average levels.

**State of stock:** SSB has been decreasing since 1989.

#### Forecast for 1993:

Assuming  $F(92) = 0.96$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 8.8.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{\max}$	0.29	6.9	-	3.0	10.4	Large increase in SSB.
B	$0.6 \times F_{91}$	0.58	6.5	-	5.3	7.2	Above average SSB.
C	$0.8 \times F(91) \sim F_{\text{med}}$	0.77	6.2	-	6.5	5.7	SSB increasing to average level.
D	$F(91)$	0.96	6.0	-	7.5	4.4	SSB decreasing.
E	$1.2 \times F(91)$	1.16	5.7	-	8.4	3.5	SSB decreasing rapidly.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a decrease in SSB.

**Management advice:** Despite the recent decrease in SSB, this stock is not considered at present to be outside safe biological limits. However, fishing mortality for this stock is high. At such levels, catches and stock size are highly dependent on incoming recruitment, and the occurrence of two poor year classes in a row might suffice to deplete the stock. A significant cut back in fishing mortality is required to avoid this situation. ACFM, therefore, recommends that fishing mortality in 1993 be reduced to 80% of the 1991 level (approximating  $F_{\text{med}}$ ) corresponding to a 1993 TAC of 6,500 t.

**Special comments:** The Celtic Sea cod stock is heavily exploited. 75% of the 1991 catches in number comprised 1- and 2-year old fish. A decreasing trend in the mean weights at age is apparent; this also contributes to the decrease in SSB.

Any TAC for this stock should apply to the assessment area (Divisions VIIf,g).

### 3.8.2 Celtic Sea whiting (Divisions VIIf and g)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	8-10	7.1	7.0	7.9	8.4	8.0	8.0 <sup>3</sup>			
Agreed TAC	TAC covers Sub-area VII (except Division VIIa)										
Catch as used by WG	7.3	6.8	8.7	9.7	12.4	10.1	9.5	-	12.4	6.8	8.8
Sp. stock biomass	8.9	9.2	9.8	17.6	22.2	14.0	10.5	11.1	22.2	7.8	11.8
Recruitment (age 1)	24.6	33.0	63.3	54.6	16.5	26.3	34.6	29.0 <sup>2</sup>	63.3	16.4	31.4
Mean F(2 - 5,u)	1.20	1.15	1.41	1.1	1.1	1.0	1.2	-	1.5	1.0	1.2

<sup>1</sup>Over period 1982-1991. <sup>2</sup>Assumed. <sup>3</sup>Precautionary. Weights in '000 t, recruitment in millions.

**Catches:** Fluctuating, but catches since 1988 have been the highest in the 1982-1991 time series (Table 3.8.2).

**Data and assessment:** Age-based analytical assessment, using catch-per-unit effort data from one fleet. Recruitment estimated from commercial CPUE of 2-year-olds.

**Fishing mortality:** At very high levels ( $F > 1.0$ ), but no trend is apparent (Figure 3.8.2).

**Recruitment:** Fluctuating widely, with strong 1986 and 1987 year classes. Year class 1990 is about average.

**State of stock:** SSB has been decreasing since the peak value in 1983, but remains within the range of observations.

#### Forecast for 1993:

Assuming  $F(92) = 1.2$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 7.9.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.8x $F(91)$	1.0	11.0	-	6.6	11.4	SSB increases to about average level.
B	$F(91)$	1.2	10.7	-	7.7	10.2	SSB near long-term average.
C	1.2x $F(91)$	1.5	10.3	-	8.6	9.2	SSB decreasing slightly.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to little change in SSB in the short term.

**Management advice:** Despite the very high fishing mortalities, SSB is within the range of past observations and recruitment fluctuates about the mean level. The stock is, therefore, considered to be within safe biological limits.

**Special comments:** Decreasing fishing mortality from the current high levels would be advantageous for long-term yield and stability. This may be achieved if measures are taken similar to those recommended to reduce fishing on Celtic Sea cod, which is caught by the same fleets as whiting.

As for Celtic Sea cod, a decreasing trend in mean weights at age is apparent.

Any TAC for this stock should apply to the assessment area (Divisions VIIf,g).

### 3.8.3 Celtic Sea plaice (Divisions VIIIf and g)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	1.3	1.6	-	-	-	~1.9	~1.7	- <sup>3</sup>			
Agreed TAC	1.8	1.8	1.8	2.5	2.5	1.9	1.9	1.5			
Official landings	1.4	1.5	1.9	2.1	2.2	n/a	n/a	-			
Unallocated	0.4	0.2	-	-	-	-	-	-			
Catch as used by	1.8	1.7	1.9	2.1	2.2	2.1	1.5	-	2.2	0.8	1.5
Sp. stock biomass	2.2	2.8	2.8	2.8	2.4	2.4	1.9	1.6 <sup>2</sup>	2.8	0.8	1.9
Recruitment (age 1)	8.6	8.6	11.0	6.8	3.6	6.1 <sup>2</sup>	6.1 <sup>2</sup>	6.1 <sup>2</sup>	11.0	2.1	6.5
Mean F(3 - 6,u)	0.63	0.58	0.58	0.76	0.73	0.88	0.79	-	0.88	0.50	0.66

<sup>1</sup>Over period 1977-1991. <sup>2</sup>Assumed. <sup>3</sup>No long-term gains in yield by increasing F. Weights in '000 t, recruitment in millions.

**Catches:** Catches increased to 1988, remained high during 1988-1990, and dropped in 1991 (Table 3.8.3).

**Data and assessment:** Age-based analytical assessment using CPUE for two fleets. Sampling of the length composition of the catches should be improved.

**Fishing mortality:** Stable up to 1987, higher in recent years (Figure 3.8.3.1).

**Recruitment:** 1986 year class was twice the average strength, the 1987 year class was average and the 1988 year class was poor. Subsequent year classes were assumed to be average.

**State of stock:** SSB has been high, but has declined since 1988.

#### Forecast for 1993:

Assuming  $F(92) = 0.79$ , Basis:  $F(92) = F(91)$ ,  $Catch(92) =$  Not calculated,  $Landings(92) = 1.36$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.8xF(91)	0.63	1.7	-	1.2	1.9	SSB returns to average level.
B	1.0xF(91)	0.79	1.6	-	1.4	1.6	Catch and SSB stable at 1992 level.
C	1.2xF(91)	0.94	1.6	-	1.6	1.5	Small increase in catch, SSB declines.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to little change in catch and SSB.

**Management advice:** SSB is currently slightly below the long-term mean. Despite high fishing mortalities, the stock is considered to be within safe biological limits. ACFM notes, however, that no gains in long-term yield will be obtained from an increase in fishing mortality.

**Special comments:** Plaice are taken in a mixed otter trawl fishery and as a by-catch in the beam trawl fishery for sole. Effects on plaice of a departure from *status quo* fishing mortality for sole, and vice versa, should be considered (see Figure 3.8.3.2).

### 3.8.4 Celtic Sea sole (Divisions VIIf and g)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	≤1.2	-	-	0.9	1.0	1.2	1.1	-			
Agreed TAC	1.2	1.5	1.6	1.1	1.0	1.2	1.2	1.2			
Catch as used by WG	1.33	1.55	1.22	1.15	1.00	1.19	1.11	-	1.9	0.8	1.2
Sp. stock biomass	2.9	3.0	2.5	2.1	1.9	1.6	2.1	2.1	4.6	1.6	3.1
Recruitment (age 2)	4.2	4.9	2.7	5.1	4.3	4.0	5.2	4.2 <sup>2</sup>	8.2	2.6	4.2
Mean F(4-8,u)	0.44	0.44	0.60	0.62	0.63	0.89	0.65	-	0.89	0.20	0.42

<sup>1</sup>Over period 1970 -1991. <sup>2</sup>Assumed. Weights in '000 t, recruitment in millions.

**Catches:** Catches have been relatively stable over the last decade (Table 3.8.4).

**Data and assessment:** Age-based analytical assessment, using catch-per-unit effort data from one fleet. Recruitment estimated from commercial catches of 3-year-olds.

**Fishing mortality:** Increased from about 0.28 in the 1970s to 0.89 in 1990, then declined to 0.65 in 1991 (Figure 3.8.4). Recent levels in excess of  $F_{\max}$  (= 0.26) and  $F_{\text{high}}$  (= 0.55).

**Recruitment:** Has been relatively stable. The 1989 year class currently appears to be strong.

**State of stock:** SSB has declined from an average of 3,600 t in the 1970s to 2,800 t in the 1980s and then to a minimum value of 1,600 t in 1990. SSB subsequently increased to 2,100 t in 1991. However, an alternative assessment based on egg production estimates suggests that there may be some uncertainty in the estimated level of stock size and associated mortality.

#### Forecast for 1993:

Assuming  $F(92) = 0.65$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 1.0.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{\max}$	0.26	2.3	-	0.50	2.8	Increases to near long-term mean.
B	$F_{\text{mod}}$	0.40	2.1	-	0.70	2.4	Slight increase in SSB.
C	$0.8 \times F_{91} \sim F_{\text{high}}$	0.52	2.1	-	0.86	2.2	SSB stable at low 1993 level.
D	$F_{91}$	0.65	2.0	-	1.03	2.0	SSB declines from 1991 level.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a slight decrease of SSB from the 1991 level.

**Management advice:** Fishing mortality has been high, resulting in a decrease of SSB since 1986 to a record low level in 1990. However, recruitment has been stable and a strong year class is expected, which will enhance SSB. Therefore, the stock is not considered to be outside safe biological limits. ACFM notes, however, that no long-term gains in yield would be realized by increasing fishing mortality.

**Special comments:** Sole and plaice in the Celtic Sea are taken in a mixed fishery. If departure from *status quo* fishing mortality is implemented for either species, the implications for the associated species should be considered.



### **3.8.5 Cod in Division VIIe (Western English Channel)**

Officially reported landings data are very incomplete for recent years. Landings as estimated by the Working Group are given in Table 3.8.5.

Data not available for an analytical assessment.

Cod in Division VIIe is managed by means of a TAC applicable to all cod stocks in Sub-area VII, with the exception of Division VIIa.

### **3.8.6 Whiting in Division VIIe (Western English Channel)**

Landings are given in Table 3.8.6.

The same comments given for cod above apply to whiting in this Division.

### 3.8.7 Plaice in Division VIIe (Western English Channel)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC (VIIId,e)	5.4	6.2	6.8	6.9	11.7	10.7	8.8	-			
Agreed TAC (VIIId,e)	6.5	6.9	8.3	9.96	11.7	10.7	10.7	9.6			
Official landings	1.3	1.7	1.9	2.4	2.3	n/a <sup>2</sup>	n/a <sup>2</sup>	-			
Unallocated landings	0.1	0.1	0.1	0.1	0.1	-	-	-			
Catch as used by WG	1.4	1.8	2.0	2.5	2.4	2.6	1.8	-	2.6	0.6	1.6
Sp. stock biomass	2.4	2.5	2.2	3.1	3.4	3.2	2.4	1.8	3.4	1.1	2.2
Recruitment (age 1)	6.5	13.1	11.5	8.2	3.1	5.0	4.6	5.9	13.1	2.6	5.5
Mean F(3 - 7,u)	0.54	0.54	0.64	0.47	0.66	0.77	0.74	-	0.77	0.43	0.56

<sup>1</sup>Over period 1976-1991. <sup>2</sup>Not reported for all countries. Weights in '000 t, recruitment in millions.

**Catches:** Increased steadily since late 1970s, at a peak during 1988-1990, now falling (Table 3.8.7).

**Data and assessment:** Analytical age-based assessment, tuned with CPUE data from two commercial fleets and a trawl survey.

**Fishing mortality:** Stable during 1979-1988, and has since increased to record-high levels (Figure 3.8.7). Current F is far above  $F_{max}$  (= 0.29).

**Recruitment:** 1985-1987 year classes strong. 1988 below average.

**State of stock:** SSB has been high, but has recently declined.

#### Forecast for 1993:

Assuming  $F(92) = 0.74$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 1.4.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{max}$	0.29	1.8	-	0.6	2.4	SSB held at 1991 level.
B	$0.8 \times F(91)$	0.59	1.7	-	1.1	1.9	SSB slightly below average level.
C	$F_{med}$	0.66	1.6	-	1.2	1.7	Reduced catch, SSB below average level.
D	$1.0 \times F(91)$	0.74	1.6	-	1.3	1.7	Slight catch reduction, SSB below low 1992 level.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a further decrease of catches and SSB.

**Management advice:** Fishing mortality is currently high, resulting in a marked decrease in SSB since 1989. However, SSB is within the range of past observations and the stock is not considered to be outside safe biological limits.

**Special comments:** A reduction of fishing mortality should be advantageous in two respects:

- in the long term there would be gains in the yield of plaice;
- in the short term this would be beneficial for the stock of the Western English Channel (Division VIIe) sole which is partly taken by the same fleets, and which is currently in a critical state.

ACFM notes that problems with the assessments of both plaice and sole arise due to the differential status of the TACs for plaice (Divisions VIIId and e combined) versus that for sole (Division VIIe only), as this may result in misreporting of catches.

### 3.8.8 Sole in Division VIIe (Western English Channel)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	1.3	1.3	1.3	1.3	1.0	0.9	0.54	0.77			
Agreed TAC	1.4	1.3	1.15	1.3	1.0	0.9	0.8	0.8			
Official landings	1.1	1.5	1.1	0.9	0.8	n/a <sup>2</sup>	n/a <sup>2</sup>	-			
Unallocated	0.3	-0.1	0.1	0.4	0.4	-	-	-			
Catch as used by	1.4	1.4	1.2	1.4	1.2	1.1	0.7	-	1.5	0.4	0.9
Sp. stock biomass	3.8	3.8	3.4	3.4	2.6	2.2	1.9	2.6	5.5	1.9	3.4
Recruitment (age 1)	3.4	5.2	3.1	3.0	2.2	8.7	5.3	3.9	8.7	1.1	4.4
Mean F(3 - 7,u)	0.44	0.41	0.36	0.44	0.52	0.51	0.40	-	0.52	0.16	0.30

<sup>1</sup>Over period 1969-1991. <sup>2</sup>Not reported for all countries. Weights in '000 t, recruitment in millions.

**Catches:** Have been decreasing since 1985 (Table 3.8.8). Catch in 1991 was the lowest since 1978.

**Data and assessment:** Analytical age-based assessment tuned using data from two commercial fleets and a trawl survey. Data series and sampling satisfactory.

**Fishing mortality:** Increased in the 1980s, peaking at record-high values in 1989-1990 (Figure 3.8.8). Fishing mortality decreased in 1991, but remains above  $F_{high}$  (= 0.36).

**Recruitment:** 1986-1988 year classes below average. 1989 year class appears to be highest for the series. 1990 year class above average.

**State of stock:** SSB has been decreasing continuously since 1982, reaching a record-low level in 1991.

#### Forecast for 1993:

Assuming  $F(92) = 0.40$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 1.0.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{med}$	0.26	2.8	-	0.7	3.0	SSB close to mean level.
B	$F_{max}$	0.32		-	0.9	2.8	Small increase in catch and SSB.
C	$F_{high}$	0.36		-	1.0	2.7	Slight increase in SSB.
D	$1.0 \times F(91)$	0.40		-	1.1	2.6	SSB held at 1992 level.
E	$1.2 \times F(91)$	0.48		-	1.3	2.5	Catch increases to double 1991 level, SSB decreases.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to falling catches and SSB after a good year class passes through.

**Management advice:** The stock has been fished above the  $F_{high}$  level in the past decade, which ACFM considers to be outside safe biological limits. As an effect, the contribution of strong year classes to SSB has been very transient. ACFM recommends that this situation be rectified and this could be achieved, as a first step, by reducing fishing mortality in 1993 to the  $F_{med}$  level (a 35% reduction) corresponding to a TAC in 1993 of 700 t. SSB in 1994 would correspond to the lowest level which produced above-average recruitment in the past.

**Special comments:** This stock should be managed in conjunction with plaice in Division VIIe, as the two stocks are exploited by mixed species fisheries.

**3.8.9       Stocks in Divisions VIIb,c, h-k**

Officially reported landings of cod, whiting, plaice and sole in Divisions VIIb,c, h-k are given in Tables 3.8.9.1-3.8.9.4.

Data are not available for analytical assessment.

### **3.9 Demersal Stocks in the Eastern English Channel**

#### **3.9.1 Overview**

The databases for these stocks are deficient in various ways. The overall levels of landings are uncertain for all the stocks concerned and discard information is not available. There are insufficient effort data available for cod and whiting and problems associated with the age composition of cod landings.

It is thus not possible to assess all the stocks analytically. The basis for management advice is thus weak for these stocks.

#### **3.9.2 Cod in Division VIIId**

The Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak considered that data available too poor to use in an analytical assessment. Landings are given in Table 3.9.2. Recent landings are on a record low level, having decreased from a short-term upsurge in the mid eighties. The marked decline in catches in recent years may be an indication of a decreasing stock. If a TAC is to be set, the declining trend in catches should be taken into account

#### **3.9.3 Whiting in Division VIIId**

The Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak considered that data available too poor to use in an analytical assessment. Landings are given in Tables 3.9.3. The landings in recent years have been stable around the long-term mean. ACFM considers that there is no basis for providing management advice for the whiting stocks in Division VIIId.

#### **3.9.4 Haddock and saithe in Division VIIId**

Catches are negligible and official statistics are very incomplete for recent years (Tables 3.9.4.1 and 3.9.4.2).

3.9.5 Sole in Division VIId (Eastern English Channel)

**Source of information:** Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	2.3	2.6	3.1	3.4	3.8	3.7	3.4	≤2.7			
Agreed TAC	2.7	3.2	3.85	3.85	3.85	3.85	3.85	3.5			
Official landings	3.6	2.9	3.8	3.3	2.9	n/a <sup>3</sup>	3.7	-	3.8	1.8	3.0
Unallocated landings	0.3	1.0	1.1	0.6	1.3	-	0.6	-	2.2	0.3	1.0
Catch as used by WG	3.9	3.9	4.9	3.9	4.2	4.0	4.3	-	4.9	3.3	3.5
Sp. stock biomass	10.5	11.2	10.0	8.8	7.8	8.6	6.5	6.4	11.2	6.2	8.4
Recruitment (age 1)	12.8	26.7	10.8	24.3	13.1	19.7	20.4	18.2 <sup>2</sup>	26.7	10.8	19.2
Mean F(3 - 8,u)	0.30	0.37	0.56	0.40	0.57	0.42	0.55	-	0.57	0.28	0.42

<sup>1</sup>Over period 1980-1991. <sup>2</sup>Assumed. <sup>3</sup>Not reported for all countries. Weights in '000 t, recruitment in millions.

**Catches:** Relatively stable at a high level since peaking in 1987 (Table 3.9.5). Uncertainties about catch levels.

**Data and assessment:** Analytical age-based assessment. Data collected before 1983 are of poor quality but have improved considerably since 1985. Fishery-independent information from beam trawl survey.

**Fishing mortality:** VPA indicates that fishing mortality varies substantially from year to year and is currently at a high level (Figure 3.9.5).

**Recruitment:** Recruitment and beam trawl surveys indicate that 1989 year class may be higher than estimated. Recruitment in recent years appears to be average, but survey indices are not very reliable.

**State of stock:** SSB is close to the lowest historical level.

**Forecast for 1993:**

Assuming F(92) = 0.55, Basis: F(92) = F(91), Catch(92) = Not calculated, Landings (92) = 3.8.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	F(93)=0.7 F(91)	0.39	6.1	-	2.8	6.5	Stabilizes SSB at low 1991 level
B	F(93)=0.8 F(91)	0.44	-	-	3.0	6.2	SSB continues to decline.
C	F(93)=F(91)	0.55	-	-	3.6	5.7	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to further decline in SSB.

**Management advice:** SSB has declined to a new record-low level in 1991 and is expected to decline even further by the start of 1993. The current fishing mortality is close to a record high. ACFM considers this stock to be outside biological safe limits. To rebuild the SSB to its 1991 level, ACFM recommends that fishing mortality in 1993 should be reduced by 30% (F<sub>93</sub> = 0.39) corresponding to a TAC in 1993 of 2,800 t.

**Special comments:** The time series is very short and only reliable since 1983.

3.9.6 Plaice in Division VIId (Eastern English Channel)

Source of information: Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak, October 1992 (C.M.1993/Assess:5).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC (VIId,e)	5.4	6.2	6.8	6.9	11.7	10.7	8.8	-			
Agreed TAC (VIId,e)	6.5	6.9	8.3	9.96	11.7	10.7	10.7	9.6			
Official landings	6.0	5.7	7.9	9.1	6.7	n/a <sup>3</sup>	7.3	-	9.1	2.0	5.7
Unallocated landings	0.05	1.1	0.4	1.3	2.1	5.4	0.5	-	5.4	0.05	1.1
Catch as used by WG	6.0	6.8	8.3	10.4	8.8	9.0	7.8	-	10.4	3.3	6.7
Sp. stock biomass	6.4	6.8	11.1	10.1	10.8	11.3	9.3	10.1	11.3	5.0	7.9
Recruitment (age 1)	30.7	63.7	33.3	28.7	23.4	23.1	21.1	27.2 <sup>2</sup>	63.7	14.2	28.1
Mean F(2 - 6,u)	0.54	0.56	0.51	0.57	0.61	0.58	0.53	-	0.62	0.44	0.55

<sup>1</sup>Over period 1980-1991. <sup>2</sup>Assumed. <sup>3</sup>Not reported for all countries. Weights in '000 t, recruitment in millions.

Catches: Increased steadily up to 1988 (Table 3.9.6).

Data and assessment: Analytical age-based assessment with four tuning fleets. Data base improving.

Fishing mortality: Fishing mortality has been stable (0.5 - 0.6) since the 1980s (Figure 3.9.6).

Recruitment: High recruitment from the 1985 year class.

State of stock: Prior to 1986, SSB was around 6,000 t, but has since then been around 10,000 t.

Forecast for 1993:

Assuming F(92) = 0.53, Basis: F(92) = F(91), Catch(92): Not calculated, Landings (92) = 6.6.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	F(93)=0.6 F(91)	0.32	9.5	-	4.2	11.4	SSB remains stable at high level.
B	F(93)=0.8 F(91)	0.43		-	5.4	10.4	
C	F(93)=F(91)	0.53		-	6.4	9.5	
							SSB remains above long-term average.
D	F(93)=1.2 F(91)	0.64		-	7.3	8.6	SSB decreases but remains above long-term average.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to SSB remaining stable above the long-term average.

Management advice: The stock is considered to be within safe biological limits.

Special comments: Since plaice is mainly a by-catch in the mixed demersal fisheries, and given the recommended reduction of 30% of fishing mortality for Division VIId sole, the TAC should be set at a level that takes this into account.

## 4. STOCKS IN NEAFC REGIONS 2 AND 3

### 4.1 Hake in Sub-areas III, IV and VI-IX

Nominal landings of hake for 1987-1991 as officially reported to ICES are given in Table 4.1.

#### 4.1.1 Hake - Northern stock (Division IIIa, Sub-areas IV, VI and VII, and Divisions VIIIa,b)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	<sup>2</sup>	<sup>2</sup>	<sup>2</sup>	54	54	59	59	61.5 <sup>4</sup>			
Agreed TAC <sup>3</sup>	-	48.86	63.46	66.16	59.67	65.1	67.0	69.0			
Landings as used by WG	65.7	59.9	63.3	64.8	66.5	59.9	57.6	-	66.5	50.5	59.0
Discards/slipping	4.7	2.8	2.0	2.0	2.3	1.5	1.7	-	4.7	1.5	2.5
Catch as used by WG	70.3	62.6	65.3	66.8	68.8	61.4	59.3	-	70.3	52.9	61.5
Indicative of trends only											
Sp. stock biomass	439	387	384	330	306	259	249	-	439	249	333
Recruitment (age 0)	492	271	268	374	240	420	367 <sup>5</sup>	367 <sup>5</sup>	492	239	366
Mean F (1-4,u)	0.14	0.20	0.18	0.19	0.24	0.25	0.23	-	0.27	0.14	0.21

<sup>1</sup>Over period 1978-1991. <sup>2</sup>Based on recent landings. <sup>3</sup>Sum of area TACs corresponding to Northern stock plus Division IIa (EC zone only). <sup>4</sup>Precautionary. <sup>5</sup>Assumed. Weights in '000 t, recruitment in millions.

**Catches:** Relatively stable in the range 60,000-65,000 t during 1984-1990 with a peak in 1985, but decreased in 1991 to levels prevailing in 1978-1982 (Figure 4.1.1). Actual discards of about 2,000 t in each year, but large numbers of undersized fish are landed.

**Data and assessment:** Length-composition data by fishery unit available annually for 1978-1989 and quarterly for 1990-1991. Converted to age compositions by numerical methods. Analytical assessment tuned on four commercial fleets and one survey, but the results were considered to be indicative of trends only. There are doubts about the accuracy of the 1985 and 1986 length compositions of international catches.

**Fishing mortality:** The current assessment indicates that fishing mortality is close to natural mortality, with no obvious trend.  $F_{max}$  calculated on landings would imply a 30% reduction compared to the current level, unless exploitation pattern was improved.

**State of stock:** There are indications that SSB has been decreasing in recent years, but there are uncertainties as to whether this is driven by the fishery in view of the low fishing mortality estimated in the assessment.

**Management advice:** Available information indicates that the stock is capable of sustaining the current level of fishing. However, ACFM notes that large numbers of juvenile hake are still being caught and, therefore, reiterates its previous advice that enforcement of the current legislation on mesh size and minimum landing size would be beneficial to the fishery.

**Special comments:** There are still uncertainties regarding the basic dynamics of the stock. ACFM, therefore, refrains from providing forecast based on the current assessment.



#### 4.1.2 Hake - Southern stock (Divisions VIIIc and IXa)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	8.5	15.0	15.0	15.0	15.0	15.0	10.0	10.0 <sup>4</sup>			
Agreed TAC	-	-	25.0	25.0	20.0	20.0	18.0	16.0			
Landings as used by WG	18.1	16.2	15.2	15.4	12.9	12.0	11.6	-			
Discards/slipping	No information available										
Catch as used by WG	18.1	16.2	15.2	15.4	12.9	12.0	11.6	-	34.8 <sup>3</sup>	11.6 <sup>3</sup>	19.4 <sup>3</sup>
Spawning stock biomass	35.3	21.2	20.1	22.8	19.9	16.3	15.9	15.2	51.6	15.92	28.0
Recruitment (age 0)	120.5	114.8	96.8	65.2	26.5	29.5	37.0 <sup>2</sup>	37.0 <sup>2</sup>	136.3	26.5	87.8
Mean F(1-4,u)	0.42	0.43	0.37	0.39	0.36	0.32	0.43	-	0.43	0.24	0.37

<sup>1</sup>Over period 1983-1991. <sup>2</sup>Assumed. <sup>3</sup>Over period 1972-1991. <sup>4</sup>Precautionary. Weights in '000 t. Recruitment in millions.

**Catches:** Declining trend in landings continues with a new record low in 1991 (Table 4.1.2).

**Data and assessment:** Length-composition data for landings during 1983-1991 converted to age by numerical methods. Analytical assessment tuned using data from 5 commercial fleets and 2 surveys.

**Fishing mortality:** Recent fishing mortality has been stable at about 0.4 (Figure 4.1.2.1). The lowest value of 0.24 in 1984 is probably anomalous.

**Recruitment:** Has been declining since 1984. Recent recruitment has been low.

**State of stock:** SSB has declined since 1983 to the lowest value in 1991. The stock is clearly decreasing.

##### Forecast for 1993:

Assuming  $F(92) = 0.43$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 8.3

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	No fishing	0.00	12.3	-	0.0	15.0	SSB decreasing further to lowest levels ever.
B	$F_{max}$	0.19		-	3.4	12.4	
C	$0.6 \times F(91)$	0.26		-	4.3	11.6	
D	$0.8 \times F(91)$	0.34		-	5.5	10.7	
E	$F(91)$	0.43		-	6.7	9.8	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will result in a further depletion of the stock.

**Management advice:** SSB of this stock has been declining, and is expected to decline further at the current level of fishing mortality. Recent recruitment has been poor and there is little evidence of any significant improvement in the foreseeable future. Hence, the stock is considered to be outside safe biological limits. ACFM, therefore, recommends that SSB should be rebuilt to 20,000 t (the SSB in 1987 and 1989) as soon as possible (e.g., within 3 years).

However, projections assuming a constant F policy for the period 1993-1996 (Figure 4.1.2.2) indicate that this objective can only be achieved with a fishing mortality of no more than 10% of that in 1991 (implying catches of the order of 1,000 t in each year).

In view of the mixed-fishery nature of the fisheries in Divisions VIIIc and IXa, the implications are that there should be no directed fishery on the stock of hake.

ACFM notes that a large number of juvenile hake are still being caught and, therefore, reiterates its previous advice that enforcement of current legislation on mesh size, minimum landing size and nursery area closures is required to support the rebuilding of the stock.

4.2 Megrim (*L. whiffiagonis*) in Divisions VIIb-k and VIIa,b

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC <sup>2</sup>	-	-	16.46	18.1	18.1	18.1	18.1	18.1			
Discards/slipping	1.7	2.3	1.7	1.7	5.5	3.1	3.2	-	5.5	1.7	2.7
Catch as used by WG	19.6	19.0	18.6	19.4	21.6	16.1	18.0	-	21.6	16.1	18.9
Sp. stock biomass	87.0	91.4	96.5	92.0	65.0	74.1	81.2	100.3	96.5	65.0	86.5
Recruitment (age 1)	245.4	272.1	270.1	293.9	513.3	473.4	300.1 <sup>3</sup>	300.1 <sup>3</sup>	513.3	245.4	330.1
Mean F(3 - 6,u)	0.19	0.17	0.22	0.20	0.29	0.22	0.26	-	-	-	-

<sup>1</sup>Over period 1984-1991. <sup>2</sup>Includes Division VIIa. <sup>3</sup>Assumed. Weights in '000 t, recruitment in millions.

**Catches:** Relatively stable in the range 16,000 t to 21,000 t with a decrease in landings in the last two years (Table 4.2). Landings ranged from 13,000 t to 17,700 t. Discards varying between 2,000 t to 4,000 t, and comprising fish in a large range of sizes.

**Data and assessment:** Length compositions available annually for 1984-1989 and quarterly for 1990-1991. For 1984-1986 age compositions obtained using single combined age/length key over the years 1987-1990, since 1987 with annual age/length key. Assessment was tuned using data from five commercial fleets.

**Fishing mortality:** Stable at a low level close to the assumed natural mortality level (Figure 4.2).

**Recruitment:** Stable, with strong 1988 and 1989 year classes.

**State of stock:** SSB relatively stable during 1985-1991 and expected to increase to record-high level in 1992.

**Forecast for 1993:**

Assuming F(92) = 0.26, Basis: F(92) = F(91), Catch(92) = 21.3, Landings (92) = 16.7.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	F(93) = 0.8F(91)	0.21	101.8	18.6	14.8	104.5	SSB remains near record-high level.
B	F(93) = F(91)	0.26		22.6	18.0	100.0	
C	F(93) = 1.2F(91)	0.31		26.4	20.9	95.5	

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to an SSB of 100,000 t in 1994 which is the high 1992 level.

**Management advice:** The stock is considered to be within safe biological limits.

**Special comments:** For most fleets megrim is only a by-catch caught with anglerfish, *Nephrops*, cod and whiting. Catches of *L. boschii* in these areas represent about 5% of those of *L. whiffiagonis*.

### 4.3 Anglerfish in Divisions VIIb-k and VIIa,b (*L. piscatorius* and *L. budegassa*)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC <sup>4</sup>	-	-	39.08	42.99	42.99	42.99	42.99	42.99			
Catch as used by WG	29.4	30.2	27.0	27.4	27.5	27.2	24.2	-	30.2	24.2	27.2
Catch of <i>L. piscatorius</i>	22.3	20.4	19.1	17.7	18.0	18.4	15.4	-	22.3	15.4	18.8
Catch of <i>L. budegassa</i>	7.1	9.9	7.9	9.6	9.4	8.7	8.8	-	9.9	7.1	8.8
Sp. stock biomass <sup>3</sup>	-	51.6	47.5	38.6	36.6	37.4	32.4	29.3	51.6	32.4	40.7
Recruitment (age 0) <sup>3</sup>	-	14.0	10.8	7.2	3.4	7.8 <sup>2</sup>	7.8 <sup>2</sup>	7.8 <sup>2</sup>	14.0	3.4	7.7
Mean F(3-7,u) <sup>3</sup>	-	0.30	0.26	0.32	0.34	0.39	0.32	0.32 <sup>2</sup>	0.39	0.26	0.32

<sup>1</sup>Over period 1985-1991. <sup>2</sup>Assumed. <sup>3</sup>Refers only to *L. piscatorius*. <sup>4</sup>Includes Division VIIa. Weights in '000 t, recruitment in millions.

**Catches:** *L. piscatorius* constitutes about 65% of landings (Table 4.3.1). Catches of this species show a decreasing trend with lowest value in 1991. Catches of *L. budegassa* are stable at about 9,000 t (Table 4.3.2).

**Data and assessment:** Age composition of both species available from 1986 to 1991. Analytical assessment tuned on 2 commercial fleets for *L. piscatorius*. Similar analysis and data set for *L. budegassa* but analytical assessment failed possibly due to deficiencies in the data.

**Fishing mortality:** Moderate for *L. piscatorius*, although well above  $F_{\max}$  (=0.12) (Figure 4.3). Low for *L. budegassa*, and close to natural mortality when derived from length-cohort analysis.

**Recruitment:** Declined from 1986 to 1989 for *L. piscatorius*.

**State of stock:** SSB of *L. piscatorius* shows a decreasing trend with current values at the lowest in the five-year series available. Unknown for *L. budegassa*.

**Forecast for 1993:** Refer to *L. piscatorius* only.

Assuming  $F(92) = 0.32$ , Basis:  $F(92) = F(91)$ ,  $Catch(92) =$  Not estimated,  $Landings(92) = 12.7$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	0.8 x $F_{91}$	0.26	25.0	-	9.2	24.9	SSB declining.
B	1.0 x $F_{91}$	0.32	24.4	-	11.1	22.8	SSB further declining.
C	1.2 x $F_{91}$	0.38	23.9	-	12.7	20.9	SSB declining to low level.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to a continued decrease in SSB of *L. piscatorius* to the lowest values of the series.

**Management advice:** Due to the very short time series in the assessment, it is difficult to determine the status of this stock. There is concern about the apparent decrease in SSB of *L. piscatorius*, but it is not clear that this stock is outside safe biological limits. Moreover, two species with apparently different catch trends would need to be considered when advising upon either stock.

**Special comments:** The agreed TACs in the recent period have been far above the catches of both species combined. In view of the decrease in one of the species, the TAC should be brought in line with recent catches.

## 5. STOCKS IN NEAFC REGION 3

### 5.1 Sardine in Divisions VIIIc and IXa

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	90	140	150	212	-	176	-	212		
Agreed TAC	-	-	-	-	-	-	-	-	-	-	-
Catch as used by WG	204	181	169	159	137	139	128	-	214	128	167

<sup>1</sup>Over period 1976-1991. Weights in '000 t.

**Catches:** Total landings have declined from a near-record high of 204,000 t in 1985 to a record-low level in 1991 (Table 5.1).

**Data and assessment:** Information on stock size from the acoustic survey. Analytical assessment was attempted using Portuguese and Spanish CPUE data and acoustic surveys, but was not considered reliable.

**Fishing mortality:** Fishing mortality appears to have increased since 1984.

**Recruitment:** After a decline in recruitment in recent years, it appears that the 1991 year class may be a good one.

**State of stock:** Based on results of acoustic and egg surveys, the spawning stock biomass appears to have decreased from 1988.

**Forecast for 1993:** Not available

**Management advice:** Although there are some problems in assessing this stock, the indications are that fishing mortality has been increasing in recent years. Catch rates have been declining and recruitment in the last few years may have been at a lower level than previously. Furthermore, biomass estimated from egg survey in 1990 was less than half of the 1988 estimate and, in the areas covered by the Spanish acoustic survey, estimates of biomass in 1990-1992 have been lower than in earlier years. Given these factors and the marked decline in catches in recent years, a precautionary TAC of 135,000 t (corresponding to average catches during 1989-1991) should be considered for this stock to prevent expansion of the fishery.

**Special comments:** The quality of the assessment is unlikely to improve unless surveys of the entire distribution area are carried out.

## 5.2 Anchovy in Sub-area VIII (Bay of Biscay)

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	- <sup>3</sup>	-	12.3	14.0	-			
Agreed TAC	32	32	32	32	32	30	30	30			
Official landings	11	8	14	14	n/a	n/a	n/a	-			
Unallocated landings	-	-	1	1	-	-	-	-			
Catch as used by WG	11	8	15	15	10	34	19	25 <sup>4</sup>	84	5	30
Sp. stock biomass <sup>5</sup>			29 <sup>5</sup>	63 <sup>5</sup>	12 <sup>5</sup> /16 <sup>6</sup>	98 <sup>5</sup>	20 <sup>5</sup> /80 <sup>6</sup>	50-80 <sup>5</sup> /113 <sup>6</sup>			
Recruitment (age 1) <sup>5</sup>			656	2,349	246	5,581	591	(2818-4508)			

<sup>1</sup>Over period 1940-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Not greater than the 1985-1987 level. <sup>4</sup>1st half of year. <sup>5</sup>From egg surveys.

<sup>6</sup>Acoustic estimate. Weights in '000 t, recruitment in millions.

**Catches:** Apart from 1990, catches have been relatively low in recent years (Table 5.2).

**Data and assessment:** Catch-at-age and catch-at-length data from French and Spanish fisheries. Stock biomass estimates from egg and acoustic surveys.

**Mortality:** Based only on surveys and catch-at-age data; the natural mortality and fishing mortality rates are estimated to vary between 0.5 and 2.2 and 0.3 and 1.1, respectively. There seems to have been an increase in fishing mortality over the last 2 years.

**Recruitment:** Very variable. Much higher recruitment in 1992 than in 1991.

**State of stock:** In the last decade, biomass has been at a low or medium level and below the level of the 1960s.

**Forecast for 1993:** No reliable forecast available.

**Management advice:** The stock is likely to fluctuate widely due to the large variations in mortality and recruitment. The low catches in the 1980s and the change in exploitation pattern towards juveniles indicate a relatively low spawning stock biomass.

Reduced fishing mortality on juvenile anchovy will on average increase the spawning biomass without major loss in total yield. This may be achieved by closing the fishery in areas with high abundance of 1-group anchovy. To this end, ACFM advises that fishing for anchovy could be prohibited between January and June inclusive within the area defined by the following boundaries (Figure 5.2):

- from the Spanish coast north along longitude 1°35'W to latitude 44° 45'N,  
west to longitude 1°45'W,  
north to latitude 46°00'N,  
and east to the French mainland.

**Special comments:** In the first half of the year, catches consist mainly of 1- and 2-year old-fish while relatively large quantities of 0-group anchovy are caught in the second half of the year. The very high variation in mortality and recruitment of 0-group anchovy to the fishery in the second half of the year makes it very difficult to predict catches, and to manage the stock by TAC regulations. As such, even a precautionary TAC would have limited, if any, utility for this stock.

In response to a request from the EC to advise on the most adequate strategies for managing the stock of anchovy, several other approaches are potentially available.

#### Regulation of fishing effort and catch

A preferred management system for the stock could be via a survey-based TAC system and/or a system of fishing licences.

The adoption of such a TAC must be based on an annual monitoring of the stock at a time just before the start of the main fishing season. Management options on the levels of available catches could be provided as soon as a recruitment level has been determined so the uncertainties on the fishable stock are minimized. Acoustic surveys performed in April could be the basis for such a management system. However, the conflicting results between egg and acoustic surveys seem to indicate that some time will still be required for checking the performance of these methods, before the management system could be implemented.

Fishing licences by themselves could not prevent stock collapse at low levels of biomass, due to possible increases of catchability with decreasing biomass, as recorded on other pelagic stocks. For this reason, such a system must be complemented with close monitoring of the stock and mechanisms of protecting the stock at low levels of biomasses (such as a TAC or appropriate additional measures, see below).

An annual revisable TAC set initially for the first half of the year could be based on a rough forecast of the catch for that period. The forecast of catch for the first half of the year would be estimated from:

- a) the proportion of the stock expected to survive assuming average natural mortality and derived from direct biomass estimates of the stock;
- b) the recruitment at age 1, as an average from recent years.

The quantity thus determined should be reduced by a proportion (e.g., 30%) for the sake of caution.

The TAC for the second half of the season could then be determined in the middle of the year, as soon as an estimate of the size of the recruiting year class becomes available, taking into account the high variability of recruitment and natural mortality observed in recent years. This process allows the uncertainties of annual TACs to be minimized and makes the best use of the current monitoring of the stock.

#### Technical measures to increase the spawning stock biomass

The implementation of technical measures in addition to closed areas (i.e., minimum landing size and closed periods) to protect the recruiting year classes, and thus to increase the average SSB, could also be considered.

The basis of these measures is to protect as far as possible the juveniles from capture prior to the spawning season (April - June) by introducing a minimum landing size category and to add some complementary regulations to prevent an increase in discarding. A minimum legal landing size category of 60 anchovy per kg is suggested. In order to prevent an increase in discarding as a result of the size limit regulation, some area and seasonal closures might also be considered.

According to the level of biomass estimated or according to the objectives of managers (more or less restrictive regulations), some alternative durations could be defined between November and the end of June for closure of the whole fishery during the recruitment and spawning periods. November coincides with the beginning of the presence of juveniles in the fisheries and the end of June to the last part of the spawning season.

So three possibilities could be considered:

- January to March, to prevent some important catches on the immature 1-year-old anchovies;
- November to April, to allow a greater proportion of the juveniles to spawn at least once and to allow a part of the adult population to survive to spawn again;
- November to May, to reduce the fishing mortality on all age groups until the middle of the spawning season and to protect the majority of juveniles from capture.

In addition to any area or seasonal closures, a prohibition of the use of automatic sorting equipment on board vessels could be considered.



### 5.3 Anchovy in Division IXa (Gulf of Cadiz)

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC <sup>2</sup>	-	-	4.6	6	6	9	9	12	12	4.6	7.8
Catch as used by WG	2.1	2.2	1.6	4.7	6.2	6.5	5.9	-	12.6	0.1	3.4

<sup>1</sup>Over period 1943-1991. <sup>2</sup>TAC for Sub-areas IX and X and CECAF 34.1.1. Weights in '000 t.

**Catches:** Catch level during the period 1970-1984 was only 750 t, but has increased considerably in the most recent years (Table 5.3).

**Data and assessment:** No assessment because of insufficient data.

**Fishing mortality:** Not available.

**Recruitment:** Not available.

**Forecast for 1993:** Not available.

**Management advice:** If a TAC is to be set for 1993, a precautionary TAC at the level of recent catches is appropriate in order to avoid an increase of effort.

**Special comments:** Advice on alternative management measures (see Section 5.2) cannot yet be given for this stock, given the limited knowledge of the biology and dynamics of this population.

## 5.4 Megrim in Divisions VIIIc and IXa

### 5.4.1 Megrim (*L. boscii*) in Divisions VIIIc and IXa

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-			
Agreed TAC <sup>3</sup>	-	13	13	13	13	14.3	14.3	14.3	13	13.6
Catch as used by WG	1.1	1.7	2.2	2.6	1.9	1.7	-	2.6	1.1	1.9
Sp. stock biomass	2.7	3.5	4.5	4.3	2.8	2.9	1.7	4.5	2.7	3.5
Recruitment (age 0)	75.1	40.1	42.6	19.6	17.8	27.0 <sup>2</sup>	27.0 <sup>2</sup>	75.1	16.0	35.2
Mean F(2 - 4,u)	0.36	0.34	0.38	0.61	0.58	0.45	-	0.61	0.34	0.45

<sup>1</sup>Over period 1986-1991. <sup>2</sup>Assumed. <sup>3</sup>Including *L. whiffiagonis*. Weights in '000 t, recruitment in millions.

**Catches:** Relatively stable during the period with a peak in 1989 and a slight decrease until 1991 (Table 5.4.1). No discards are estimated.

**Data and assessment:** Length-composition data by division. Age-based analytical assessment tuned with CPUE data from 4 fleets. Assessment is based only on short time series (1986-1991).

**Fishing mortality:** Variable; fluctuated between 0.3 and 0.6 (Figure 5.4.1).

**Recruitment:** Apparently high recruitment 1986-1988, followed by lower recruitment until 1992.

**State of stock:** SSB increased to 1988, and has since declined to below the 1986 level.

#### Forecast for 1993:

Assuming  $F(92) = 0.45$ , Basis:  $F(92) = F(91)$ ,  $Catch(92) = \text{Not calculated}$ ,  $Landings(92) = 0.92$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$0.6 \times F_{91}$	0.27	1.6	-	0.61	1.80	SSB lower than in 1991.
B	$F_{max}$	0.36	1.6	-	0.78	1.62	SSB remains at 1993 level.
C	$F_{91}$	0.45	1.5	-	0.94	1.47	SSB declines from 1993 level.

Weights in '000 t.

Continued fishing at current levels of fishing mortality would result in a further decrease of SSB.

**Management advice:** Despite the small decrease in landings, and perhaps recruitment, there is no evidence that the stock is outside safe biological limits. However, ACFM notes that no gain would be realized by increasing fishing mortality, which is currently above  $F_{max}$ .

**Special comments:** TACs include both species, *L. boscii* and *L. whiffiagonis*. There is an enormous discrepancy (by a factor of 10:1) between the agreed TAC and the catches of both species combined.

#### 5.4.2 Megrim (*L. whiffiagonis*) in Divisions VIIIc and IXa

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-			
Agreed TAC <sup>3</sup>	-	13	13	13	13	14.3	14.3	14.3	13	13.6
Catch as used by WG	0.7	0.5	0.8	0.7	1.0	0.6	-	1.0	0.5	0.7
Sp. stock biomass	2.2	1.9	2.4	3.0	3.2	2.0	2.4	3.0	1.9	2.5
Recruitment (age 0)	18.3	15.3	12.2	16.1	4.2	15.0 <sup>2</sup>	15.0 <sup>2</sup>	18.3	4.2	13.5
Mean F(2- 4,u)	0.29	0.26	0.34	0.29	0.29	0.30	-	0.34	0.26	0.30

<sup>1</sup>Over period 1986-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Including *L. boscii*. Weights in '000 t, recruitment in millions.

**Catches:** Relatively stable during the short period considered, with a peak in 1990 (Table 5.4.2). There are no estimates of discards.

**Data and assessment:** Length-composition data by divisions are available. Age-based assessment tunes on CPUE data from 3 fleets. Assessment is based on a short time series (1986-1991).

**Fishing mortality:** Stable at a moderate level during 1986-1991 (Figure 5.4.2).

**Recruitment:** Apart from the apparently weak 1990 year class, recruitment has been stable.

**State of stock:** SSB has fluctuated between 2,000 and 3,000 t since 1986.

#### Forecast for 1993:

Assuming  $F(92) = 0.30$ , Basis:  $F(92) = F(91)$ , Catch(92) = Not calculated, Landings (92) = 0.75.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{max}$	0.27	2.6	-	0.72	2.8	SSB increases.
B	$F_{91}$	0.30	2.6	-	0.78	2.7	SSB increases above 1986-1991 level.
C	$1.2 \times F_{91}$	0.36	2.6	-	0.92	2.5	SSB decreases slightly, but remains at about the 1986-1991 level.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to an increase in SSB above the recent average.

**Management advice:** Although the assessment is based on a very short time series, the stock is considered to be within safe biological limits.

**Special comments:** TACs include both species, *L. boscii* and *L. whiffiagonis*. There is an enormous discrepancy (by a factor of 10:1) between the agreed TACs and the catches of both species combined.

## 5.5 Anglerfish in Divisions VIIIc and IXa (*L. piscatorius* and *L. budegassa*)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC	-	-	12.0	12.0	12.0	12.0	12.0	12.0			
Catch as used by WG	6.9	9.4	9.5	10.0	7.6	6.1	5.8	-	10.0	5.8	7.9
<i>L. piscatorius</i>	5.0	6.9	5.8	6.3	5.0	3.8	3.6	-	6.9	3.6	5.3
<i>L. budegassa</i>	1.8	2.6	3.7	3.7	2.6	2.3	2.2	-	3.7	1.8	2.6

<sup>1</sup>Over period 1984-1991. Weight in '000 tonnes.

**Catches:** *L. piscatorius* represents 63% of the catches and has shown a 53% decline since 1986. Landings of *L. budegassa* have fluctuated between 1,833 t in 1985 and 3,700 t in 1987 and 1988, but have declined to 2,200 t in 1991. Overall landings of both species have declined by 50% since 1988 (Tables 5.5.1-5.5.2).

**Data and assessment:** Length compositions by species available for 1986-1991. No ageing data, and numerical length to age conversions unreliable. Improved estimates of length-composition data and landings for each species. Length cohort analysis and long-term equilibrium yield projections carried out using new estimates of growth.

**Fishing mortality:** For *L. piscatorius*, length cohort analysis indicates that fishing mortality is beyond  $F_{max}$  and for *L. budegassa*  $F$  is rather low (Figure 5.5.1). The combined yield curve for both species (Figure 5.5.2) is relatively flat, but with the average exploitation pattern, average levels of  $F$  are beyond  $F_{max}$ .

**Recruitment:** No information available.

**State of stock:** Unknown.

**Forecast for 1993:** Not available.

**Management advice:** If the decline in landings is representative of the decline of the stock, and considering that present  $F$  is above  $F_{max}$ , no long-term gain in yield would be realised by increasing fishing mortality.

**Special comments:** More information on age, growth and recruitment is needed before an age-based assessment can be made.

The agreed TACs have been about double the catches of both species combined in recent years.

## 5.6 Sole in Divisions VIIIa,b (Bay of Biscay)

**Source of information:** Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1992 (C.M.1993/Assess:3).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	3.7	4.5	5.1	4.7	5.0			
Agreed TAC	3.3 <sup>3</sup>	3.3 <sup>3</sup>	4.4	4.0	4.8	5.2	5.3	5.3			
Official landings	3.9	4.6	4.4	4.4	5.8 <sup>4</sup>	n/a <sup>4</sup>	4.7 <sup>4</sup>	-	5.8	0.3	3.6
Unallocated landings	0.4	0.2	0.7	1.0	-	-	0.9	-	5.6	0	1.0
Landings as used by WG	4.3	4.8	5.1	5.4	5.8	5.9	5.6	-	5.9	2.6	4.8
Discards as used by WG	0.3	0.2	0.6	0.7	0.7	0.6	0.5	-	0.7	0.2	0.4
Sp. stock biomass	13.0	14.1	15.0	14.3	13.3	13.3	14.0	14.1	15.0	7.4	12.7
Recruitment (age 0)	46.6	52.7	49.5	58.3	44.6	50.6 <sup>2</sup>	50.6 <sup>2</sup>	50.6 <sup>2</sup>	58.6	44.6	51.9
Mean F(2-6,u)	0.33	0.35	0.37	0.42	0.49	0.45	0.41	-	0.49	0.25	0.35

<sup>1</sup>Over period 1979-1991. <sup>2</sup>Assumed. <sup>3</sup>Sub-area VIII (EC zone). <sup>4</sup>Not reported for all countries. Weights in '000 t, recruitment in millions.

**Catches:** Increased during the 1980s to a record high level in 1989 and 1990, and decreased in 1991 (Tables 5.6.1-5.6.2).

**Data and assessment:** Age-based analytical assessment (including discards) tuned with data from two fleets.

**Fishing mortality:** Increased to record high level in 1989, and decreased slightly in 1990 and 1991 (Figure 5.6).

**Recruitment:** Recruitment relatively stable.

**State of stock:** SSB has fluctuated within a narrow range and is currently above the long-term mean.

### Forecast for 1993:

Assuming  $F(92) = 0.41$ , Basis:  $F(92) = F(91)$ ,  $Catch(92) = 6.03$ ,  $Landings(92) = 5.51$ .

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F(93) = F_{max}$	0.14	14.7	2.4	2.2	19.9	Large increase in SSB.
B	$F(93) = 0.8F(92)$	0.33		5.2	4.8	16.5	Increase in SSB to new record-high level.
C	$F(93) = 0.9F(92)$	0.37		5.7	5.3	15.8	
D	$F(93) = F(92)$	0.41		6.3	5.7	15.1	SSB remains slightly above high 1991 level.
E	$F(93) = 1.2 F(92)$	0.50		7.2	6.6	14.0	Slight decrease in SSB to high 1991 level.

Weights in '000 t.

Continued fishing at current levels of fishing mortality will lead to an increase in SSB to the highest level observed.

**Management advice:** The stock is considered to be within safe biological limits. ACFM notes, however, that no gain in long-term yield would be realized by increasing fishing mortality.

**Special comments:** Estimates of the discards are included in this assessment, which, therefore, is not totally comparable to the previous one.

## 6. STOCKS IN NEAFC REGIONS 1, 2 AND 3

### 6.1 *Nephrops* in Sub-areas III-X

#### 6.1.1 General comments

##### Functional Units and Management Areas

The management of *Nephrops* is best achieved through management areas of a limited size comprising only a few functional units. However, TACs in 1992 have in some cases been set for much larger regions. This risks, and has had the effect of, generating excessive effort on some functional units and loss of yield from others. Therefore, ACFM recommends that TACs be set by the recommended management areas.

There have been no changes to the functional units and recommended management areas defined in 1991 (Figures 6.1.1 to 6.1.3). The recommended management areas with their constituent functional units are also listed in Table 6.1.1.

##### Trends in Landings, Effort, CPUE, LPUE, and Mean Size

Trends in landings, effort, catch per unit effort (CPUE), landings per unit effort (LPUE), and mean size of *Nephrops* caught, landed and/or discarded were examined over the past 10 years for all functional units.

Trends over the most recent years (1986-1991) give cause for concern for the following stocks:

- a) Kattegat (4): Both landings and LPUE show declining trends.
- b) Farn Deep (6): High effort, landings low and mean size relatively small.
- c) Firth of Forth (8): Dramatic drop in landings and LPUE lowest since 1975.
- d) South Minch (12): LPUE fluctuating but at a low level.
- e) Porcupine Bank (16): Interpretation varies between fleets but landings have continued to fall and CPUE is at its lowest level.
- f) Celtic Sea (20-22): Landings and LPUE fell sharply in 1991 and need to be monitored carefully.

In most other stocks, CPUE and/or LPUE have been fairly stable, fluctuated without trend or risen slightly over the most recent years.

**Assessments:** New length-cohort analyses were carried out only if new data were available, and that was the case for the following functional units: 3+4, 5, 11, 13, 17.

##### Mesh Assessments/Minimum Landing Size

Mesh assessments were not repeated since there were no new selectivity data (see 1991 ACFM report). For the Skagerrak/Kattegat, it was again noted that the minimum landing size is out of step with the mesh size in use and that this is leading to excessively high levels of discards.

**Management advice:** Three different landing options were provided by ACFM in 1990 as guidance for the expected catch levels in 1991. The information available to ACFM in 1991 did not result in major changes to the general advice given in 1990. For each recommended management area, ACFM indicated its preference for a single option based largely on the precautionary principle, because the analytical assessments available could not be used to make reliable catch predictions. This year, new information demanding a re-evaluation of the stock status was available for 5 stocks and in these cases new precautionary TACs were calculated following the same procedures as last year, i.e., mean effort, maximum landings or mean landings. For all other stocks, there is no basis for revising the advice on precautionary TACs compared to last year.

In the past, ACFM has regularly updated the range of years for which catch data were used when calculating precautionary TACs. This procedure has the inherent danger that the preferred catch options drift when a fishery is developing, which tends to undermine the precautionary principle. Therefore, it has been decided not to change precautionary TACs annually, unless new information warrants new calculations to be carried out.

### 6.1.2 *Nephrops* in Division IIIa

Units included in recommended Management Area: a) Skagerrak (Unit 3) and b) Kattegat (Unit 4).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	-	~4.0			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	3.5			
Landings <sup>4</sup>											
a) Skagerrak	2.2	2.0	2.4	2.3	2.6	2.9	2.9 <sup>2</sup>	-	2.9	1.0	2.2
b) Kattegat	1.8	1.8	1.6	1.4	1.3	1.5	1.3 <sup>2</sup>	-	2.0	1.3	1.6
Total area	4.0	3.8	4.0	3.7	3.9	4.4	4.2 <sup>2</sup>	-	4.7	2.7	3.9

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>Overall TAC in IIIa-d (EC zones). <sup>4</sup>Provided by Working Group members. Weights in '000 t (rounded up).

**Landings:** Fairly stable over area as a whole, but increasing in the Skagerrak and decreasing in the Kattegat.

**Data and assessment:** Landings per unit effort (LPUE) data are available. Length compositions for 1990-1991 permitted length-based LCA and Y/R predictions for the two areas combined.

**Fishing mortality:** Effort rising in Skagerrak, stable in Kattegat. Preliminary assessments indicate that current fishing mortality is above  $F_{max}$  especially for the males but also slightly for females.

**State of stock:** State of exploitation cannot be precisely assessed. LPUE is decreasing in both stocks and data suggest a declining mean size of *Nephrops*.

**Management advice:** ACFM advises, on the basis of new information on the length distribution of the catch, a precautionary TAC in 1993 of about 4,300 t for Division IIIa. It should be noted that this recommended management area includes two functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the two units.

**Special comments:** Large amounts of undersized *Nephrops* in the catch shows that minimum landing size in use does not correspond to the current legal mesh size.

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Units 3 and 4	4,300	Effort '93 = Effort '91



### 6.1.3 *Nephrops* in Division IVa Rectangles 44-48 E6-E7+44E8

Units included in recommended Management Area: a) Moray Firth (Unit 9) and b) Noup (Unit 10).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	2.33	~2.4			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	12.0			
Landings <sup>4</sup>											
a) Moray Firth	2.08	2.14	1.99	1.96	2.58	2.04	1.52 <sup>2</sup>	-	2.58	0.94	1.72
b) Noup	0.02	0.07	0.04	0.08	0.08	0.22	0.20 <sup>2</sup>	-	0.22	0.02	0.08
c) Others <sup>5</sup>	0.02	0.04	0.03	0.05	0.04	0.07	0.07 <sup>2</sup>	-	0.07	0.00	0.03
Total area	2.12	2.26	2.07	2.08	2.71	2.32	1.79 <sup>2</sup>	-	2.71	0.96	1.83

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>Overall TAC in IIa and IV (EC zones). <sup>4</sup>Provided by Working Group members.

<sup>5</sup>Landings taken within the Management Area, but outside the Units under a) and b). Weights in '000 t (rounded up).

**Landings:** 1991 Moray Firth landings fell by 500 t, following earlier periods of expansion. At Noup the landings are fluctuating and were relatively high in 1990 and 1991.

**Data and assessment:** LPUE data available for both units. Yield per recruit (1990) assessments carried out for Moray Firth. No length composition data available for Noup.

**Fishing mortality:** a) Moray Firth: current effort lower than any year since 1984; LCA suggests fishing mortality close to  $F_{max}$  in males and below  $F_{max}$  in females. b) Noup: effort fluctuating.

**State of stock:** a) Moray Firth: probably fully exploited since 1985. LPUE fell from 1984-1987 but has risen slightly since. Mean size fell between 1981 and 1986 but has been fairly stable since; b) Noup: LPUE fluctuating strongly.

**Management advice:** Given the absence of new information, there is no basis for revising the precautionary TAC suggested for 1992 and ACFM advises a precautionary TAC for 1993 of 2,400 t.

It should be noted that this recommended management area includes two functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the two units.

**Special comments:**

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 9	2,076	Average effort 1985-1990
Unit 10	217	Max. landings 1981-1990
Others	69	Max. landings 1981-1990
Total	2,362	

#### 6.1.4 *Nephrops* in Division IVa (Rectangles not included under Section 6.1.3)

Units included in recommended Management Area: a) Fladen Ground (Unit 7).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	2.37	~2.7			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	12.0			
Landings <sup>4</sup>											
a) Fladen Ground	1.15	1.54	1.72	1.57	2.36	2.59	4.24 <sup>2</sup>	-	4.24	0.38	1.58
b) Other <sup>5</sup>	0.03	0.02	0.01	0.05	0.07	0.08	0.14 <sup>2</sup>	-	0.14	+	0.04
Total area	1.18	1.56	1.73	1.62	2.43	2.67	4.38 <sup>2</sup>	-	4.38	0.38	1.61

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>Overall TAC in IIa and IV (EC zones). <sup>4</sup>Provided by Working Group members.

<sup>5</sup>Landings taken within the Management Area, but outside the Unit under a). Weights in '000 t (rounded up).

**Landings:** Increased markedly over the reference period, large increase in 1991.

**Data and assessment:** LPUE available. Yield per recruit (1990) assessment carried out.

**Fishing mortality:** Effort has increased over reference period and rose sharply in 1991. LCA suggests fishing mortality prior to 1991 was close to  $F_{max}$  in males and females.

**State of stock:** LPUE and mean size fluctuating without obvious trend. LPUE is highest amongst the Scottish fleet (this is partly attributable to larger fishing vessels and gears).

**Management advice:** In the absence of new information, there is no basis for revising the precautionary TAC suggested for 1992 and ACFM advises a precautionary TAC for 1993 of 2,700 t.

**Special comments:** The fishery is still developing over the available area of *Nephrops* distribution. Length compositions are from a relatively restricted area and probably do not reflect the whole ground. More data are required.

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 7	2,592	Max. landings 1981-1990
Others	79	Max. landings 1981-1990
Total	2,671	

6.1.5 *Nephrops* in Divisions IVb,c east of 1°E

Units included in recommended Management Area: a) Botney Gut and Silver Pit (Unit 5).

Source of information: Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	0.77	~0.87			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	12.0			
Landings <sup>4</sup>											
a) Botney Gut etc.	≥0.7	≥0.4	≥0.4	0.55	0.65	0.75	0.76 <sup>2</sup>	-	0.76	0.38	0.58
b) Other <sup>5</sup>	+	+	+	0.07	0.13	0.13	0.17 <sup>2</sup>	-	0.17	+	0.05
Total area	≥0.7	≥0.4	≥0.4	0.62	0.78	0.88	0.93 <sup>2</sup>	-	0.93	0.38	0.63

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>Overall TAC in IIa and IV (EC zones). <sup>4</sup>Provided by Working Group members. <sup>5</sup>Landings taken within the Management Area, but outside the Unit under a). Weights in '000 t (rounded up).

Landings: Dropped sharply in 1986 then steadily rose until 1990, stable in 1991.

Data and assessment: LPUE data available. Yield per recruit length-based assessment (1990 and 1991) carried out with revised length compositions.

Fishing mortality: Effort generally increasing from 1981-1991. Current fishing mortality estimated to be close to  $F_{max}$  in males and far below  $F_{max}$  in females.

State of stock: LPUE shows two distinct levels. Since 1986 LPUE has been stable but at a lower level than in the period preceding this. Mean size of males and females has been relatively stable since 1982 with some evidence of increases in larger males and females.

Management advice: ACFM advises a precautionary TAC for 1993 of 875 t for Divisions IVb,c east of 1°E.

Special comments:

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 5	750	Max. landings 1981-1990
Others	125	Max. landings 1981-1990
Total	875	

### 6.1.6 *Nephrops* in Divisions IVb,c west of 1°E

Units included in recommended Management Area: a) Farn Deepes (Unit 6) and b) Firth of Forth (Unit 8).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991 <sup>2</sup>	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	4.49	~4.6			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	12.0			
Landings <sup>4</sup>											
a) Farn Deepes	2.03	2.02	2.19	2.50	3.10	2.50	2.06 <sup>2</sup>	-	3.10	1.08	2.14
b) Firth of Forth	1.97	2.26	1.67	2.53	1.89	1.93	1.40 <sup>2</sup>	-	2.53	1.01	1.61
c) Other <sup>5</sup>	0.11	0.14	0.14	0.31	0.16	0.13	0.39 <sup>2</sup>	-	0.39	0.07	0.16
Total area	4.10	4.42	4.01	5.34	5.14	4.56	3.85 <sup>2</sup>	-	5.34	3.69	4.09

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>Overall TAC in IIa and IV (EC zones). <sup>4</sup>Provided by Working Group members.

<sup>5</sup>Landings taken within the Management Area, but outside the Units under a) and b). Weights in '000 t (rounded up).

**Landings:** a) Farn Deepes: fluctuating around 2,000 t up to 1987, increased in 1988-1989 but falling recently; b) Firth of Forth: increased up to 1984, then fluctuating; recently low. In the area as a whole, landings increased up to 1988 then declined.

**Data and assessment:** LPUE and mean size data available for both areas. CPUE available for Farn Deepes up to 1990.

**Fishing mortality:** a) Farn Deepes: effort generally increasing. Current  $F$  estimated by LCA to be above  $F_{max}$  in males and below  $F_{max}$  in females. b) Firth of Forth: effort increased up to 1988 and has recently fallen. LCA shows current  $F$  well above  $F_{max}$  in males and below  $F_{max}$  in females.

**State of stock:** a) Farn Deepes: LPUE has levelled off in last 6 seasons and is currently at the long-term mean. Mean size decreasing up to 1988, steady recently; b) Firth of Forth: LPUE currently at very low level, lowest since 1975. Mean size shows steady decline over the last 10 years. In both stocks current  $F$  is above  $F_{max}$  in males, the most vulnerable component.

**Management advice:** ACFM advises, on the basis of new information a precautionary TAC for 1993 of about 4,170 t for Divisions IVb,c west of 1°E. The advised TAC takes into account a reduction in effort of 20% in the Firth of Forth unit, due to the recent drop in CPUE. It should be noted that this recommended management area includes two functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the two units.

**Special comments:**

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 6	2,453	Mean landings 1986-1989
Unit 8	1,405	20% reduction average effort 1981-1991
Others	310	Max. landings 1981-1990
Total	4,168	

### 6.1.7 *Nephrops* in Division VIa

Units included in recommended Management Area: a) North Minch (Unit 11), b) South Minch (Unit 12) and c) Firth of Clyde (Unit 13).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	11.7	~11.4			
Agreed TAC	<sup>3</sup>	14.8	16.0	16.0	16.0	16.0	13.5	12.0			
<b>Landings<sup>4</sup></b>											
a) North Minch	4.06	3.38	4.08	4.04	3.21	2.54	2.78 <sup>2</sup>	-	4.14	2.54	3.37
b) South Minch	3.83	3.32	3.71	4.31	4.41	4.21	4.21 <sup>2</sup>	-	4.42	3.25	3.81
c) Firth of Clyde	4.29	4.34	3.01	3.66	2.81	2.91	3.03 <sup>2</sup>	-	4.34	2.62	3.37
d) Other <sup>5</sup>	0.29	0.26	0.45	0.70	0.56	0.41	0.47 <sup>2</sup>	-	0.7	+	0.33
Total area	12.46	11.30	11.25	12.70	10.98	10.07	10.49 <sup>2</sup>	-	12.70	8.70	10.85

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>No TAC in force. <sup>4</sup>Provided by Working Group members. <sup>5</sup>Landings taken within the Management Area, but outside the Units under a), b) and c). Weights in '000 t (rounded up).

**Landings:** a) North Minch: landings fluctuating, up compared to 1990 but lower than average for reference period; b) South Minch: landings similar to 1990 but down on 1989 peak; c) Firth of Clyde: landings up slightly relative to 1990 but lower than the high landings of 1985-1986. In other rectangles landings fluctuating after rise in early 1980s.

**Data and assessment:** LPUE and mean size data available for areas (a-c). Yield per recruit analysis repeated for a) and c).

**Fishing mortality:** a) North Minch: effort falling 1987-1990, up slightly in 1991. Current fishing mortality at about  $F_{max}$  in males, below  $F_{max}$  in females. b) South Minch: effort generally increasing, highest level in 1990-1991. Current  $F$  above  $F_{max}$  in males below  $F_{max}$  in females. c) Clyde: effort in 1991 above average for reference period. Current  $F$  above  $F_{max}$  in males and below  $F_{max}$  in females.

**State of stock:** a) North Minch: LPUE fluctuating but below average in last two years; mean size fluctuating in both sexes; b) South Minch: LPUE fluctuating but at low level in 1990-1991; mean size fluctuating in both sexes. Stock should benefit from effort reduction; c) Firth of Clyde: LPUE at very low level in 1989-1991; mean size fluctuating in both sexes.

**Management advice:** ACFM advises, on the basis of new information on the state of the stock, a precautionary TAC for 1993 of about 11,300 t for Division VIa. It should be noted that this recommended management area includes three functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the three units.

**Special comments:** The advised precautionary TAC takes into account an effort reduction in the South Minch.

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 11	3,431	Average landings 1981-1990
Unit 12	3,653	80% of average effort 1985-1991
Unit 13	3,485	1990 effort level
Others	697	Max. landings 1990
Total	11,266	

**6.1.8 *Nephrops* in Divisions Vb (EC) and VIb**

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

**Special comments:** There are no reported landings of *Nephrops* from this area, so it is suggested that a zero TAC would prevent misreporting.

6.1.9 *Nephrops* in Division VIIa (excluding rectangles 33E2-E5)

Units included in recommended Management Area: a) Irish Sea east (Unit 14) and b) Irish Sea west (Unit 15).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	8.76	~ 8.9			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	20			
Landings <sup>4</sup>											
a) Irish Sea E	0.52	0.69	0.47	0.50	0.43	0.63	0.84 <sup>2</sup>	-	0.87	0.43	0.66
b) Irish Sea W	6.43	8.75	9.26	8.25	8.07	8.28	9.46 <sup>2</sup>	-	9.46	6.43	8.28
Total area	6.95	9.43	9.73	8.75	8.50	8.91	10.30 <sup>2</sup>	-	10.30	6.95	8.93

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>TAC for Sub-area VII as a whole. <sup>4</sup>Provided by Working Group members. Weights in '000 t (rounded up).

**Landings:** a) Irish Sea East: recent rise in landings continued in 1991 with highest landings in series; b) Irish Sea West: landings fluctuating without trend, highest figure in 1991. Landings in area as a whole now increasing.

**Data and assessment:** LPUE and mean size data available for both units, a) Yield per recruit assessments (1990) b) Yield per recruit assessments (1991).

**Fishing mortality:** a) Irish Sea East: effort generally decreasing but higher in 1991. Current F just below  $F_{max}$  in males and just above in females; b) Irish Sea West: effort increasing since 1986. Current F above  $F_{max}$  in males and females (Yield per recruit assessment).

**State of stock:** a) Irish Sea East: decline in LPUE in 1987 was reversed in 1990 and continues upward in 1991. Mean size in 1991 comparable to figures in the mid-1980s; b) Irish Sea West - fluctuating without obvious trend. Mean size in the landings in decline and remains low - mean size in catches more stable.

**Management advice:** ACFM advises a precautionary TAC for 1993 of 9,395 t for Division VIIa (excluding rectangles 33E2-E5). It should be noted that this recommended management area includes two functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the two units.

**Special comments:**

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 14	595	Effort 93 = Effort 90
Unit 15	8,800	Average landings 1987-1990
Total	9,395	

#### **6.1.10 *Nephrops* in Divisions VIIId,e**

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

**Special comments:** There are no reported landings of *Nephrops* from this area, so it is suggested that a TAC of zero would prevent misreporting.



### 6.1.11 *Nephrops* in Divisions VIIb,c,j,k

Units included in recommended Management Area: a) Porcupine Bank (Unit 16), b) Aran Islands (Unit 17), c) NW and W Ireland (Unit 18) and d) SW Ireland (Unit 19).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	5.09	3.8			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	20.0			
Landings <sup>4</sup>											
a) Porcupine Bank	3.95	2.57	2.44	2.32	2.11	1.88	1.61 <sup>2</sup>	-	4.29	1.61	2.87
b) Aran Islands	1.99	1.05	1.18	0.75	0.83	0.35	0.55 <sup>2</sup>	-	1.99	0.40	0.87
c) NW and W Ireland	0.02	+	+	0.01	0.01	0.01	0.03 <sup>2</sup>	-	0.09	+	0.02
d) SW Ireland	0.67	0.47	0.72	0.60	0.65	0.57	0.17 <sup>2</sup>	-	0.67	0.17	0.50
e) Other <sup>5</sup>	0.21	0.14	0.17	0.19	0.14	0.11	0.20 <sup>2</sup>	-	0.27	+	0.18
Total area	6.85	4.23	4.52	3.88	3.74	2.92	2.56 <sup>2</sup>	-	6.85	2.56	4.42

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>TAC for Sub-area VII as a whole. <sup>4</sup>Provided by Working Group members.

<sup>5</sup>Landings taken within the Management Area, but outside the Units under a)-d). Weights in '000 t (rounded up).

**Landings:** In a) Porcupine Bank and b) the Aran Islands grounds, landings which had been decreasing since 1985 did so very slightly during 1991. In c) NW Ireland, the small landings continue to fluctuate. In d) SW Ireland, landings increased sharply in 1982-1987 but have since decreased. Landings from e) Other rectangles continue to fluctuate without trend.

**Data and assessment:** CPUE, LPUE and mean size data were available for the Porcupine Bank. Length composition data were available for the Porcupine and Aran grounds (1990 and 1991). Yield per recruit assessments from LCA were carried out for a) Porcupine Bank (1991) and b) Aran (1992). Assessments not possible for c) and d).

**Fishing mortality:** a) Porcupine Bank: effort decreasing in both Spanish and French fleets, Current  $F$  is higher than the  $F_{max}$  in both males and females. b) Aran grounds: the assessment suggests that the current  $F$  is close to  $F_{max}$  in both males and females. No assessments for other units.

**State of stock:** a) Porcupine Bank CPUE (Spanish) and LPUE (French) decreasing markedly since the early 1980s. Mean size is fairly stable in males, increasing slightly in females but 1991 figure lower.

**Management advice:** ACFM advises, on the basis of new information on the state of the stock, a precautionary TAC for 1993 of about 4,000 t for Divisions VIIb,c,j,k. It should be noted that this recommended functional area includes four functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the four units.

**Special comments:** The advised precautionary TAC takes into account the fact that a reduction in effort in the Aran Island unit is no longer required.

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 16	2,514	Average effort 1985-1990
Unit 17	568	Average landings 1989-1990
Unit 18	90	Max. landings 1981-1990
Unit 19	725	Max. landings 1981-1990
Other	124	Max. landings 1981-1990
Total	4,021	

### 6.1.12 *Nephrops* in Divisions VII<sub>f,g,h</sub> and VII<sub>a</sub> 33E2-E5

Units included in recommended Management Area: a) Celtic Sea (Units 20, 21 and 22 combined).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	3.83	3.8			
Agreed TAC <sup>3</sup>	-	-	-	-	-	-	-	20			
Landings <sup>4</sup>											
a) Celtic Sea	3.82	2.81	3.14	2.91	3.88	4.30	3.08 <sup>2</sup>	-	4.30	2.81	3.54
b) Other <sup>5</sup>	+	+	0.24	0.16	0.10	0.08	+ <sup>2</sup>	-	0.24	+	0.05
Total area	3.82	2.81	3.37	3.07	3.98	4.38	3.08 <sup>2</sup>	-	4.38	2.81	3.59

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>TAC for Sub-area VII as a whole. <sup>4</sup>Provided by Working Group members.

<sup>5</sup>Landings taken within the Management Area, but outside the Units under a). Weights in '000 t (rounded up).

**Landings:** Celtic Sea landings have been fluctuating without trend. Recently they have dropped in 1991.

**Data and assessment:** LPUE and mean size data are available. Length compositions from France were used in Yield per recruit (length-based) (1990).

**Fishing mortality:** Fishing effort fluctuating without obvious trend. Current fishing mortality in males is estimated to be above  $F_{max}$  although the curve is relatively flat-topped with little to be gained by reducing effort; in females  $F$  is below  $F_{max}$ .

**State of stock:** There was a sudden drop of LPUE in 1991; it had previously fluctuated without trend.

**Management advice:** Given the absence of new information, there is no basis for revising the precautionary TAC suggested for 1992, and ACFM advises a precautionary TAC for 1993 of 3,800 t for Divisions VII<sub>f,g</sub> and rectangles 33E2-E5 in Division VII<sub>a</sub>.

**Special comments:**

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Units 20,21,22	3,523	Average effort 1987-1990
Others	235	Average effort 1987-1990
Total	3,758	

### 6.1.13 *Nephrops* in Divisions VIIIa,b

Units included in recommended Management Area: a) Bay of Biscay North (Unit 23) and b) Bay of Biscay South (Unit 24).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	5.19	~6.8			
Agreed TAC	<sup>3</sup>	7.5	7.5	7.5	7.5	7.5	6.5	6.8			
Landings <sup>4</sup>											
a) Biscay N	4.28	3.97	5.07	6.02	4.60	4.60	4.35 <sup>2</sup>	-	6.02	3.97	4.84
b) Biscay S	0.31	0.37	0.47	0.66	0.63	0.36	0.40 <sup>2</sup>	-	0.66	0.18	0.38
c) Other <sup>5</sup>	?	0.10	0.11	0.14	0.14	0.14	0.06 <sup>2</sup>	-	0.14	0.05	0.11
Total area	4.59	4.43	5.66	6.81	5.37	5.10	4.81 <sup>2</sup>	-	6.81	4.43	5.29

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>No TAC in force. <sup>4</sup>Provided by Working Group members. <sup>5</sup>Landings taken within the Management Area, but outside the Units under a) and b). Weights in '000 t (rounded up).

**Landings:** For a) and b) combined, fluctuating without trend although the decline since 1988 has continued into 1991.

**Data and assessment:** LPUE available for a) Biscay North. Mean size for a) and b) combined.

**Fishing mortality:** Fishing effort (based on Biscay N) slowly decreasing. Estimates of total effort suggest rise to 1988 followed by a decline to 1991.

**State of stock:** LPUE showing no obvious trend but at a low level at present. a) and b) combined. Mean sizes of males and females in the landings have increased in the last couple of years.

**Management advice:** Given the absence of new information, there is no basis for revising the precautionary TAC suggested for 1992, and ACFM advises a precautionary TAC for 1993 of 6,800 t for Divisions VIIIa,b. It should be noted that this recommended management area includes two functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the two units.

**Special comments:**

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Units 23 + 24	6,677	Maximum landings 1985-1989
Others	142	Maximum landings 1985-1989
Total	6,819	

### 6.1.14 *Nephrops* in Division VIIIc

Units included in recommended Management Area: a) North Galicia (Unit 25) and b) Cantabrian Sea (Unit 31).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	0.51	~0.51			
Agreed TAC	- <sup>3</sup>	0.4	0.5	0.5	0.6	0.8	0.6	0.8			
Landings <sup>4</sup>											
a) N. Galicia	0.48	0.36	0.41	0.45	0.38	0.29	0.42 <sup>2</sup>	-	0.51	0.29	0.41
b) Cantabrian	0.13	0.13	0.12	0.15	0.14	0.19	0.11 <sup>2</sup>	-	0.19	0.10	0.12
Total area	0.61	0.49	0.53	0.60	0.52	0.48	0.53 <sup>2</sup>	-	0.61	0.32	0.51

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>No TAC in force. <sup>4</sup>Provided by Working Group members. Weights in '000 t (rounded up).

**Landings:** a) North Galicia: Landings recovered to mean level of previous years, after a decline in 1989-1990. b) Cantabrian Sea: Landings fluctuating with lowest recorded level in 1991.

**Data and assessment:** CPUE and mean size data available for both stocks. a) North Galicia: Yield per recruit length-based analysis (1991). b) Cantabrian Sea: length-based assessment (1991).

**Fishing mortality:** a) North Galicia: effort fluctuating. Current  $F$  is above  $F_{max}$  for both sexes although long-term gains in moving to  $F_{max}$  are less than 10% and short-term losses are about 20%. b) Cantabrian Sea: effort fluctuating without trend. Current  $F$  is above  $F_{max}$  in males and below  $F_{max}$  in females.

**State of stock:** a) North Galicia: CPUE recovered the level of previous years after the fall in 1990. Mean size of males and females decreasing slightly. b) Cantabrian Sea: CPUE below the level of the period 1987-1990. Mean size stable.

**Management advice:** In the absence of new information, there is no basis for revising the precautionary TAC suggested for 1992, and ACFM advises a precautionary TAC for 1993 at the same value of 510 t as advised for 1992. It should be noted that this recommended management area includes two functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the two units.

**Special comments:**

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 25	353	Average landings 1980-1990
Unit 31	158	Average landings 1988-1990
Total	511	

#### 6.1.15 *Nephrops* in Divisions VIIId,e

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

**Special comments:** Units included - none. There are no reported landings of *Nephrops* from this area, so it is suggested that, if required, a TAC of zero would prevent misreporting.

### 6.1.16 *Nephrops* in Division IXa

Units included in recommended Management Area: a) West Galicia (Unit 26), b) North Portugal (Unit 27), c) Southwest Portugal (Unit 28), d) South Portugal (Unit 29) and e) Gulf of Cadiz (Unit 30).

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
TAC preferred by ACFM	-	-	-	-	-	-	1.84	1.3			
Agreed TAC	<sup>3</sup>	4.1	4.8	4.8	4.8	4.7	3.0	2.5			
Landings <sup>4</sup>											
a) W. Galicia	0.75	0.66	0.67	0.64	0.63	0.40	0.55 <sup>2</sup>	-	0.82	0.401	0.66
b) N. Portugal	0.02	0.04	0.07	0.10	0.09	0.05	0.05 <sup>2</sup>	-	0.10	0.01	0.04
c) SW Portugal	0.51	0.47	0.51	0.42	0.47	0.37	0.48 <sup>2</sup>	-	1.43	0.26	0.61
d) S. Portugal											
e) Gulf of Cadiz	0.26	0.22	0.30	0.14	0.17	0.22	?	-	0.30	0.14	0.22
Total area	1.53	1.38	1.55	1.30	1.36	1.04	1.08 <sup>2</sup>	-	2.29	1.04	1.44

<sup>1</sup>Over period 1981-1991. <sup>2</sup>Preliminary. <sup>3</sup>No TAC in force. <sup>4</sup>Provided by Working Group members. Weights in '000 t (rounded up).

**Landings:** Landings for the period 1986-1990 have been revised for functional units 27, 28 and 29. a) West Galicia: slight increase in landings in 1991 after falling to lowest level in 1990. b) N. Portugal: catch increased since 1986, stable in last two years at intermediate level. c) + d) SW + S. Portugal: fluctuating without trend. e) Gulf of Cadiz: fluctuating without trend.

**Data and assessment:** a) LPUE and mean size data. Yield per recruit assessment using LCA in 1991. b), c) + d) CPUE effort and mean size data available. Yield per recruit assessment using LCA (1991). e) No data - no assessment.

**Fishing mortality:** a) W. Galicia: Effort fluctuating without obvious trend. Current F above  $F_{max}$  in both males and females (1991 results). b) N. Portugal: effort declined recently. Yield per recruit shows current F above  $F_{max}$  in males and below in females. c) + d) SW + S. Portugal: effort stable at present. Yield per recruit shows current F above  $F_{max}$  in both sexes. e) Gulf of Cadiz: no information.

**State of stock:** a) West Galicia: CPUE fluctuating without trend. Mean size of both sexes fell in late 1980s but rose in 1991. b) N. Portugal: mean size decreased in 1991, probably due to marketing and sampling problems. c) + d) SW + S. Portugal: CPUE fluctuating. Mean size decreasing in 1991 probably due to marketing and sampling problems.

**Management advice:** In the absence of new information, there is no basis for revising the precautionary TAC suggested for 1992, and ACFM advises that the TAC for 1993 is set at the same value of 1,300 t. It should be noted that this recommended management area includes five functional units and that a total TAC set for the entire area will not necessarily result in a balanced exploitation between the five units.

**Special comments:**

Basis for the precautionary TAC		
Unit	TAC (t)	Basis
Unit 26	514	Average landings 1989-1990
Unit 27	78	Average landings 1987-1990
Units 28 + 29	443	Average landings 1987-1990
Unit 30	302	Maximum landings 1980-1990
Total	1,337	

**6.1.17 *Nephrops* in Division IXb and Sub-area X**

**Source of information:** Report of the Working Group on *Nephrops* and *Pandalus* Stocks, February/March 1992 (C.M.1992/Assess:8).

**Special comments:** Units included - none. There are no reported landings of *Nephrops* from this area, so it is suggested that, if required, a TAC of zero would prevent misreporting.



## **6.2 Mackerel**

### **6.2.1 General comments**

The Commission of the EC requested advice on whether the current patterns of distribution and migration of mackerel have become more or less permanent and whether the existing management units are appropriate. There is no evidence to suggest that the patterns of distribution and migration have now stabilised. The assessment units used are appropriate for the present situation and ACFM considers these to be more appropriate management units than the units currently used by management bodies.

Catches for all areas are given in Tables 6.2.1.1 - 6.2.1.6.

6.2.2 North Sea mackerel

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max	Min	Mean
Recommended TAC <sup>3</sup>	0-20	LPL <sup>1</sup>	LPL <sup>1</sup>	LPL <sup>1</sup>	LPL <sup>1</sup>	LPL <sup>1</sup>	LPL <sup>1</sup>	LPL <sup>1</sup>			
Agreed TAC <sup>4</sup>	37	55	55	55	49.2	45.2	65.5	76.3			
Official landings	]	No data on a stock basis									
Unallocated landings											
Discards/slipping											
Catch as used by WG <sup>5</sup>	35	25	3	6	7	10	10 <sup>2</sup>	-			
Sp. stock biomass		45	-	37	(53)	78	~80 <sup>2</sup>				

<sup>1</sup>LPL = Lowest Practicable Level. <sup>2</sup>Predicted or assumed. <sup>3</sup>TAC for Sub-area IV and Division IIIa. <sup>4</sup>TAC for Sub-area IV, Division IIIa and Division IIa (EC zone). <sup>5</sup>Estimated landings of North Sea stock. Weights in '000 t.

**Catches:** Based on estimates of total mortality from spawning stock sizes in 1986, 1988 and 1990. Catch in 1991 is assumed to be the same as in 1990.

**Data and assessment:** No analytical assessment possible. Problems with estimating catches from stocks due to overlap in distribution with Western mackerel. Egg surveys carried out on an international basis every second year up until 1990.

**Fishing mortality:** Not available.

**Recruitment:** The increase in SSB from 1988 to 1990 was due to the 1987 and 1988 year classes. Spawning area covered once both in June 1991 and June 1992. No signs of further improvement of SSB. Poor recruitment in the 1970s and 1980s.

**State of stock:** The stock is still at a historically low level and is outside safe biological limits.

**Management advice:** This stock still needs the maximum possible protection and, therefore, ACFM reiterates its previous recommendation that:

- a) There should be no fishing for mackerel in Divisions IIIa and IVb,c at any time of the year.
- b) There should be no fishing for mackerel in Division IVa during the period 1 January - 31 July.
- c) The 30 cm minimum landing size at present in force in Divisions IIIa and Sub-area IV should be maintained and the present by-catch regulations should be continued.

### 6.2.3 Western mackerel

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC <sup>3</sup>	340	290	380	430	355	480	500	670 <sup>6</sup>			
Agreed TAC <sup>4</sup>	415 <sup>4</sup>	367 <sup>4</sup>	405 <sup>4</sup>	573 <sup>4</sup>	495 <sup>4</sup>	525 <sup>4</sup>	575 <sup>4</sup>	594 <sup>4</sup>			
Official landings	473	473	567	557	539	597	603	-			
Unallocated landings	79	58	37	35	21	+	13	-			
Discards/slipping	9	7	11	36	7	19	31	-			
Catch as used by WG <sup>5</sup>	561	538	615	628	567	606	647	-	662	326	568
Sp. stock biomass	2,178	1,807	2,050	2,028	2,082	1,990	2,214 <sup>2</sup>	-	2,797	1,807	2,194
Recruitment (age 0)	2,284	2,784	5,614	2,675	6,900	5,231	3,300 <sup>2</sup>	-	6,932	902	4,104
Mean F(4 - 8,u)	0.21	0.22	0.23	0.28	0.25	0.28	-	-	0.28	0.12	0.22

<sup>1</sup>Over period 1976-1990. <sup>2</sup>Predicted or assumed. <sup>3</sup>Recom. TACs for areas (VI, VII, VIIa,b, Vb, IIa, and from 1988, IV).

<sup>4</sup>See Special comment 4 in 1991 ACFM Report. <sup>5</sup>Landings and discards of Western stock. <sup>6</sup>Also advised for 1993. Weights in '000 t, recruitment in millions.

**Catches:** Catches increased in 1991 to 647,000 t which is the highest level since 1981. Catches again exceeded the recommended and agreed TACs. Discards only apply to catches of one fleet - not the overall catch of Western mackerel. Misreporting amounted to 120,000 t in 1991 (i.e., catches taken in Division IVa but reported as Division VIa).

**Data and assessment:** No assessment was carried out because the results of the 1992 egg surveys have not been fully analyzed. Preliminary analysis of the 1992 egg survey data supported the original and updated predictions. The VPA database was updated but no new assessment carried out. The predictions carried out in 1991 were checked with the 1991 catches in number.

**Fishing mortality:** Not available for 1991. The actual catches in numbers at age were compared with the predicted values and the results suggested a possible shift in exploitation from the younger to the older age groups.

**Recruitment:** Recruitment surveys confirmed that the 1989 year class is a very strong one. The preliminary results indicate that the 1990 year class appears to be strong and the 1991 year class to be very strong.

**State of stock:** The SSB has been stable at about 2 million t since 1985.

**Forecast for 1993:** Based on a revised forecast taking into account new recruitment estimates, it was not considered necessary to change the ACFM advice on TACs previously given for 1993.

**Management advice:** The management area should correspond to the assessment area (see Section 6.2.1), which for this stock is Divisions IIa, Vb, VIIa,b,d,e and Sub-areas VI and VII, all for the whole year, and Division IVa from 1 August - 31 December.

**Special comments:** Those parts of Divisions VIIId and e on or close to the continental shelf are within the main range of the Western mackerel stock and so are included within the units listed in the ACFM advice for this stock.

Division IVa and the EC zone of Division IIa are included in the TAC regulation applying to North Sea mackerel, whereas the ACFM advice, which is based on available information about the distribution and migration of each stock, indicates that they should be included in the management area of the Western stock for the period August-December. During this period of the year a large proportion of adult Western mackerel is in Divisions IIa and IVa. The TAC regulation applying to Division IVa and the EC zone of Division IIa imposes a major constraint on the fisheries of some countries that have quotas to exploit mackerel of the Western stock in these areas even though the scientific advice indicates that such severe restrictions are not needed. The result of this limitation is that large quantities of mackerel caught in Division IVa are misreported from adjacent areas, particularly Division VIa.

Information on discards, particularly in Divisions IIa and IVa, is required.

#### 6.2.4 Mackerel in Divisions VIIIc and IXa

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC <sup>3</sup>	-	24.7	36.57	36.57	36.57	36.57	36.57	36.57			
Catch as used by WG	18	25	22	25	18	21	21	-	27	15	21

<sup>1</sup>Over period 1977-1991. <sup>2</sup>Predicted or assumed. <sup>3</sup>Division VIIIc, Sub-areas IX and X, and CECAF Division 34.1.1 (EC waters only). Weights in '000 t.

**Catches:** 1991 catches in Divisions VIIIc and IXa remained at almost the same level as in 1990.

**Data and assessment:** No assessment of the southern stock was made because of insufficient data and doubts about the identity of the stock.

**Fishing mortality:** Not available.

**Recruitment:** Not available.

**State of stock:** Unknown.

**Forecast for 1993:** Not available.

**Special comments:** Very large quantities of juvenile (ages 0-2) mackerel are caught in Divisions VIIIc and IXa (82 million in 1990 and 70 million in 1991) and a large proportion of the catch is comprised of immature fish (42% - 86% by number up to 1991). The fishery may have a considerable and adverse effect on the recruitment to whatever spawning stock they belong. It is too early to evaluate the effect of the introduction of the 20 cm minimum landing size.

## 6.3 Horse Mackerel

### 6.3.1 General comments

The Commission of the EC requested advice on whether the current patterns of distribution and migration of horse mackerel have become more or less permanent and whether the existing management units are appropriate. There is no evidence to suggest that the patterns of distribution and migration have now stabilised. The assessment units used are appropriate for the present situation and ACFM considers these to be more appropriate management units than the units currently used by management bodies.

Discard data have been reported by only one country. These discard estimates represent less than 2% of the total landings of all countries, but the total quantity discarded is likely to have been higher. The lack of data may not at present affect the accuracy of the estimate of spawning stock size, particularly as this is largely based on the egg surveys which are independent of catch data. However, as the spawning stock appears to be declining and as recruitment is poor, it is becoming increasingly important to obtain accurate total catch information, particularly in relation to the younger age groups.

It is, therefore, recommended that all countries which have fisheries in which horse mackerel are caught should collect information about discard levels as a matter of urgency and this information should be made available to the Working Group as soon as possible.

TACs and management regulations should refer to each horse mackerel species separately and not to horse mackerel in general (i.e. *Trachurus trachurus*, *T. mediterraneus* and *T. picturatus* instead of *Trachurus* spp.).

Catches for all areas are given in Tables 6.3.1.1 - 6.3.1.8.

### 6.3.2 North Sea horse mackerel (Divisions IIIa, IVb,c, VIId)

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	-	-	-			
Agreed TAC <sup>2</sup>	18.5	30	30	50	45	40	45	55			
Catch as used by WG	27	25	12	24	33	19	12	-	33	4	19
Sp. stock biomass <sup>3</sup>				120	217	255	247				

<sup>1</sup>Over period 1982-1991. <sup>2</sup>Division IIa and Sub-area IV (EC waters only). <sup>3</sup>Egg survey estimates. Weights in '000 t.

**Catches:** North Sea horse mackerel are caught in Divisions IIIa east (i.e., the Kattegat and the eastern part of the Skagerrak), IVb,c and VIId. Catches were below 10,000 t before 1984. In 1984-1989, the catches were between 24,000 t and 33,000 t, except for 1987. The catches declined in 1990 and 1991 to 19,000 t and 12,000 t, respectively. The majority of the catch is taken as by-catch in the small-mesh industrial fishery while landings from the directed fishery for horse mackerel are limited. In 1991, the catches in the western part of Skagerrak (2,725 t) and the Norwegian catches in Division IVb (3,600 t) were considered to be catches of Western horse mackerel.

**Data and assessment:** Samples taken from the Dutch commercial catches and research vessel catches were available for the period 1987-1991, but these are not considered representative of the total international catch. SSB is estimated from egg surveys conducted in 1988-1991.

**Fishing mortality:** The low catch compared to the estimated SSB indicates a low fishing mortality.

**Recruitment:** The 1982 year class is very strong. The 1986 and 1989 year classes are considered to be relatively strong. All other year classes since 1980 are poor.

**State of stock:** SSB increased from 1988 to 1990 and is considered to be at a relatively high level. No information on historical state of the stock.

**Forecast for 1993:** Not available.

**Special comments:** If a TAC is set for North Sea horse mackerel, it should only apply to the areas where the stock is fished (Divisions IVb,c, VIId and IIIa (east)) (see Section 6.3.1).

### 6.3.3 Western horse mackerel (Divisions IIa, IVa, Vb, VIa, VIIa-c,e-k, VIIIa,b,d,e)

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	100	~200	-				
Agreed TAC	145 <sup>3</sup>	123 <sup>4</sup>	155 <sup>4</sup>	169 <sup>4</sup>	153 <sup>4</sup>	203 <sup>4</sup>	230 <sup>4</sup>	250 <sup>4</sup>			
Landings as used by WG	73	97	157	184	267	363	328	-			
Discards/slipping	8	9	-	4	1	10	5	-			
Catch as used by WG	81	106	157	188	269	373	334	-	373	42	150
Sp. stock biomass	-	645	-	-	2,134	1,753	1,338	-	2,134	483	-
Mean F(5-11,w)	0.07	0.10	0.05	0.06	0.11	0.17	-	-	0.17	0.05	0.10

<sup>1</sup>Over period 1982-1990. <sup>2</sup>Predicted or assumed. <sup>3</sup>Division Vb (EC waters only) and Sub-areas VI-VIII. <sup>4</sup>Division Vb (EC waters only), Sub-areas VI and VII, and VIIIa,b,d,e. Weights in '000 t, recruitment in millions.

**Catches:** Catches from this stock increased up to 1990 but decreased in 1991. Catches decreased in the northern areas (Divisions IIa, IVa), but increased in Sub-area VII. Discards only apply to catches of one fleet. Catches from the western part of the Skagerrak (2,725 t in 1991) and the Norwegian catches in Division IVb (3,600 t in 1991) have been assumed to be from the Western stock.

**Data and assessment:** No full assessment carried out. Only preliminary results of the 1992 egg survey are available.

**Fishing mortality:** No new information.

**Recruitment:** The 1982 year class has dominated this fishery for a number of years. The 1991 year class appears to be more widespread than usual. Based on the fishery there are no signs of an incoming year class of considerable strength.

**State of stock:** A new assessment will be made in 1993 when the final results from the 1992 egg survey will be available. Preliminary results from the 1992 egg survey indicate that the stock is higher than predicted last year.

**Forecast for 1993:** Not available.

**Management advice:** The SSB producing the strong 1982 year class was of the order of 500,000 - 600,000 t. As long as the spawning stock is above that level, ACFM considers it to be within safe biological limits. An analysis made last year showed that annual catches of 300,000 t (of which 200,000 t are assumed to be from the 1982 year class) in 1993-95 will result in the 1982 year class being fished out by 1996/97. The catch from the 1982 year class in 1991 was 217,000 t. With catches at half this level (i.e., 100,000 t per year from the 1982 year class), the cohort will last for another decade.

The management area should correspond to the assessment area (see Section 6.3.1), which for this stock is Divisions IIa, IVa, Vb, VIa, VIIa-c,e-k, VIIIa,b,d,e.

**Special comments:** Due to the exceptional size of the 1982 year class, growth and maturation have been very much reduced. The results of the 1989 egg survey indicated that a much lower proportion of this 1982 year class had spawned in 1986 than was assumed (10% instead of 60%). For last year's prediction it was assumed that at the age of 7 the 1982 year class would be fully mature in 1989. The maturity rates may have to be revised following analysis of the 1992 egg survey data.

### 6.3.4 Southern horse mackerel (Divisions VIIIc and IXa)

**Source of information:** Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy, June 1992 (C.M.1992/Assess:17).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	-	-	-	-	-	38	61	61 <sup>2</sup>			
Agreed TAC	-	72.5 <sup>3</sup>	72.5 <sup>3</sup>	82.0 <sup>3</sup>	73.0 <sup>3</sup>	55.0 <sup>4</sup>	73.0 <sup>4</sup>				
Catch as used by WG	44	71	55	56	56	49	46	-	167	44	103

<sup>1</sup>Over period 1962-1991. <sup>2</sup>Precautionary TAC. <sup>3</sup>Division VIIIc, Sub-areas IX and X, and CECAF Division 34.1.1 (EC waters only). <sup>4</sup>Division VIIIc and Sub-area IX. Weights in '000 t, recruitment in millions.

**Catches:** Catches revised by the ICES Workshop for Revising the Horse Mackerel Database of Divisions VIIIc and IXa. Catches have shown a decreasing trend since 1978. Total catches in 1991 were about 7% lower than in 1990.

**Data and assessment:** Uncertainty about stock identity. Catch in numbers at age and CPUE at age revised for 1985-1991. Recruitment estimated from trawl surveys. Analytical assessment was attempted but was not considered reliable.

**Recruitment:** Recruitment has decreased during the period 1985-1991. The 1992 year class appears to be strong.

**Forecast for 1993:** Not available.

**Special comments:** It is difficult to advise on a precautionary TAC for 1993 for the Southern horse mackerel, because of the unknown effect of the apparently strong 1992 year class on the fishery, which is mainly concentrated on juvenile fish.



## 6.4 Blue Whiting

### 6.4.1 Blue whiting in the Northern area (Sub-areas I-VI and XIV and Divisions VIIb,c)

**Source of information:** Report of the Blue Whiting Assessment Working Group, September 1992 (C.M.1993/Assess:4).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Recommended TAC	783	1000	950	832	630	600	670	-			
Agreed TAC	-	-	-	-	-	-	-	-			
Catch as used by WG <sup>3</sup>	653	794	632	523	592	529	356	-	1092	238	639
Sp. stock biomass	2060	2444	2169	2003	2004	2026	3163	3810	6830	1818	3319
Recruitment (age 0)	11.4	12.8	9.4	10.9	47.4	8.7 <sup>2</sup>	10.3 <sup>2</sup>	8.7 <sup>2</sup>	47.4	3.5	13.9
Mean F(4 -8,u)	0.33	0.53	0.49	0.48	0.39	0.35	0.16	-	0.53	0.03	0.29

<sup>1</sup>Over period 1977-1991. <sup>2</sup>Assumed. <sup>3</sup>Including catches in Divisions VIIg-k and Sub-area XII. Weights in '000 t, recruitment in 10<sup>9</sup>.

**Catches:** The fishery became fully established in 1977. There was a peak in landings in 1979/1980 which was followed by a decrease with a minor peak in 1986 (Tables 6.4.1.1 - 6.4.1.4). After stabilizing at a level half of that in 1979/1980, a notable drop occurred in 1991. The recommended TAC has not been reached in any year.

**Data and assessment:** Analytical assessment using catch-in-number data and acoustic survey results. The tuning is based on the acoustic survey. The assessment is considered to be improved (see Special comments below).

**Fishing mortality:** From the low F-values during the early years of the fully-established fishery (in 1977-1979), there was an increase to a maximum in 1986 (Figure 6.4.1.1). Thereafter fishing mortality declined, with a particularly sharp drop in 1991. Current fishing mortality is below  $F_{0.1}$  and close to the assumed natural mortality.

**Recruitment:** The 1989 year class is the most abundant one since 1983, i.e., stronger than the strong 1982 and 1983 year classes. While the 1991 year class is considered average, the 1990 and 1992 year classes are below average.

**State of stock:** SSB has been rather stable during the last decade, but has now increased by 50%. The 1989 year class will have a dominant effect on SSB for the years to come.

#### Forecast for 1993:

Assuming  $F(92) = 0.182$ ; Basis: Catch estim.; Catch(92) = Not calculated; Landings (92) = 440.

Option	Basis	F(93)	SSB(93)	Catch(93)	Lndgs(93)	SSB(94)	Consequences/implications
A	$F_{91}$	0.160	3852	-	431	3854	Same level of SSB.
B	$F_{92}$	0.182		-	489	3799	Slight decline from 1992 but above the average.
C	$F_{0.1}$	0.241		-	630	3670	

Weights in '000 t.

Continued fishing at the estimated 1992 level ( $F_{92} = 0.18$ ) in 1993 will lead to a slight decline in SSB compared to 1992, but SSB in 1994 would remain above the average level.

**Management advice:** ACFM considers that the assessment of this stock has improved. Although there are still uncertainties in the assessment, the stock appears to be well within safe biological limits. Current fishing mortality is below the  $F_{0.1}$  (0.24) level and spawning stock biomass has increased to its highest level since 1981. It is anticipated that the strong 1989 year class will support high catches in the years to come. Maintaining the *status quo*  $F$  ( $F_{92} = 0.18$ ) in 1993 would result in increased catches in 1993 (490,000 t) while maintaining SSB in 1994 at the 1992 level. Catches of about 600,000 t in 1993 would result in SSB in 1994 remaining above the 1977-1991 long-term average while  $F$  still remained below  $F_{0.1}$ .

**Special comments:** The analytical assessment carried out this year gives a similar picture of the size of the blue whiting stock as presented in the 1991 VPA, except that SSBs for 1985-1990 are slightly lower (between 6-18% less) than those estimated last year year (e.g., SSB in 1990 of 2.02 vs 2.46 million t). ACFM considers these inconsistencies to reflect the present precision level of the VPA tuning data, in particular the discrepant age compositions of blue whiting in the Russian and Norwegian surveys.

Acoustic surveys conducted in 1988-1992 during the spawning season in the spawning area west of Britain and Ireland provided the following SSB estimates:

1988:	6.8 million t
1989:	6.1 million t
1990:	5.7 million t
1991:	4.4 million t
1992:	4.3 million t

The 1992 estimate of 4.3 million t (total stock 4.6 million t) is considered to be more reliable than previous estimates as the 1992 result is supported by the estimates from two repeated surveys which gave stock estimates at the same level, i.e., 4.0 to 4.2 million t.

The acoustic surveys prior to 1991 indicate a much larger biomass than that estimated from the 1992 VPA, but show a clear downward trend. SSB values for 1988-1992 from this year's VPA (tuned using the Russian and Norwegian acoustic results in conjunction with the international catch-at-age data), however, do not follow this pattern. The VPA results indicate that SSB was stable during 1988-1990 but sharply increased in 1991 and 1992, viz.:

1988:	2.0 million t
1989:	2.0 million t
1990:	2.0 million t
1991:	3.2 million t
1992:	3.8 million t

There are several major problems inherent in assessing blue whiting stocks. Firstly, the fishery is almost entirely a directed pelagic trawl fishery, and catch-per-unit values, therefore, reflect the stock situation to only a very limited extent. Secondly, age determination of blue whiting is difficult and more complicated compared to most other fish species. This is seen in the different age compositions of the Russian and Norwegian surveys, despite the similarity in total biomass estimated from the two surveys. Thirdly, the target strength for blue whiting has yet to be precisely determined. Thus, estimates of biomass from the acoustic surveys (which are derived using a target strength value) cannot be taken as absolute values, but only as relative indices of stock size. Lastly, stock identity problems still exist for blue whiting. The present separation of blue whiting into two stocks (Northern and Southern) was based more on convenience than on scientific evidence. Several studies are underway, however, to investigate the stock structure of blue whiting in more detail.

#### 6.4.1.1 Medium-term predictions requested by NEAFC

For the Northern stock of blue whiting, NEAFC requested ICES to evaluate the development of the total stock biomass and spawning stock biomass over a three-year period (1994-1996) assuming:

- recruitment as estimated for the year classes up to and including 1990,
  - for the year classes 1991 and after average recruitment, excluding the recruitment for the year classes 1982, 1983 and 1989,
- for the following scenarios:
- a 1993-1995 TAC for each year of 300,000; 400,000; 500,000; 600,000 and 700,000 t.

The input data for the starting year, including the selection pattern, were the same as for the standard prediction.

For the recruitment in 1993-1996, two options were used:

- A. The geometric mean of the recruitment in all years 1977-1988 ( $10,279 \times 10^6$  at age 0).
- B. The geometric mean of the recruitment in all the years 1977-1988, excluding the rich year classes 1982-1983 ( $8,677 \times 10^6$  at age 0).

Assuming a catch in 1992 of 440,000 t, spawning stock biomass (SSB) and total stock biomass (TSB) at 1 January was computed for the years 1992-1996 with TAC constraints for 1993-1995 of 300, 400, 500, 600 and 700 thousand tonnes.

The results are shown in Table 6.4.1.5 and Figures 6.4.1.2 A-B.

Assuming a catch in 1992 of 440,000 t ( $F_{92}=0.18$ ) and average recruitment (1977-1988; Option A) for the year classes 1991 and after, spawning stock biomasses remain nearly stable (+3% to - 11%) [compared with 1993] for constant TACs of 300,000 t, 400,000 t and 500,000 t. Constant TACs of 600,000 t and 700,000 t would result in significant declines in SSB (SSBs in 1996 would be 18% and 25% lower, respectively, than in 1993). However all of the TAC scenarios, except for the 700,000 t option, would result in SSB in 1996 being higher than during 1982-1990.

Assuming a catch in 1992 of 440,000 t ( $F_{92}=0.18$ ) and average recruitment (1977-1981, 1984-1988; Option B) for the year classes 1991 and after, spawning stock biomasses remain nearly stable (0% to -7%) [compared with 1993] for constant TACs of 300,000 t and 400,000 t. Constant TACs of 500,000 t, 600,000 t and 700,000 t would result in declines in SSB between 14% and 28% (1993 vs 1996). However, as under the option A recruitment scenario, all of the TAC levels, except for the 700,000 t option, would result in SSB in 1996 being higher than during 1982-1990.

Given the uncertainties in the assessment, caution should be exercised if a multi-annual TAC in excess of 600,000 t is considered.

#### 6.4.2 Blue whiting in the Southern area (Divisions VIId,e,g-k and Sub-areas VIII and IX)

**Source of information:** Report of the Blue Whiting Assessment Working Group, September 1992 (C.M.1993/Assess:4).

Year	1985	1986	1987	1988	1989	1990	1991	1992	Max <sup>1</sup>	Min <sup>1</sup>	Mean <sup>1</sup>
Landings as used by WG <sup>2</sup>	42.8	33.1	32.8	30.8	33.7	32.8	32.0	-	42.8	27.2	32.8

<sup>1</sup>Over period 1977-1991. <sup>2</sup>Excluding catches in Division VIIg-k allocated to Northern stock. Weights in '000 t.

**Catches:** Fairly constant landings, except for 1985 (Table 6.4.2). Landings composed mostly of young-age groups (mainly 1-3 years).

**Data and assessment:** Available data include catch-in-number data, CPUE at age for both single and pair trawlers, bottom-trawl survey indices by age, and acoustic estimates in Divisions VIIIc and IXa in 1991 and 1992. No assessment carried out (see Special comments).

**Fishing mortality:** Unknown.

**Recruitment:** The 1986 year class is considered a strong one.

**State of stock:** Unknown.

**Forecast for 1993:** Not available.

**Special comments:** An analytical assessment was not attempted for the Southern stock of blue whiting because the landings are from a very limited part of the whole distributional area (assumed to be from the Porcupine Bank and southwards) and there are doubts about stock identity. There is little information available on the distribution of this stock in time and space.

If the assessment of this stock is to be improved, information on the size and distribution of the stock is required from surveys carried out on a regular basis.

### **6.4.3 Distribution in space and time of different life stages of blue whiting in the Northern area**

During 1992, information about blue whiting distribution was obtained in both the spawning season and in the feeding season. In the 1991 ACFM Report, revised maps of the distribution and main fishing areas were presented. No data have been obtained which indicate a need to update these maps.

#### **Spawning Area**

As stated in last year's report, the distribution of blue whiting within the spawning area is largely influenced by the North Atlantic Current. In 1992 this current was weaker than observed in 1990 and 1991. Due to the hydrographic situation, the fish distribution south of the Porcupine Bank was more easterly than in 1991 and 1990.

In spring 1992, more convincing evidence for the northwards migration was obtained. The result of three short consecutive surveys this year clearly demonstrated a northward migration of the main fish concentrations. Although the biomass estimate of the second survey is considered less accurate, it is consistent with the first one, i.e., 4.6 and 4.2 million t, respectively, and this indicates that the main part of the blue whiting spawning in the Porcupine Bank area belongs to the northern stock. In addition, an estimate of about 4 million t during the third coverage further strengthens this conclusion.

#### **Nursery Area**

The nursery area of the Northern blue whiting population is situated in the southern part of the Norwegian Sea, and in the northern part of the North Sea, especially in the Norwegian Trench. Most of the larvae hatched in the area west of the British Isles from the Porcupine Bank and the Hebrides drift in a northward direction.

Ichthyoplankton observations were made by R/V "Pinro" during the period 17 April to 2 May in the area west and northwest of the British Isles. The survey area in 1992 was approximately 46% of that surveyed in 1991 and the total number of stations sampled in 1991 was twice that sampled this year. Blue whiting larvae were present at 14 stations. The highest concentrations of larvae were collected between 52° - 54°N, 10° - 13°W and from 56° - 59°N, 08° - 12°W. The larval distribution in the south was similar to that recorded during surveys made in 1990 and 1991, whilst the distribution in the north was similar to that recorded in 1986.

In some years (e.g., 1990), 0-group blue whiting have been observed in the Barents Sea. The results of the international 0-group fish survey in the Barents Sea and adjacent waters in August-September 1992 showed that 0-group blue whiting were absent.

#### **Feeding Area**

The distribution of blue whiting concentrations in the Norwegian Sea during the feeding season depends on the position of the Polar front. During 1989 and 1990, only weak aggregations of blue whiting were observed in this feeding area, and consequently only low fishing activity took place. However, with the recruitment of the strong 1989 year class to the fishery in 1991 and 1992, the situation has improved. Due to the location of the Polar front in 1990-1992, the distribution pattern was observed to be more easterly than before. During the summer of 1991 and 1992 the temperature in the main stream of the North-Atlantic current was higher than earlier.

**Zonal Distribution**

The acoustic surveys conducted in 1992 confirmed that during spawning most of the blue whiting stock is in the EC zone (Table 6.4.3.1).

The distribution of the blue whiting aggregations during the feeding season in 1992 is shown in Figure 6.4.3. The blue whiting concentration is observed mainly in the national zones of Norway and the Faroes, as well as in the international waters of the Norwegian Sea.

Total catches of blue whiting in 1978-1991 divided into areas within and beyond the national fisheries jurisdiction of NEAFC are presented in Table 6.4.3.2.

**Table 2.1.2.1** North-East Arctic COD. Total nominal catch (t) by fishing areas. (Data provided by Working Group members.)

Year	Sub-area I	Division IIa	Division IIb	Total catch
1961	409,694	153,019	220,508	783,221
1962	548,621	139,848	220,797	909,266
1963	547,469	117,100	111,768	776,337
1964	206,883	104,698	126,114	437,695
1965	241,489	100,011	103,430	444,983
1966	292,253	134,805	56,653	483,711
1967	322,798	128,747	121,060	572,605
1968	642,452	162,472	269,254	1,074,084
1969	679,373	255,599	262,254	1,197,226
1970	603,855	243,835	85,556	933,246
1971	312,505	319,623	56,920	689,048
1972	197,015	335,257	32,982	565,254
1973	492,716	211,762	88,207	792,685
1974	723,489	124,214	254,730	1,102,433
1975	561,701	120,276	147,400	829,377
1976	526,685	237,245	103,533	867,463
1977	538,231	257,073	109,997	905,301
1978	418,265	263,157	17,293	698,715
1979	195,166	235,449	9,923	440,538
1980	168,671	199,313	12,450	380,434
1981	137,033	245,167	16,837	399,037
1982	96,576	236,125	31,029	363,730
1983	64,803	200,279	24,910	289,992
1984	54,317	197,573	25,761	277,651
1985	112,605	173,559	21,756	307,920
1986	157,631	202,688	69,794	430,113
1987	146,106	245,387	131,578	523,071
1988	166,649	209,930	58,360	434,939
1989	164,512	149,360	18,609	332,481
1990	62,272	99,465	25,263	187,000
1991 <sup>1</sup>	65,339	155,088	37,455	257,882

<sup>1</sup>Provisional figures.

**Table 2.1.2.2** Coastal COD. Total nominal catch ('000 t) by Norway in Division IIa. (Data provided by Working Group members).

Year	Division IIa
1980	40
1981	49
1982	42
1983	38
1984	33
1985	28
1986	26
1987	31
1988	22
1989	17
1990	24
1991 <sup>1</sup>	25



**Table 2.1.2.3** North-East Arctic COD. Nominal catch (t) by countries (Sub-area I and Divisions IIa and IIb combined). (Data provided by Working Group members.)

Year	Faroe Islands	France	German Dem. Rep.	Germany Fed. Rep.	Norway	Poland	United Kingdom	USSR/ Russia <sup>2</sup>	Others	Total all countries
1961	3,934	13,755	3,921	8,129	268,377	-	158,113	325,780	1,212	783,221
1962	3,109	20,482	1,532	6,503	225,615	-	175,020	476,760	245	909,266
1963	-	18,318	129	4,223	205,056	108	129,779	417,964	-	775,577
1964	-	8,634	297	3,202	149,878	-	94,549	180,550	585	437,695
1965	-	526	91	3,670	197,085	-	89,962	152,780	816	444,930
1966	-	2,967	228	4,284	203,792	-	103,012	169,300	121	483,704
1967	-	664	45	3,632	218,910	-	87,008	262,340	6	572,605
1968	-	-	225	1,073	255,611	-	140,387	676,758	-	1,074,084
1969	29,374	-	5,907	5,543	305,241	7,856	231,066	612,215	133	1,197,226
1970	26,265	44,245	12,413	9,451	377,606	5,153	181,481	276,632	-	933,246
1971	5,877	34,772	4,998	9,726	407,044	1,512	80,102	144,802	215	689,048
1972	1,393	8,915	1,300	3,405	394,181	892	58,382	96,653	166	565,287
1973	1,916	17,028	4,684	16,751	285,184	843	78,808	387,196	276	792,686
1974	5,717	46,028	4,860	78,507	287,276	9,898	90,894	540,801	38,453	1,102,434
1975	11,309	28,734	9,981	30,037	277,099	7,435	101,843	343,580	19,368	829,377
1976	11,511	20,941	8,946	24,369	344,502	6,986	89,061	343,057	18,090	867,463
1977	9,167	15,414	3,463	12,763	388,982	1,084	86,781	369,876	17,771	905,301
1978	9,092	9,394	3,029	5,434	363,088	566	35,449	267,138	5,525	698,715
1979	6,320	3,046	547	2,513	294,821	15	17,991	105,846	9,439	440,538
1980	9,981	1,705	233	1,921	232,242	3	10,366	115,194	8,789	380,434
<u>Spain</u>										
1981	12,825	3,106	298	2,228	277,818	14,500	5,262	83,000	-	399,037
1982	11,998	761	302	1,717	287,525	14,515	6,601	40,311	-	363,730
1983	11,106	126	473	1,243	234,000	14,229	5,840	22,975	-	289,992
1984	10,674	11	686	1,010	230,743	8,608	3,663	22,256	-	277,651
1985	13,418	23	1,019	4,395	211,065	7,846	3,335	62,489	4,330	307,920
1986	18,667	591	1,543	10,092	232,096	5,497	7,581	150,541	3,505	430,113
1987	15,036	1	986	7,035	268,004	16,223	10,957	202,314	2,515	523,071
1988	15,329	2,551	605	2,803	223,412	10,905	8,107	169,365	1,862	434,939
1989	15,625	3,231	326	3,291	158,684	7,802	7,056	134,593	1,273	332,481
1990	9,584	592	169	1,437	88,737	7,950	3,412	74,609	510	187,000
1991 <sup>1</sup>	8,981	975		2,493	125,999	3,677	3,978	108,501	3,278	257,882

<sup>1</sup>Provisional figures.

<sup>2</sup>In 1991.

**Table 2.2.1** North-East Arctic HADDOCK. Total nominal catch (t) by fishing areas. (Data provided by Working Group Members).

Year	Sub-area I	Division IIa	Division IIb	Total
1960	125,657	27,925	1,854	155,434
1961	165,165	25,642	2,427	193,234
1962	160,972	25,189	1,727	187,888
1963	124,774	21,031	939	146,744
1964	79,056	18,735	1,109	98,900
1965	98,505	18,640	939	118,079
1966	124,115	34,892	1,614	160,621
1967	108,066	27,980	440	136,486
1968	140,970	40,031	725	181,726
1969	88,960	40,208	1,341	130,509
1970	59,493	26,611	497	86,601
1971	56,300	21,567	435	78,302
1972	221,183	41,979	2,155	265,317
1973	283,728	23,348	2,989	320,065
1974	159,037	47,033	5,068	221,138
1975	121,686	44,330	9,726	175,742
1976	94,065	37,566	5,649	137,279
1977	72,159	28,452	9,547	110,158
1978	63,965	30,478	979	95,422
1979	63,841	39,167	615	103,623
1980	54,205	33,616	68	87,889
1981	36,834	39,864	455	77,153
1982	17,948	29,005	2	46,955
1983	7,550	13,872	185	21,607
1984	4,000	13,247	71	17,318
1985	30,385	10,774	111	41,270
1986	69,865	26,006	714	96,585
1987	109,429	38,182	3,048	150,659
1988	43,990	47,086	668	91,744
1989	31,265	23,502	355	55,122
1990	15,138	10,375	304	25,816
1991 <sup>1</sup>	18,690	14,122	402	33,214

<sup>1</sup>Provisional figures.

**Table 2.2.2** North-East Arctic HADDOCK. Nominal catch (t) by countries (Sub-area I and Divisions IIa and IIb combined). (Data provided by Working Group members).

Year	Faroe Islands	France	German Dem. Rep.	Germany, Fed. Rep.	Norway	Poland	United Kingdom	USSR/ Russia <sup>2</sup>	Others	Total
1960	172	-	-	5,597	46,263	-	45,469	57,025	125	155,651
1961	285	220	-	6,304	60,862	-	39,650	85,345	558	193,234
1962	83	409	-	2,895	54,567	-	37,486	91,910	58	187,438
1963	17	363	-	2,554	59,955	-	19,809	63,526	-	146,224
1964	-	208	-	1,482	38,695	-	14,653	43,870	250	99,158
1965	-	226	-	1,568	60,447	-	14,345	41,750	242	118,578
1966	-	1,072	11	2,098	82,090	-	27,723	48,710	74	161,778
1967	-	1,208	3	1,705	51,954	-	24,158	57,346	23	136,397
1968	-	-	-	1,867	64,076	-	40,129	75,654	-	101,726
1969	2	-	309	1,490	67,549	-	37,234	24,211	25	130,820
1970	541	-	656	2,119	37,716	-	20,423	26,802	-	87,257
1971	81	-	16	896	45,715	43	16,373	15,778	3	78,905
1972	137	-	829	1,433	46,700	1,433	17,166	196,224	2,231	266,153
1973	1,212	3,214	22	9,534	86,767	34	32,408	186,534	2,501	322,626
1974	925	3,601	454	23,409	66,164	3,045	37,663	78,548	7,348	221,157
1975	299	5,191	437	15,930	55,966	1,080	28,677	65,015	3,163	175,758
1976	536	4,459	348	16,660	49,492	986	16,940	42,485	5,358	137,265
1977	213	1,510	144	4,798	40,118	-	10,878	52,210	287	110,158
1978	466	1,411	369	1,521	39,955	1	5,766	45,895	38	95,422
1979	343	1,198	10	1,948	66,849	2	6,454	26,365	454	103,623
1980	497	226	15	1,365	61,886	-	2,948	20,706	246	87,889
1981	381	414	22	2,398	58,856	<u>Spain</u>	1,682	13,400	-	77,153
1982	496	53	-	1,258	41,421	-	827	2,900	-	46,955
1983	428	-	1	729	19,371	139	259	680	-	21,607
1984	297	15	4	400	15,186	37	276	1,103	-	17,318
1985	424	21	20	395	17,490	77	153	22,690	-	41,270
1986	893	33	75	1,079	48,314	22	431	45,738	-	96,585
1987	464	26	83	3,106	69,333	99	563	76,980	-	150,654
1988	1,113	116	78	1,324	57,273	72	435	31,293	41	91,745
1989	1,218	125	26	171	31,825	1	853	20,903	-	55,122
1990	875	-	5	128	17,634	-	569	6,605	-	25,816
1991 <sup>1</sup>	1,117	60	-	219	18,894	-	514	12,388	22	33,214

<sup>1</sup>Provisional figures.

<sup>2</sup>In 1991.

**Table 2.3** North-East Arctic SAITHE. Nominal catch (tonnes) by countries in Sub-area I and Divisions IIa and IIb combined as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-
Faroe Islands	339	539	503	490	426
France	82	418	431	657	308
German Dem.Rep.	-	-	6	11	-
Germany, Fed.Rep.	7,224	4,933	4,532	1,837	3,470
Norway	159,643	149,556	152,818	103,899	63,090
Spain	-	33	-	-	-
UK (Engl. & Wales)	731	1,251	335	202	54
UK (Scotland)	1	-	-	+	21
USSR	14	206	161	51	27
Total	168,034	156,936	158,786	107,147	67,396

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	1	-	-	-	5
Faroe Islands	712	441	388	1,207	963
France	576	411	460 <sup>2</sup>	340 <sup>2</sup>	77 <sup>2</sup>
German Dem.Rep.	-	17	-	14	-
Germany, Fed.Rep.	4,909	4,557	606	1,126	1,805
Norway	85,710	108,244	119,625	91,945 <sup>1</sup>	105,445
Spain	-	-	-	-	-
UK (Engl. & Wales)	54	436	702	681	408 <sup>2</sup>
UK (Scotland)	3	6	23	28	-
USSR/Russia <sup>3</sup>	426	130	506	52	518 <sup>2</sup>
Total	92,391	114,242	122,310	95,393	109,221

<sup>1</sup>Provisional figures.

<sup>2</sup>As reported to Norwegian authorities.

<sup>3</sup>In 1991.

**Table 2.4.1** REDFISH in Sub-areas I and II. Nominal catch (t) by countries in Sub-areas I, Divisions IIa and IIb combined as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-
Faroe Islands	-	-	-	-	29
France	841	798	2,970	3,326	2,719
German Dem.Rep.	4,463	3,394	4,168	3,260	1,323
Germany,Fed.Rep.	3,182	3,395	3,289	3,306	3,561
Norway	10,045	11,083	18,650	20,456	23,255
Portugal	-	-	1,806	2,056	1,591
Spain	72	222	25	38	-
UK (Engl. & Wales)	336	182	716	167	129
UK (Scotland)	-	-	-	-	14
USSR	112,810	105,459	69,689	59,943	20,694
Total	131,749	124,533	101,313	92,552	53,315

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	+	-	-	37 <sup>3</sup>	23
Faroe Islands	450 <sup>3</sup>	973	338	386	644 <sup>2</sup>
France	1,611	3,369	344 <sup>3</sup>	285 <sup>3</sup>	245 <sup>3</sup>
German Dem.Rep.	417	994	1,978	5,351	-
Germany,Fed.Rep.	5,412	1,361	2,267	1,390	1,053
Norway	18,051	24,662	25,295 <sup>2</sup>	33,906 <sup>2</sup>	44,166 <sup>2</sup>
Portugal	1,175	500	340	830	166
Spain	25	26	5	-	1 <sup>2</sup>
UK (Engl. & Wales)	230	468	259	332	317 <sup>2</sup>
UK (Scotland)	9	2	13	1	13
USSR/Russia <sup>4</sup>	7,215	9,139	14,344	18,918	14,898 <sup>2</sup>
Total	34,595	41,494	45,183	61,436	61,526

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>As reported to Norwegian authorities.

<sup>4</sup>In 1991.

**Table 2.4.2** REDFISH in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Faroe Islands	-	-	-	-	-
Germany, Fed. Rep.	10	-	1	143	50
Norway	732	580	1,472	2,378	4,260
UK (England & Wales)	77	48	22	43	32
UK (Scotland)	-	-	-	-	3
USSR	1,750	4,023	532	368	1,066
Total	2,569	4,651	2,027	2,932	5,411

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	-	1	13	7	-
Germany, Fed. Rep.	10	6	+	-	-
Norway	2,331	2,232	1,823 <sup>2</sup>	1,256 <sup>2</sup>	2,565 <sup>2</sup>
UK (England & Wales)	14	20	12	+	-
UK (Scotland)	-	-	2	-	-
USSR/Russia <sup>3</sup>	769	199	594	114	255 <sup>2</sup>
Total	3,124	2,458	2,444	1,377	2,820

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>In 1991.

**Table 2.4.3** REDFISH in Sub-areas I and II. Nominal catch (t) by countries in Division IIa as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Faroe Islands	-	-	-	-	29
France	841	798	2,970	3,326	2,719
German Dem. Rep.	2,760	2,500	2,570	2,800	1,252
Germany, Fed. Rep.	3,172	3,395	3,288	2,972	3,319
Norway	9,140	10,500	17,111	18,062	18,693
Portugal	-	-	1,134	1,327	1,273
Spain	-	-	-	-	-
UK (England & Wales)	259	134	672	120	94
UK (Scotland)	-	-	-	-	11
USSR	63,125	82,836	63,342	59,047	19,099
Total	79,297	100,163	91,087	87,654	46,489

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	450 <sup>2</sup>	970	315	371	639
France	1,611	3,349	316 <sup>3</sup>	280 <sup>3</sup>	232 <sup>3</sup>
German Dem. Rep.	375	879	1,468	722	-
Germany, Fed. Rep.	3,562	1,320	2,144	1,338	735 <sup>2</sup>
Norway	15,409	22,288	23,406 <sup>2</sup>	31,117 <sup>2</sup>	37,428 <sup>2</sup>
Portugal	1,156	467	251	824	159
Spain	-	26	-	-	-
UK (England & Wales)	205	412	240	269	279 <sup>3</sup>
UK (Scotland)	8	2	9	1	-
USSR/Russia <sup>4</sup>	4,953	7,598	10,661	6,884	7,917 <sup>2</sup>
Total	27,729	37,311	38,810	41,806	47,389

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>As reported to Norwegian authorities.

<sup>4</sup>In 1991.

**Table 2.4.4** REDFISH in Sub-areas I and II. Nominal catch (t) by countries in Division IIb as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-
Faroe Islands	-	-	-	-	-
France	-	-	-	-	-
German Dem.Rep.	1,703	894	1,598	460	71
Germany, Fed.Rep.	-	-	-	190	192
Norway	173	3	67	16	302
Portugal	-	-	672	729	318
Spain	72	222	25	38	-
UK (England & Wales)	+	-	22	4	3
UK (Scotland)	-	-	-	-	+
USSR	47,935	18,600	5,815	528	529
Total	49,883	19,719	8,199	1,965	1,415

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	+	-	-	37 <sup>3</sup>	23
Faroe Islands	-	2	10	8	5 <sup>3</sup>
France	-	20 <sup>3</sup>	28 <sup>3</sup>	5 <sup>3</sup>	13 <sup>3</sup>
German Dem.Rep.	42	115	510	4,629	-
Germany, Fed.Rep.	1,840	35	123	52	318 <sup>2</sup>
Norway	311	142	66 <sup>2</sup>	1,533 <sup>2</sup>	4,173 <sup>2</sup>
Portugal	19	33	89	6	7
Spain	25 <sup>2</sup>	26 <sup>2</sup>	5	-	1 <sup>2</sup>
UK (England & Wales)	11	36	7	63	38
UK (Scotland)	1	-	2	-	13
USSR/Russia <sup>4</sup>	1,493	1,342	3,089	11,920	6,726 <sup>2</sup>
Total	3,742	1,751	3,929	18,253	11,317

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>As reported to Norwegian authorities.

<sup>4</sup>In 1991.



**Table 2.4.5** REDFISH in Sub-areas I and II. Nominal catch (t) of *Sebastes marinus* and *Sebastes mentella* in Sub-area I and Divisions IIa and IIb combined.

Species	1982	1983	1984	1985	1986
<i>S. marinus</i>	16,366	19,260	28,379	29,484	30,203
<i>S. mentella</i>	115,383	105,273	72,934	63,068	23,112
Total	131,749	124,533	101,313	92,552	53,315

Species	1987	1988	1989	1990	1991 <sup>1</sup>
<i>S. marinus</i>	24,077	25,908	22,572	26,537	21,543
<i>S. mentella</i>	10,518	15,586	22,611	34,899	39,983
Total	34,595	41,494	45,183	61,436	61,526

<sup>1</sup>Provisional figures.

**Table 2.5.1** GREENLAND HALIBUT in Sub areas I and II. Nominal catch (t) by countries (Sub-area I, Divisions IIa and IIb combined) as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-
Faroe Islands	-	-	-	-	42
France	8	67	138	239	13
German Dem.Rep.	1,153	1,913	2,089	3,807	2,659
Germany, Fed.Rep.	18	130	76	193	59
Norway	3,206	4,883	4,376	5,464	7,890
UK (Engl. & Wales)	10	2	23	5	10
UK (Scotland)	-	-	-	-	2
USSR	12,394	15,152	15,181	10,237	12,200
Spain	-	-	-	-	-
<b>Total</b>	<b>16,789</b>	<b>22,147</b>	<b>21,883</b>	<b>19,945</b>	<b>22,875</b>

Country	1987	1988	1989	1990 <sup>1</sup>	1991 <sup>1</sup>
Denmark	+	-	-	-	11
Faroe Islands	-	186	67	163	314
France	13	67	37 <sup>3</sup>	39 <sup>3</sup>	47 <sup>3</sup>
German Dem.Rep.	1,855	712	589	909	-
Germany, Fed.Rep.	169	32	11	45	117
Norway	7,261	9,076	11,043 <sup>2</sup>	16,825 <sup>2</sup>	24,039 <sup>2</sup>
UK (Engl. & Wales)	61	82	6	10	+
UK (Scotland)	20	2	-	-	2
USSR/Russia <sup>4</sup>	9,733	9,430	8,812	4,764 <sup>2</sup>	2,490 <sup>2</sup>
Spain	-	-	-	-	132 <sup>2</sup>
<b>Total</b>	<b>19,112</b>	<b>19,587</b>	<b>20,565</b>	<b>22,755</b>	<b>27,152</b>

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>As reported to Norwegian Authorities.

<sup>4</sup>In 1991.

**Table 2.5.2** GREENLAND HALIBUT in Sub-areas I and II. Nominal catch (t) by countries in Sub-area I as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Faroe Islands	-	-	-	-	-
Germany, Fed. Rep.	-	-	-	-	1
Norway	505	490	593	602	557
UK (Engl. & Wales	8	1	17	1	5
UK (Scotland)	-	-	-	-	1
USSR	200	196	81	122	615
Total	713	687	691	725	1,179

Country	1987	1988	1989	1990 <sup>1</sup>	1991 <sup>1</sup>
Faroe Islands	-	9	-	7	-
Germany, Fed. Rep.	2	4	-	-	-
Norway	984	978	335 <sup>2</sup>	304 <sup>2</sup>	1,923 <sup>2</sup>
UK (Engl. & Wales	10	7	+	-	-
UK (Scotland)	+	-	-	-	-
USSR/Russia <sup>3</sup>	259	420	482	321 <sup>2</sup>	522 <sup>2</sup>
Total	1,255	1,418	817	632	2,445

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figures.

<sup>3</sup>In 1991.

**Table 2.5.3** GREENLAND HALIBUT in Sub areas I and II. Nominal catch (t) by countries in Division IIa as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Faroe Islands	-	-	-	-	6
France	8	67	138	239	13
German Dem.Rep.	73	14	189	82	55
Germany, Fed.Rep.	18	130	76	172	42
Norway	2,487	4,257	3,703	4,791	6,389
UK (Engl.& Wales)	2	1	1	2	5
UK (Scotland)	-	-	-	-	1
USSR	2,459	5,031	5,459	6,894	5,553
Total	5,047	9,500	9,566	12,180	12,064

Country	1987	1988	1989	1990 <sup>1</sup>	1991 <sup>1</sup>
Faroe Islands	-	177	67	133	314
France	13	67	37 <sup>3</sup>	39 <sup>3</sup>	47 <sup>3</sup>
German Dem.Rep.	12	130	94	10	
Germany, Fed.Rep.	63	20	10	2	21
Norway	5,705	7,859	7,208 <sup>2</sup>	8,025 <sup>2</sup>	9,734 <sup>2</sup>
UK (Engl.& Wales)	44	56	6	1	+
UK (Scotland)	10	2	-	-	1
USSR/Russia <sup>4</sup>	4,739	4,002	4,964	1,246 <sup>2</sup>	305 <sup>2</sup>
Total	10,586	12,313	12,386	9,456	10,422

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>As reported to Norwegian Authorities.

<sup>4</sup>In 1991.

**Table 2.5.4** GREENLAND HALIBUT in Sub areas I and II. Nominal catch (t) by countries in Division IIb as officially reported to ICES.

Country	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-
Faroe Islands	-	-	-	-	36
German Dem.Rep.	1,080	1,899	1,900	3,725	2,604
Germany, Fed.Rep.	-	-	-	21	16
Norway	214	136	80	71	944
UK (Engl.& Wales)	+	+	5	2	+
UK (Scotland)	-	-	-	-	-
USSR	9,735	9,925	9,641	3,221	6,032
Total	11,029	11,960	11,626	7,040	9,632

Country	1987	1988	1989	1990 <sup>1</sup>	1991 <sup>1</sup>
Denmark	+	-	-	-	11
Faroe Islands	-	-	-	23	-
German Dem.Rep.	1,843	582	495	899	-
Germany, Fed.Rep.	104	8	1	43	96
Norway	572	239	3,500 <sup>2</sup>	8,496 <sup>2</sup>	12,382 <sup>2</sup>
UK (Engl.& Wales)	7	19	-	9	+
UK (Scotland)	10	+	-	-	1
USSR/Russia <sup>3</sup>	4,735	5,008	3,366	3,197 <sup>2</sup>	1,663 <sup>2</sup>
Spain	-	-	-	-	132 <sup>2</sup>
Total	7,271	5,856	7,362	12,667	14,285

<sup>1</sup>Provisional figures.

<sup>2</sup>Working Group figure.

<sup>3</sup>In 1991.

**Table 2.6.1.1** Nominal catch (tonnes) of COD in ICES Sub-area XIV, 1981-1991 as officially reported to ICES.

Country	1981	1982	1983	1984	1985
Faroe Islands	292	-	368	-	-
Germany, Fed. Rep.	7,367	8,940	8,238	7,035	2,006
Greenland	890	898	438	1,051	106
Iceland	1	-	-	-	-
Norway	-	-	-	794	-
UK(England & Wales)	-	-	-	-	-
UK(Scotland)	-	-	-	-	-
Total	8,550	9,838	9,044	8,880	2,112
Working Group estimate	16,000	27,000	13,377	8,068	2,112

Country	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	86	-	12	40	-	-
Germany, Fed. Rep.	4,063	5,358	12,049	10,613	26,419	8,557
Greenland	606	1,476	345	3,870	4,490	6,677
Iceland	-	1	9	-	-	-
Norway	-	-	-	-	12 <sup>1</sup>	836
UK(England & Wales)	-	-	-	1,158	2,365	4,971
UK(Scotland)	-	-	-	135	93	528
Total	4,755	6,835	12,415	15,816	33,379	21,569
Working Group estimate	4,668	6,658	9,415 <sup>2</sup>	14,575 <sup>3</sup>	-	22,227 <sup>4</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Excluding 3,000 t assumed to be from NAFO Division 1F.

<sup>3</sup>Excluding 2,741 t assumed to be from NAFO Division 1F and including 1,500 t reported from other areas assumed to be from Sub-area XIV.

<sup>4</sup>Includes additional catches reported to Greenland authorities.

**Table 2.6.1.2** Nominal catch of COD in NAFO Sub-area 1, 1981-1991.

Country	1981	1982	1983	1984	1985
Faroe Islands	-	-	1,139	-	-
Germany, Fed. Rep.	417	8,139	10,158	8,941	2,170
Greenland	53,039	47,693	44,970	24,457	12,651
Japan	-	-	-	13	-
Norway	-	-	-	5	-
United Kingdom	-	-	1,174	-	-
Total	53,456	55,832	57,641	33,416	14,876

Country	1986	1987	1988	1989	1990 <sup>1</sup>	1991 <sup>2</sup>
Faroe Islands	-	-	-	-	-	-
Germany, Fed. Rep.	41	55	6,573	12,763	6,512	71
Greenland	6,549	12,283	52,166	92,150	59,043	20,236
Japan	-	33	10	-	-	-
Norway	-	-	-	-	-	-
United Kingdom	-	-	927	3,987	2,127	-
Total	6,603	12,372	59,684	108,900	67,682	20,307
Working Group estimate <sup>3</sup>	-	-	62,684	111,641	-	-

<sup>1</sup>Provisional data.

<sup>2</sup>Reported to Greenland authorities.

<sup>3</sup>Includes 3,000 t in 1988 and 2,741 t in 1989 reported to be from ICES Sub-area XIV.

**Table 2.6.2** Nominal catch (tonnes) of COD in Division Va, 1978-1991, as officially reported to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Belgium	1,314	1,485	840	1,321	236	188	254
Faroe Is.	7,069	6,163	4,802	6,183	5,297	5,626	2,041
Iceland	319,648	360,077	429,044	461,038	382,297	293,890	281,481
Norway	189	288	358	559	557	109	90
UK (Engl. & Wales)	-	-	-	-	-	-	2
Total	328,220	368,013	435,044	469,101	388,387	299,813	283,868

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	207	226	597	365	309	260	548
Faroe Islands	2,203	2,554	1,848	1,966	2,012	1,782	1,339
Iceland	322,810	365,852	389,808	375,741	353,985	333,348	298,000
Norway	46	1	4	4	3	-	-
UK (Engl. & Wales)	1	-	-	-	-	-	-
Total	325,267	368,633	392,257	378,076	356,309	335,390	299,887
Total used in the assessment							313,468 <sup>2</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Additional catch by Iceland of 13,581 t included.



**Table 2.6.3** Nominal catch (tonnes) of SAITHE in Division Va, 1978-1991, as officially reported to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Belgium	1,092	980	980	532	201	224	269
Faroe Islands	4,250	5,457	4,930	3,545	3,582	2,138	2,044
France	-	-	-	-	23	-	-
Iceland	44,327	57,066	52,436	54,921	65,124	55,904	60,406
Norway	3	1	1	3	1	+	-
UK (Engl. & Wales)	-	-	-	-	-	-	-
Total	49,672	63,504	58,347	59,001	68,933	58,266	62,719

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	158	218	217	268	369	190	236
Faroe Islands	1,778	783	2,139	2,596	2,246	2,905	2,690
France	-	-	-	-	-	-	-
Iceland	55,135	63,867	78,175	74,383	79,796	95,032	98,000
Norway	1	-	-	-	-	-	-
UK (Engl. & Wales)	29	-	-	-	-	-	-
Total	57,101	64,868	80,531	77,247	82,411	98,127	100,926
Total used in the assessment	-	66,376 <sup>2</sup>	-	-	82,425 <sup>3</sup>	-	101,997 <sup>4</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Additional catch by Faroe Islands of 1,508 tonnes included.

<sup>3</sup>Additional catch by Iceland of 14 t included.

<sup>4</sup>Additional catch by Iceland of 1,071 t included.

**Table 2.6.4.1 GREENLAND HALIBUT.** Nominal catches (tonnes) in Sub-areas V and XIV, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	-	-	6
Faroe Islands	1,042	767	1,532	1,146	2,502	1,052	853	1,096
France	51	8	27	236	489	845	52	19
Germany, Fed. Rep.	2,318	3,007	2,581	1,142	936	863	858	565
Greenland	-	+	1	5	15	81	177	154
Iceland	27,838	15,4552	28,300	28,360	30,080	29,231	31,044	44,780
Norway	3	-	+	2	2	3	+	2
UK (Engl. & Wales)	-	-	-	-	-	-	-	-
Total	31,252	19,239	32,441	30,888	34,024	32,075	32,984	46,622
Total used in the assessment	-	-	-	-	-	-	-	-

Country	1988	1989	1990	1991 <sup>1</sup>
Denmark	+	-	-	-
Faroe islands	1,378	2,319	1,803	1,636
France	25	-	-	-
Germany, Fed. Rep.	637	493	336	309
Greenland	37	11	40	65
Iceland	49,040	58,330	36,557	34,000
Norway	1	3	48	26
UK (Engl. & Wales)	-	-	27	27
Total	51,118	61,396	38,811	36,063
Total used in the assessment	-	61,936	39,326	42,891

<sup>1</sup>Preliminary data.

**Table 2.6.4.2** GREENLAND HALIBUT. Nominal catches (tonnes) in Division Vb, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Denmark	-	-	-	-	-	-	-	6	+	-	-
Faroe Islands	951	442	863	1,112	2,456	1,052	775	907	901	1,513	1,064
France	51	8	27	236	489	845	52	19	25	-	-
Germany, Fed. Rep.	172	114	142	86	118	227	113	109	42	73	43
Norway	3	2	+	2	2	2	+	2	1	3	42
Total	1,177	566	1,032	1,436	3,065	2,126	940	1,043	969	1,589	1,149
Total used in the assessment	-	-	-	-	-	-	-	-	-	1,606 <sup>2</sup>	1,282 <sup>3</sup>

Country	1991 <sup>1</sup>
Denmark	-
Faroe Islands	1,363
France	-
Germany, Fed. Rep.	25
Norway	16
Total	1,404
Total used in the assessment	1,721 <sup>4</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Includes 17 t taken by France.

<sup>3</sup>Includes 133 t taken in Division IIa (Faroes waters).

<sup>4</sup>Includes 317 t taken in Division IIa (Faroes waters).

**Table 2.6.4.3** GREENLAND HALIBUT. Nominal catches (tonnes) in Division Va, 1980-1991, as reported officially to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	91	325	669	33	46	-	-	15	379	719	739	273
Iceland	27,836	15,455	28,300	28,359	30,078	29,195	31,027	44,644	49,000	58,330	36,557	34,000
Norway	-	+	-	+	+	2	-	-	-	-	-	-
<b>Total</b>	<b>27,927</b>	<b>15,780</b>	<b>28,969</b>	<b>28,392</b>	<b>30,124</b>	<b>29,196</b>	<b>31,027</b>	<b>44,659</b>	<b>49,379</b>	<b>59,049</b>	<b>37,296</b>	<b>34,273</b>
Total used in the assessment	-	-	-	-	-	-	-	-	-	59,272 <sup>2</sup>	37,308 <sup>3</sup>	40,310 <sup>4</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Includes 223 t by Norway.

<sup>3</sup>Includes 12 t by Norway.

<sup>4</sup>Includes additional catches by Iceland.

**Table 2.6.4.4** GREENLAND HALIBUT. Nominal catches (tonnes) in Sub-area XIV, 1980-1991, as reported officially to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	-	-	-	-	-	-	78	74	98	87	-	-
Germany, Fed. Rep.	2,146	2,893	2,439	1,054	818	636	745	456	595	420	293	284
Greenland	-	+	1	5	15	81	177	154	37	11	40	65
Iceland	2	-	-	1	2	36	17	136	40	+	-	-
Norway	-	-	-	-	+	-	-	-	-	-	6	10
UK (Engl. & Wales)	-	-	-	-	-	-	-	-	-	+	27	27
<b>Total</b>	<b>2,148</b>	<b>2,893</b>	<b>2,440</b>	<b>1,060</b>	<b>835</b>	<b>753</b>	<b>1,017</b>	<b>820</b>	<b>770</b>	<b>518</b>	<b>365</b>	<b>386</b>
Total used in the assessment <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	736 <sup>2</sup>	860 <sup>3</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Includes 370 t catches by Japan.

<sup>3</sup>Includes 315 t catch by Japan and 159 t by other countries as reported to Greenland.

<sup>1</sup>Preliminary.

<sup>2</sup>Catches by Japan included.

**Table 2.7.1** Nominal catch of REDFISH (in tonnes) by countries in Division Va (Iceland) as reported officially to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Belgium	1,549	1,385	1,381	924	283	389	291
Faroe Is.	242	629	1,055	1,212	1,046	1,357	686
Iceland	33,318	62,253	69,780	93,349	115,051	122,749	108,270
Norway	93	43	33	32	11	32	12
Total	35,202	64,310	72,249	95,517	116,391	124,527	109,259

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	400	423	398	372	190	70	153
Faroe Is.	291	144	332	372	394	624	412
Iceland	91,381	85,992	87,768	93,995	91,536	90,891	94,500
Norway	8	2	7	7	1	-	-
Total	92,080	86,561	88,505	94,746	92,121	91,585	95,065

<sup>1</sup>Provisional data.

**Table 2.7.2** Landings of REDFISH in Division Va (in tonnes) by country, as used by the Working Group.

Year	Belgium	Faroese	Iceland	Norway	Total
1978	1,549	242	33,318	93	35,202
1979	1,385	629	62,253	43	64,310
1980	1,381	1,055	69,780	33	72,249
1981	924	1,212	93,349	32	95,517
1982	283	1,046	115,051	11	116,391
1983	389	1,357	122,749	32	124,527
1984	291	686	108,270	12	109,259
1985	400	291	91,381	8	92,080
1986	423	253	85,992	2	86,670
1987	398	332	87,768	7	88,505
1988	372	372	94,011	7	94,762
1989	190	394	91,488	1	92,073
1990	70	624	90,891	0	91,585
1991	153	412	96,914	0	97,479

**Table 2.7.3** Nominal catch of REDFISH (in tonnes) by countries in Division Vb (Faroe Islands) as reported officially to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Denmark	-	-	-	-	-	-	-
Faroe Islands	1,525	5,693	5,509	3,232	3,999	4,642	8,770
France	448	862	627	59	204	439	559
Germany, Fed. Rep.	7,767	6,108	3,891	3,841	4,660	4,300	4,460
Iceland	-	-	-	-	1	-	-
Netherlands	+	-	-	-	-	-	-
Norway	9	11	12	13	7	3	1
UK	57	+	-	-	-	-	-
USSR	-	-	-	-	-	-	142
Total	9,806	12,674	10,039	7,145	8,871	9,384	13,932

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	36	176	8	-	+	-
Faroe Islands	12,634	15,224	13,477	12,966	12,636	10,014	12,389
France	1,157	752	819	582	-	-	-
Germany, Fed. Rep.	5,091	5,142	3,060	1,595	1,191	441	449 <sup>2</sup>
Iceland	-	-	-	-	-	-	-
Netherlands	-	-	-	-	-	-	-
Norway	4	2	5	5	21	21	20
UK	-	-	-	-	-	+	1
USSR	-	-	-	-	-	-	-
Total	18,886	21,156	17,537	15,156	13,848	10,476	12,859

<sup>1</sup>Provisional data.

<sup>2</sup>Includes former GDR.

**Table 2.7.4** Landings of REDFISH (in tonnes) by country, in Division Vb as used by the Working Group.

Year	Denmark	Faroes	France	Germany	Iceland	Norway	UK	USSR	Total
1978	0	1,525	448	7,767	0	9	57	0	9,806
1979	0	5,693	862	6,108	0	11	0	0	12,674
1980	0	5,509	627	3,891	0	12	0	0	10,039
1981	0	3,232	59	3,841	0	13	0	0	7,145
1982	0	3,999	204	5,230	1	7	0	0	9,441
1983	0	4,642	439	4,300	0	3	0	0	9,384
1984	0	8,770	559	4,460	0	1	0	142	13,932
1985	0	12,634	1,157	5,091	0	4	0	868	19,754
1986	36	15,224	752	5,142	0	2	0	320	21,476
1987	176	13,478	819	3,060	0	5	0	0	17,538
1988	8	13,318	582	1,595	0	5	0	0	15,508
1989	0	12,860	928	1,191	0	21	0	0	15,000
1990	0	10,364	1,410	441	0	21	0	2	12,238
1991	0	14,055	663	449	0	20	0	4	15,191

**Table 2.7.5** Nominal catch of REDFISH (in tonnes) by countries in Sub-area VI as reported officially to ICES.

Country	1978	1979	1980	1981	1982	1983	1984
Faroe Islands	-	1	-	-	-	-	19
France	307	215	202	24	44	93	102
Germany, Fed. Rep.	18	604	907	983	604	359	563
Norway	4	4	2	3	4	2	9
Spain	-	-	-	1	-	2	-
UK (Engl. & Wales)	1	-	-	-	2	-	1
UK (Scotland)	1	1	-	-	-	-	1
Total	331	825	1,111	1,011	654	456	695

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	18	-	-	1	61	-	22
France	397	480	1,032	1,024	-	-	-
Germany, Fed. Rep.	76	24	-	16	1	6	-
Norway	-	14	2	1	2	5 <sup>1</sup>	+
Spain	-	-	-	-	-	-	-
UK (Engl. & Wales)	1	2	3	75	4	29	4
UK (Scotland)	-	10	17	6	4	6	39
Total	492	530	1,054	1,123	72	46	

<sup>1</sup>Preliminary.

**Table 2.7.6** Landings of REDFISH (in tonnes) by countries in Sub-area VI as used by the Working Group.

Year	Faroes	France	Germany, F.R.	Norway	Spain	UK	Total
1978		307	18	4		2	331
1979	1	215	604	4		1	825
1980		202	907	2			1,111
1981		24	983	3	1		1,011
1982		44	604	4		2	654
1983		93	359	2	2		456
1984	19	102	563	9		2	695
1985	18	397	76			1	492
1986		480	24	14		12	530
1987		1,032		2		20	1,054
1988	1	1,024	16	1		81	1,123
1989	61	1,000 <sup>1</sup>	1	2		8	1,072
1990		1,000 <sup>1</sup>	6	5		35	1,046
1991	11	1,000 <sup>1</sup>				43	1,054

<sup>1</sup>Estimated

**Table 2.7.7** Nominal catch of REDFISH (in tonnes) by country in Sub-area XII as reported officially to ICES.

Country	1982	1983	1984	1985	1986
Bulgaria	-	-	-	-	-
German Dem. Rep.	-	-	-	-	-
Germany, Fed. Rep.	5,696	2,209	-	-	-
Iceland	-	-	-	-	-
Norway	-	-	-	-	-
Poland	-	-	-	-	-
USSR	39,783	60,079	60,643	17,300	24,131
Total	45,479	62,288	60,643	17,300	24,131

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Bulgaria	-	-	-	1,617	-
German Dem. Rep.	-	-	352	-	-
Germany, Fed. Rep.	-	-	1	7	-
Iceland	-	-	567	185	-
Norway	-	-	-	-	4,642
Poland	-	-	112	-	-
USSR	2,948	9,772	15,543	4,274	4,173
Total	2,948	9,772	16,575	6,083	8,815

<sup>1</sup>Provisional.



**Table 2.7.8** Landings of REDFISH (in tonnes) by countries in Sub-area XII as used by the Working Group.

Year	Bulgaria	Iceland	Norway	GDR	FRG	Poland	USSR	Total
1978								0
1979								0
1980								0
1981								0
1982							39,783	39,783
1983							60,079	60,079
1984							60,643	60,643
1985							17,300	17,300
1986							24,131	24,131
1987							2,948	2,948
1988							9,772	9,772
1989		658 <sup>2</sup>		352	1	112	15,543	16,666
1990	1,617	215 <sup>2</sup>	926 <sup>3</sup>	0	7	0	4,274	7,039
1991	1,500 <sup>1</sup>	0	0	0	0	0	4,173	5,673

<sup>1</sup>Estimated.

<sup>2</sup>Raised by 16% to account for discarding.

<sup>3</sup>Raised by 5% to account for discarding.

**Table 2.7.9**

Nominal catch of REDFISH (in tonnes) by countries in Sub-area XIV (East Greenland) as reported officially to ICES.

Country	1982	1983	1984	1985	1986
Bulgaria	-	-	2,961	5,825	11,385
Denmark	11	-	-	-	-
Faroe Islands	-	27	-	-	5
German Dem. Rep.	-	155	989	5,438	8,574
Germany, Fed. Rep	37,119	28,878	14,141	5,974	5,584
Greenland	+	1	10	5,519 <sup>2</sup>	9,542 <sup>2</sup>
Iceland	17	-	-	+	-
Norway	-	-	17	-	-
Poland	581	-	239	135	149
UK (Engl. & Wales)	-	-	-	-	-
UK (Scotland)	-	-	-	-	-
USSR	20,217	-	-	42,973	60,863
Total	57,945	29,061	18,357	65,864	96,102

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Bulgaria	12,270	8,455	4,546	1,073	-
Denmark	-	-	-	-	-
Faroe Islands	382	1,634	226	-	115
German Dem. Rep.	7,023	16,848	6,444	7,950	-
Germany, Fed. Rep.	4,691	5,734	2,372	3,268	9,138
Greenland	670	42	3	24	42
Iceland	-	-	814	3,726	7,500
Norway	-	-	-	5000 <sup>1</sup>	1
Poland	25	-	-	-	-
UK (Engl. & Wales)	-	-	5	39	151
UK (Scotland)				3	1
USSR	68,521	55,254	7,177	3,040	2,150
Total	93,582	87,967	21,587	24,123	19,457

<sup>1</sup>Provisional.

<sup>2</sup>Fished mainly by the Japanese fleet.

Table 2.7.10 Landings of REDFISH (in tonnes) by country, in Sub-area XIV, as used by the Working Group.

Year	Bulgaria	Green- land	Faroes	France	Germany, Dem.Rep.	Germany, Fed. Rep.	Iceland	Japan	Norway	Poland	UK	USSR	Total
1978	0	3	0	0	0	20711	151	0	2	0	13	0	20880
1979	0	0	0	490	0	20428	0	0	0	0	0	0	20918
1980	0	0	0	0	0	32520	89	0	0	0	0	0	32609
1981	0	1	18	0	0	42980	0	0	0	0	0	0	42999
1982	0	0	0	0	0	42815	17	0	0	581	0	20217	63630
1983	0	1	27	0	155	30815	0	0	0	0	0	0	30998
1984	2961	10	0	0	989	14141	0	0	15	239	0	0	18355
1985	5825	5519	0	0	5438	5974	0	0	0	135	0	42973	65864
1986	11385	9542	5	0	8574	5584	0	0	0	149	0	60863	96102
1987	12270	2912	382	0	7023	4691	0	0	0	25	0	68521	95824
1988	8455	3751	1634	0	16848	5734	0	0	0	0	0	55254	91676
1989	4546	285	226	0	6444	2372	3158 <sup>2</sup>	307	0	0	5	7177	24520
1990	1073	24	0	0	7950	3268	4322 <sup>2</sup>	3450	6159 <sup>3</sup>	0	42	4973	31261
1991	1000 <sup>1</sup>	42	115	0	0	9138	9861 <sup>2</sup>	1224	4307 <sup>3</sup>	0	212	2150	28049

<sup>1</sup>Estimated.

<sup>2</sup>Raised by 16% to account for discarding.

<sup>3</sup>Raised by 5% for discarding.

Table 2.7.11 *S. marinus* landings by area as used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	31,300	2,039	313	0	15,477	49,129
1979	56,616	4,805	6	0	15,787	77,213
1980	62,052	4,920	2	0	22,203	89,177
1981	75,828	2,538	3	0	23,608	101,977
1982	97,899	1,810	28	0	30,692	130,429
1983	87,412	3,394	60	0	15,636	106,502
1984	84,766	6,228	86	0	5,040	96,120
1985	67,312	9,194	245	0	2,117	78,868
1986	67,772	6,300	288	0	2,988	77,348
1987	69,212	6,143	576	0	1,196	77,127
1988	80,472	5,020	533	0	3,964	89,989
1989	59,961	4,140	530	0	685	65,316
1990	67,953	2,428	540	0	727	71,648
1991 <sup>1</sup>	565	2,132	548	0	3,910	7,155

<sup>1</sup>Excluding landings from Iceland for area V.

**Table 2.7.12** *S. mentella* landings by area as used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	3,902	7,767	18	0	5,403	17,090
1979	7,694	7,869	819	0	5,131	21,513
1980	10,197	5,119	1,109	0	10,406	26,831
1981	19,689	4,607	1,008	0	19,391	44,695
1982	18,492	7,631	626	0	12,140	38,889
1983	37,115	5,990	395	0	15,207	58,707
1984	24,493	7,704	609	0	9,126	41,932
1985	24,768	10,560	248	0	9,376	44,952
1986	18,898	15,176	242	0	12,138	46,454
1987	19,293	11,395	478	0	6,407	37,573
1988	14,290	10,488	590	0	6,065	31,433
1989	32,112	10,860	542	0	2,284	46,798
1990	23,631	9,810	506	0	6,090	40,037
1991 <sup>1</sup>	0	13,059	506	0	6,526	20,091

<sup>1</sup>Excluding landings from Iceland for area V.**Table 2.7.13** *S. mentella*, oceanic type. Landings (in tonnes) by area as used by the Working Group.

Year	Va	Vb	VI	XII	XIV	Total
1978	0	0	0	0	0	0
1979	0	0	0	0	0	0
1980	0	0	0	0	0	0
1981	0	0	0	0	0	0
1982	0	0	0	39,783	20,798	60,581
1983	0	0	0	60,079	155	60,234
1984	0	0	0	60,643	4,189	64,832
1985	0	0	0	17,300	54,371	71,671
1986	0	0	0	24,131	80,976	105,107
1987	0	0	0	2,948	88,221	91,169
1988	0	0	0	9,772	81,647	91,419
1989	0	0	0	16,892	21,325	38,217
1990	0	0	0	7,039	24,477	31,516
1991	0	0	0	5,673	17,613	23,286

**Table 2.7.14** *S. mentella*, oceanic type. Landings (in tonnes) by countries as used by the Working Group.

Year	Bulgaria	German Dem. Rep.	Germany, Fed. Rep.	Faroes	Iceland	Norway	Poland	USSR	Total
1980	0	0	0	0	0	0	0	-	-
1981	0	0	0	0	0	0	0	-	-
1982	0	0	0	0	0	0	581	60,000	60,581
1983	0	155	0	0	0	0	0	60,079	60,234
1984	2,961	989	0	0	0	0	239	60,643	64,832
1985	5,825	5,438	0	0	0	0	135	60,273	71,671
1986	11,385	8,574	0	5	0	0	149	84,994	105,107
1987	12,270	7,023	0	382	0	0	25	71,469	91,169
1988	8,455	16,848	0	1,090	0	0	0	65,026	91,419
1989	4,546	6,796	1	226	3,816	0	112	22,720	38,217
1990	2,690	7,950	7	0	4,537	7,085	0	9,247	31,516
1991 <sup>1</sup>	2,500 <sup>2</sup>	0	180	115	9,861	4,307	0	6,323	23,286

<sup>1</sup>Provisional.<sup>2</sup>Estimated.

**Table 2.8.1** Nominal catch (t) of SAITHE in Division Vb, 1799-1990, as reported to ICES.

Country	1979	1980	1981	1982	1983	1984
Denmark	-	-	-	-	-	-
Faroe Islands	22,003	23,810	29,682	30,808	38,963	54,344
France	2,974	1,110	258	130	180	243
German Dem. Rep.	-	-	-	-	-	-
Germany, Fed.Rep.	581	197	20	19	28	73
Netherlands	-	-	-	-	-	-
Norway	1,137	62	134	15	5	5
UK (Engl. & Wales)	190	13	-	-	-	-
UK (Scotland)	361	38	9	1	-	-
Russia	-	-	-	-	-	-
Total	27,246	25,230	30,103	30,973	39,176	54,665

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	21	255	94	-	2	2
Faroe Islands	42,874	40,139	39,301	44,402	43,624	59,721	52,357
France	839	87	153	313	-	-	-
German Dem.Rep.	31	-	-	-	9	-	-
Germany, Fed.Rep.	227	105	49	74	20	111	32
Netherlands	-	-	-	-	22	-	65
Norway	-	24	14	52	51	46	101
UK (Engl. & Wales)	4	-	108	-	-	-	-
UK (Scotland)	630	1,340	140	92	9	28	67
Russia	-	-	-	-	30	-	-
Total	44,605	41,716	40,020	45,027	43,713	59,906	52,624
Total used in assessment <sup>2</sup>				45,347	45,039 <sup>3</sup>	61,642 <sup>3</sup>	53,806 <sup>4</sup>

<sup>1</sup>Provisional data.<sup>2</sup>Includes catches from Division IIa in Faroese waters.<sup>3</sup>Includes France catches from Division Vb.

**Table 2.8.2** Faroe Plateau COD in Sub-Division Vb1. Nominal catches (tonnes) by countries, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-	-	8
Faroe Islands	19,966	22,616	21,387	37,916	36,914	39,422	34,492
France <sup>1</sup>	40	47	10	13	34	29	4
Germany	-	-	-	128	9	5	8
Norway	127	240	90	76	22	28	83
UK (Engl. & Wales)	13	-	-	-	-	-	-
UK (Scotland)	367	60	2	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>
Total	20,513	22,963	21,489	38,133	36,979	39,484	34,595

Country	1987	1988	1989	1990	1991 <sup>2</sup>
Denmark	30	10 <sup>1</sup>	-	-	-
Faroe Is.	21,303	22,272	20,535	12,232	7,983
France <sup>1</sup>	17	17	-	-	-
Germany	12	5	7	24	4
Norway	21	163	285	124 <sup>2</sup>	80
UK (Engl. & Wales)	8	-	-	-	-
UK (Scotland)	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>
Total	21,391	22,467	20,827	12,380	8,067
Total used in the assessment <sup>4</sup>		23,182	23,293 <sup>5</sup>	13,486 <sup>5</sup>	8,418

<sup>1</sup>Sub-division Vb2 included.

<sup>2</sup>Preliminary.

<sup>3</sup>Included in Sub-division Vb2.

<sup>4</sup>Includes catches from Division IIa in Faroese waters.

<sup>5</sup>Includes French catches from Division Vb.

**Table 2.8.3** Faroe Bank COD in Sub-Division Vb2. Nominal catches (tonnes) by countries, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-	-	-
Faroe Islands	724	975	2,184	2,284	2,189	2,913	1,836
France <sup>1</sup>	-	-	-	-	-	-	-
Germany	-	-	-	-	-	-	-
Norway	54	120	16	17	11	23	6
UK (Engl. & Wales)	85	-	-	-	-	-	-
UK (Scotland)	340	134	152	66 <sup>3</sup>	16 <sup>3</sup>	25 <sup>3</sup>	63 <sup>3</sup>
Total	1,203	1,229	2,352	2,367	2,216	2,961	1,905

Country	1987	1988	1989	1990	1991 <sup>2</sup>
Denmark	-	-	-	-	-
Faroe Islands	3,409	2,966	1,270	289	213
France <sup>1</sup>	-	-	-	-	-
Germany	-	-	-	-	-
Norway	23	94	128	72 <sup>2</sup>	38
UK (Engl. & Wales)	-	-	-	-	-
UK (Scotland)	47 <sup>3</sup>	37 <sup>3</sup>	14 <sup>3</sup>	207 <sup>3</sup>	87 <sup>3</sup>
Total	3,479	3,097	1,412	568	338

<sup>1</sup>Catches included in Sub-division Vb1.

<sup>2</sup>Preliminary.

<sup>3</sup>Include catches taken in Sub-division Vb1.



**Table 2.8.4.1** Faroe Plateau (Sub-Division Vb1) HADDOCK. Nominal catches (tonnes) by countries, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-	-	1
Faroe Islands	13,633	10,891	10,319	11,898	11,418	13,597	13,359
France <sup>1</sup>	31	113	2	2	20	23	8
Germany	4	+	1	+	+	+	1
Norway	9	20	12	12	10	21	22
UK (Engl. & Wales)	6	-	-	-	-	-	-
UK (Scotland)	434	85	1	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>
Others	6	-	-	-	-	-	-
<b>Total</b>	<b>14,123</b>	<b>11,109</b>	<b>10,335</b>	<b>11,912</b>	<b>11,448</b>	<b>13,641</b>	<b>13,391</b>

Country	1987	1988	1989	1990	1991 <sup>2</sup>
Denmark	8	4	-	-	-
Faroe Islands	13,954	10,867	13,506	11,106	7,909
France <sup>1</sup>	22	14	-	-	-
Germany	1	-	-	-	-
Norway	13	54	111	93 <sup>2</sup>	125
UK (Engl. & Wales)	2	-	-	-	-
UK (Scotland)	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>
<b>Total</b>	<b>14,000</b>	<b>10,939</b>	<b>13,617</b>	<b>11,199</b>	<b>8,034</b>
<b>Total used in the assessment<sup>4</sup></b>		<b>12,178</b>	<b>14,322</b>	<b>12,443<sup>5</sup></b>	<b>8,556<sup>5</sup></b>

<sup>1</sup>Including catches from Sub-division Vb2.

<sup>2</sup>Preliminary.

<sup>3</sup>Catches included in Sub-division Vb2.

<sup>4</sup>Includes catches from Division IIa in Faroese waters.

<sup>5</sup>Includes French catches from Division Vb (Faroese Coastal Guard Service).

**Table 2.8.4.2** Faroe Bank (Sub-Division Vb2) HADDOCK. Nominal catches (tonnes) by countries, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986
Denmark	-	-	-	-	-	-	-
Faroe Islands	690	1,103	1,553	967	925	1,474	1,050
France <sup>1</sup>	-	-	-	-	-	-	-
Germany	-	-	-	-	-	-	-
Norway	8	7	1	2	5	3	10
UK (Engl. & Wales)	152	-	-	-	-	-	-
UK (Scotland)	43	14	48	13 <sup>3</sup>	+ <sup>3</sup>	25 <sup>3</sup>	26 <sup>3</sup>
Total	893	1,124	1,602	982	930	1,502	1,086

Country	1987	1988	1989	1990	1991 <sup>2</sup>
Denmark	-	-	-	-	-
Faroe Islands	832	1,160	659	325	253
France <sup>1</sup>	-	-	-	-	-
Germany	-	-	-	-	-
Norway	5	43	16	97 <sup>2</sup>	4
UK (Engl. & Wales)	-	-	-	-	-
UK (Scotland)	45 <sup>3</sup>	15 <sup>3</sup>	30 <sup>3</sup>	725 <sup>3</sup>	240 <sup>3</sup>
Total	882	1,218	705	1,147	497

<sup>1</sup>Catches included in Sub-division Vb1.

<sup>2</sup>Preliminary.

<sup>3</sup>Includes catches taken in Sub-division Vb1.

**Table 2.9.1** Icelandic summer-spawning herring. Catch in weight (including discards in 1989, 1990 and 1991) as used by the Working Group.

Year	Catch ('000 t)
1972	0.310
1973	0.255
1974	1,274
1975	13,280
1976	17,168
1977	28,924
1978	37,333
1979	45,072
1980	53,269
1981	39,544
1982	56,528
1983	58,665
1984	50,293
1985	49,092
1986	65,413
1987	75,439
1988	91,760
1989	100,733
1990/1991	105,593 <sup>1</sup>
1991/1992	109,499 <sup>1</sup>

<sup>1</sup>Seasonal catches.

**Table 2.9.2.1** Catches of Norwegian spring-spawning herring (tonnes) since 1972.

Year	A	B <sup>1</sup>	C	D	Nominal catches	Total catch as Total used by the Working Group
1972	-	9,895	3,266 <sup>2</sup>	-	13,161	13,161
1973	139	6,602	276	-	7,017	7,017
1974	906	6,093	620	-	7,619	7,619
1975	53	3,372	288	-	3,713	13,713
1976	-	247	189	-	436	10,436
1977	374	11,834	498	-	12,706	22,706
1978	484	9,151	189	-	9,824	19,824
1979	691	1,866	307	-	2,864	12,864
1980	878	7,634	65	-	8,557	18,577
1981	844	7,814	78	-	8,736	13,736
1982	983	10,447	225	-	11,655	16,655
1983	3,857	13,290	907	-	18,054	23,054
1984	18,730	29,463	339	-	48,532	53,532
1985	29,363	37,187	197	4,300	71,047	169,872 <sup>3</sup>
1986	71,122 <sup>4</sup>	55,507	156	-	126,785	225,256 <sup>3</sup>
1987	62,910	49,798	181	-	112,899	127,306 <sup>3</sup>
1988	78,592	46,582	127	-	125,301	135,301
1989	52,003	41,770	57	-	93,830	103,830
1990	48,633	29,770	8	-	78,411	86,411
1991	48,353	31,280	50	-	79,683	84,683
1992	34,550 <sup>5</sup>					

A = catches of adult herring in winter

B = mixed herring fishery in autumn

C = by-catches of 0- and 1-group herring in the sprat fishery

D = USSR-Norway by-catch in the capelin fishery (2-group)

<sup>1</sup> Includes also by-catches of adult herring in other fisheries

<sup>2</sup> In 1972, there was also a directed herring 0-group fishery

<sup>3</sup> Includes mortality caused by fishing operations in addition to unreported catches

<sup>4</sup> Includes 26,000 t of immature herring (1983 year-class) fished by USSR in the Barents Sea

<sup>5</sup> Preliminary Norwegian catch until 30 August 1992

**Table 2.9.2.2**

Total catch of Norwegian spring-spawning herring (tonnes) since 1972 as used by the Working Group.

Year	Norway	USSR	Total
1972	13,161	-	13,161
1973	7,017	-	7,017
1974	7,619	-	7,619
1975	13,713	-	13,713
1976	10,436	-	10,436
1977	22,706	-	22,706
1978	19,824	-	19,824
1979	12,864	-	12,864
1980	18,577	-	18,577
1981	13,736	-	13,736
1982	16,655	-	16,655
1983	23,054	-	23,054
1984	53,532	-	53,532
1985	167,272	2,600	169,872
1986	199,256	26,000	225,256
1987	108,417	18,889	127,306
1988	115,076	20,225	135,301
1989	88,707	15,123	103,830
1990	74,604	11,807	86,411
1991	73,683	11,000	84,683
1992 <sup>1</sup>	34,550	13,337	

<sup>1</sup>Preliminary.

**Table 2.10.1.2** International catch of Barents Sea Capelin ('000 tonnes) in the years 1965-1992 as used by the Working Group.

Year	Winter				Summer-autumn			Total
	Norway	Russia	Other	Total	Norway	Russia	Total	
1965	217	7	0	224	0	0	0	224
1966	380	9	0	389	0	+	+	389
1967	403	6	0	408	0	+	+	408
1968	460	15	0	476	62	+	62	538
1969	436	1	0	436	243	+	243	680
1970	955	8	0	963	346	5	351	1,314
1971	1,300	14	0	1,314	71	7	78	1,392
1972	1,208	25	0	1,234	347	12	359	1,593
1973	1,078	34	0	1,112	213	11	223	1,336
1974	749	80	0	829	237	82	319	1,148
1975	549	301	43	893	394	131	524	1,417
1976	1,230	230	0	1,460	719	366	1,085	2,545
1977	1,412	345	2	1,758	704	477	1,181	2,940
1978	772	436	25	1,233	350	311	661	1,894
1979	539	342	5	886	569	327	896	1,782
1980	539	253	9	801	459	388	847	1,648
1981	784	429	28	1,240	454	284	738	1,978
1982	568	260	5	833	591	336	927	1,760
1983	735	373	36	1,145	758	439	1,197	2,342
1984	330	257	42	629	482	368	849	1,478
1985	340	234	17	590	113	164	278	868
1986	72	51	0	123	0	0	0	123
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	505	156	20	681	31	194	226	906
1992 <sup>1</sup>	620	243	24	887				

<sup>1</sup>Preliminary.

**Table 2.10.2.2** Catches of CAPELIN in the Iceland-East Greenland-Jan Mayen area, 1964-1992  
(thousand tonnes).

Year	Winter season			Summer & autumn season			Others	Total
	Iceland	Norway	Faroes	Iceland	Norway	Faroes		
1964	8.6	-	-	-	-	-	-	8.6
1965	49.7	-	-	-	-	-	-	49.7
1966	124.5	-	-	-	-	-	-	124.5
1967	97.2	-	-	-	-	-	-	97.2
1968	78.1	-	-	-	-	-	-	78.1
1969	170.6	-	-	-	-	-	-	170.6
1970	190.8	-	-	-	-	-	-	190.8
1971	182.9	-	-	-	-	-	-	182.9
1972	276.5	-	-	-	-	-	-	276.5
1973	440.9	-	-	-	-	-	-	440.9
1974	461.9	-	-	-	-	-	-	461.9
1975	457.1	-	-	3.1	-	-	-	460.2
1976	338.7	-	-	114.4	-	-	-	453.1
1977	549.2	-	24.3	259.7	-	-	-	833.2
1978	468.4	-	36.2	497.5	154.1	3.4	-	1,159.6
1979	521.7	-	18.2	442.0	124.0	22.0	-	1,127.9
1980	392.1	-	-	367.4	118.7	24.2	17.3	919.6
1981	156.0	-	-	484.6	91.4	16.2	20.8	769.0
1982	13.2	-	-	-	-	-	-	13.2
1983	-	-	-	133.4	-	-	-	133.4
1984	439.6	-	-	425.2	104.6	10.2	8.5	988.1
1985	348.5	-	-	644.8	193.0	65.9	16.0	1,268.2
1986	341.8	50.0	-	552.5	149.7	65.4	5.3	1,164.7
1987	500.6	59.9	-	311.3	82.1	65.2	-	1,019.1
1988	600.6	56.6	-	311.4	11.5	48.5	-	1,028.6
1989	609.1	56.0	-	53.9	14.4	52.7	-	786.1
1990	612.0	62.5	12.3	83.7	21.9	21.9	-	798.0
1991	258.4	-	-	56.0	-	-	-	314.4
1992	573.5	47.6	-	-	-	-	-	-

**Table 3.1.4** North Sea HERRING (Sub-area IV and Division VIId). Catch in tonnes by country, 1980-1991. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1980	1981	1982	1983	1984	1985
Belgium	-	-	9,700	5,969	5,080	3,482
Denmark	4,431	21,146	67,851	10,467	38,777	129,305
Faroe Islands	-	-	-	-	-	-
France	5,527	15,099	15,310	16,353	20,320	14,400
Germany, Fed.Rep.	147	2,300	349	1,837	11,609	8,930
Netherlands	509	7,700	22,300	40,045	44,308	79,335
Norway <sup>4</sup>	2,165	-	-	32,512	98,706	159,947
Sweden	-	-	-	284	886	2,442
UK (England)	77	303	3,703	111	1,689	5,564
UK (Scotland)	610	45	1,780	17,260	31,393	55,795
UK (N.Ireland)	-	-	-	-	-	-
Unallocated landings	47,528	94,309	114,252	181,116	64,487	74,220
Total landings	60,994	140,902	235,245	305,954	317,255	533,420
Discards <sup>3</sup>	-	-	-	-	-	-
Total catch	60,994	140,902	235,245	305,954	317,255	533,420
Catches of spring spawners (included above)						
IIIa type	-	-	-	-	6,958	17,386
Coastal type	-	-	-	-	520	905

Country	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	414	39	4	434	180	163
Denmark	121,631	138,596	263,006	210,315 <sup>2</sup>	159,280 <sup>2</sup>	194,358 <sup>2</sup>
Faroe Islands	623	2,228	810	1,916	633	334
France	9,729	7,266	8,384	29,085	23,480	24,625
Germany, Fed.Rep.	3,934	5,552	13,824	38,707	43,191	41,791
Netherlands	85,998	91,478	82,267	84,178	69,828	75,135
Norway <sup>4</sup>	223,058	241,765	222,719	221,891 <sup>2</sup>	157,850 <sup>2</sup>	124,991 <sup>2</sup>
Sweden	1,872	1,725	1,819	4,774	3,754	5,866
UK (England)	1,404	873	8,097	7,980	8,333	11,548
UK (Scotland)	77,459	76,413	64,108	68,106	56,812	57,572
UK (N.Ireland)	-	-	-	-	-	92
Unallocated landings	21,089	58,972	33,411	26,749 <sup>2</sup>	21,081	24,435
Total landings	547,211	624,907	698,449	694,135 <sup>2</sup>	544,422	560,910
Discards <sup>3</sup>	-	-	-	4,000	8,660	4,617
Total catch	547,211	624,907	698,449	698,135	553,082	565,527
Catches of spring spawners (included above)						
IIIa type	19,654	14,207	23,306	19,869	8,357	7,894
Coastal type	490	250	250	2,283	1,136	252 <sup>5</sup>

<sup>1</sup>Preliminary.

<sup>2</sup>Working Group estimates.

<sup>3</sup>Any discards prior to 1989 estimates were included in unallocated landings.

<sup>4</sup>Catches of Norwegian spring spawners removed (taken under a separate TAC).

<sup>5</sup>Landings from the Thames estuary area.



**Table 3.1.6.1 HERRING, catch in tonnes in Sub-divisions 22 and 24, as reported to the Working Group.**

Year	Denmark	German Dem. Rep.	Germany, Fed. Rep.	Poland	Sweden	Total
1978	12,383	40,678	6,849	6,335	6,550	72,795
1979	9,659	46,749	6,672	10,276	10,151	85,549
1980	7,221	58,501	9,323	13,605	12,010	100,337
1981	8,098	54,501	8,300	13,366	7,660	90,159
1982	4,583	50,739	8,300	16,868	6,536	107,519
1983	4,583	50,739	8,300	16,868	6,536	108,103
1984	23,762	49,022	7,085	14,250	7,689	101,808
1985	15,942	46,749	7,888	16,721	11,373	101,870
1986	14,046	51,180	8,850	12,344	5,946	92,066
1987	32,462	47,267	5,806	7,997	7,814	101,346
1988	33,075	49,488	5,188	6,590	4,586	98,927
1989	21,730	51,207	5,166	8,524	6,327	92,954
1990	13,559	40,193	4,981	9,662	8,051	76,446
1991	25,194	14,737 <sup>a)</sup>	- <sup>a)</sup>	5,576	19,331	64,838

<sup>a)</sup> FRG and GDR combined.

**Table 3.1.6.2 HERRING, catch in tonnes in Sub-division 23, as reported to the Working Group.**

Year	Denmark	Sweden	Total
1978	4,090	1,000	5,091
1979	8,817	1,860	10,677
1980	6,313	2,400	8,713
1981	8,098	2,000	10,098
1982	7,139	2,460	9,599
1983	4,583	2,416	6,999
1984	6,935	800	7,735
1985	6,849	1,113	7,962
1986	1,490	1,365	2,855
1987	754	172	926
1988	102	117	219
1989	1,528	102	1,630
1990	1,140	83	1,223
1991	1,726	2,268	3,994

**Table 3.1.6.3** HERRING, catch in tonnes in Division IIIa of both spring spawners and North Sea autumn spawners (data from Herring Assessment Working Group for the Area South of 62°N).

Country	1978	1979	1980	1981	1982	1983	1984
<b>Skagerrak</b>							
Denmark	7,753	8,729	22,811	45,525	43,328	54,102	64,421
Faroe Islands	1,041	817	526	900	715	1,980	891
Germany, Fed. Rep.	28	181	-	199	43	40	-
Norway	4,131	4,719	4,145	7,230	11,700	3,334	1,494
Sweden	11,551	8,140	10,701	30,274	24,859	35,176	59,195
Sub-total	25,504	22,586	38,183	83,876	80,645	94,632	126,201
<b>Kattegat</b>							
Denmark	29,241	21,337	25,380	48,922	38,609	62,901	71,359
Sweden	35,193	25,272	18,260	38,871	38,892	40,463	35,027
Sub-total	64,434	46,609	43,640	87,833	77,501	103,364	106,386
Division IIIa total	88,938	69,195	81,823	171,601	158,146	197,996	232,587

Country	1985	1986	1987	1988	1989	1990	1991
<b>Skagerrak</b>							
Denmark	88,192	94,014	105,017	144,421	47,393	62,349	58,658
Faroe Islands	455	520	-	-	-	-	-
Germany, Fed. Rep.	-	11	-	-	-	-	-
Norway	4,425	1,537	1,209	5,674	1,605	5,598	8,127
Sweden	40,349	42,996	51,184	57,159	47,900	56,503	54,679
Sub-total	133,421	139,078	157,410	207,254	96,898	124,450	121,464
<b>Kattegat</b>							
Denmark	69,235	37,419	46,603	76,175	57,130	32,224	29,653
Sweden	39,829	35,852	29,844	49,653	37,869	45,288	36,732
Sub-total	109,064	73,271	76,447	125,828	94,999	77,512	66,385
Division IIIa total	242,485	212,349	233,931	333,082	191,897	201,962	187,849

**Table 3.1.7.1** Celtic Sea and Division VIIj HERRING landings by calendar year (t), 1977-1991.  
(Data provided by Working Group members.)

Year	France	Germany	Ireland	Netherlands	U.K.	Unallocated	Discards	Total
1977	100	100	5,500	1,500	-	-	+	7,200
1978	+	200	6,200	1,000	-	900	+	8,300
1979	600	+	7,000	900	-	3,700	+	12,200
1980	+	+	8,800	400	-	-	+	9,200
1981	100	-	15,600	1,200	-	-	+	16,900
1982	+	-	9,500	-	-	-	-	9,500
1983	500	-	10,000	1,500	-	10,200	4,000	26,200
1984	700	-	7,000	900	-	11,100	3,600	23,300
1985	600	-	11,000	-	-	4,600	3,100	19,300
1986	-	-	13,300	+	-	6,100	3,900	23,300
1987	800	-	15,500	1,500	-	5,300	4,200	27,300
1988	-	-	16,800	-	-	-	2,400	19,200
1989	+	-	16,000	1,900	-	1,300	3,500	22,700
1990	+	-	15,800 <sup>1</sup>	1,000	200	700	2,500	20,200
1991 <sup>1</sup>	+	100	19,400 <sup>1</sup>	1,800	-	400	1,900	23,600

<sup>1</sup>Provisional.

**Table 3.1.7.2** Celtic Sea and Division VIIj HERRING landings (t) by season (1 April - 31 March). (Data provided by Working Group members).

Year	France	Germany	Ireland	Netherlands	U.K.	Unallocated	Discards	Total
1977/1978	100	100	6,300	1,400	-	-	+	7,900
1978/1979	+	200	8,200	1,000	-	-	+	9,400
1979/1980	600	+	7,900	900	-	900	+	10,300
1980/1981	+	+	8,000	300	-	3,800	+	-
1981/1982	100	-	15,800	1,200	-	-	+	17,100
1982/1983	+	-	13,000	-	-	-	+	13,000
1983/1984	500	-	10,000	1,500	-	9,200	3,800	25,000
1984/1985	700	-	7,000	900	-	14,000	4,200	26,800
1985/1986	600	-	12,000	-	-	4,500	3,300	20,400
1986/1987	-	-	14,700	+	-	6,100	4,200	25,000
1987/1988	800	-	15,500	1,500	-	4,400	4,000	26,200
1988/1989	-	-	17,000	-	-	-	3,400	20,400
1989/1990	+	-	15,000	1,900	-	2,600	3,600	23,100
1990/1991	+	-	15,000	1,000	200	700	1,700	18,600
1991/1992 <sup>1</sup>	+	100	21,400	1,800	-	-300	2,100	25,100

<sup>1</sup>Provisional.

**Table 3.1.8** Nominal catch (t), Division VIa (North) HERRING, 1982-1991, as reported to the Working Group.

Country	1982	1983	1984	1985	1986
Denmark	-	-	96	-	-
Faroes	74	834	954	104	400
France	2,069	1,313	-	20	18
Germany, Fed. Rep	8,453	6,283	5,564	5,937	2,188
Ireland	-	-	-	-	6,000
Netherlands	11,317	20,200	7,729	5,500	5,160 <sup>2</sup>
Norway	13,018	7,336	6,669	4,690	4,799
UK (England)	90	-	-	-	-
UK (Scotland)	38,381	31,616	37,554	28,065	25,294
Unallocated	18,958	-4,059	16,588	502	37,840 <sup>2</sup>
Discards	-	-	-	-	-
Total	92,360	63,523	75,154	43,814	81,699

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	-	-	-	-
Faroes	-	-	-	326	482
France	136	44	1,342	1,287	1,168
Germany, Fed. Rep	1,711	1,860	4,290	7,096	6,450
Ireland	6,800	6,740	8,000	10,000	8,000
Netherlands	5,212 <sup>2</sup>	6,131	5,860	7,693	7,979
Norway	4,300	456	-	1,607	3,318
UK (England)	-	1,892	1,977	2,376	2,998
UK (Scotland)	26,810	25,002	27,897	35,877	29,630
Unallocated	18,038 <sup>2</sup>	5,229 <sup>2</sup>	2,123	2,397	-10,597
Discards	-	-	1,550	1,300	1,180
Total	63,007	47,354	53,039	69,959	50,606

<sup>1</sup>Preliminary.

<sup>2</sup>Including discards.

**Table 3.1.9** Catches (t) of HERRING from the Firth of Clyde (spring and autumn-spawners combined).

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Reported landings:										
UK (Scotland)	2,506	2,530	2,991	3,001	3,395	2,895	1,568	2,135	2,184	713
UK (N.Ireland + Isle of Man)	-	273	247	22	-	-	-	-	-	-
Additional landings <sup>1</sup>	262	293	224	433	576	278	110	208	75	18
Discards	1,253	1,265	2,308 <sup>3</sup>	1,344 <sup>3</sup>	679 <sup>3</sup>	439 <sup>4</sup>	245 <sup>4</sup>	- <sup>2</sup>	- <sup>2</sup>	- <sup>2</sup>
Catch used by Working Group	4,021	4,361	5,770	4,800	4,650	3,612	1,923	2,343	2,259	731

<sup>1</sup>Calculated from estimates of weight per box and, in some years, estimated by-catch in sprat fishery.

<sup>2</sup>Reported to be at a low level; assumed to be zero.

<sup>3</sup>Based on sampling.

<sup>4</sup>Estimated assuming same discarding rate as in 1986.

**Table 3.1.10** Estimated HERRING catches in tonnes in Divisions VIa (South) and VIIb,c, 1982-1991.

Country	1982	1983	1984	1985	1986
France	353	19	-	-	-
Germany, Fed.Rep.	265	-	-	-	-
Ireland	16,856	15,000	10,000	13,900	15,540
Netherlands	1,735	5,000	6,400	1,270	1,550
UK (N.Ireland)	-	-	-	-	-
UK (England + Wales)	-	-	-	-	-
UK Scotland	-	-	-	-	-
Unallocated	-	13,000	11,000	8,204	11,785
Total landings	19,209	33,019	27,400	23,374	28,785
Discards	-	-	-	-	-
Total catch	19,209	33,019	27,400	23,374	28,785

Country	1987	1988	1989	1990	1991 <sup>1</sup>
France	-	-	-	+	-
Germany, Fed.Rep.	-	-	-	-	-
Ireland	15,000	15,000	18,200	25,000	22,500
Netherlands	1,550	300	2,900	2,533	600
UK (N.Ireland)	5	-	-	80	-
UK (England + Wales)	51	-	-	-	-
UK (Scotland)	-	-	+	-	+
Unallocated	31,994	13,800	7,100	13,826	11,200
Total landings	48,600	29,100	28,200	41,439	34,300
Discards	-	-	1,000	2,530	3,400
Total catch	48,600	29,100	29,200	43,969	37,700

<sup>1</sup>Provisional

**Table 3.1.11** HERRING. Total catches (t) in North Irish Sea (Division VIIa, North), 1980-1991 as reported to the Working Group.

Country	1980	1981	1982	1983	1984	1985
France	1	-	-	48	-	-
Ireland	1,340	283	300	860	1,084	1,000
Netherlands	-	-	-	-	-	-
UK	9,272	4,094	3,375	3,025	2,982	4,077
Unallocated	-	-	1,180	-	-	4,110
Total	10,613	4,377	4,855	3,933	4,066	9,187

Country	1986	1987	1988	1989	1990	1991 <sup>1</sup>
France	-	-	-	-	-	-
Ireland	1,640	1,200	2,579	1,430	1,699	80
Netherlands	-	-	-	-	-	-
UK	4,376	3,290	7,593	3,532	4,613	4,318
Unallocated	1,424	1,333	-	-	-	-
Total	7,440	5,823	10,172	4,962	6,312	4,398

<sup>1</sup>Provisional.

**Table 3.2.1.1** Landings<sup>1</sup> from the industrial fisheries for Sandeel, Sprat, and Norway Pout in Division IIIa ('000 t), 1974-1991.

Year	Major fisheries					Total
	Clupeoids			Gadoid species		
	Sandeel	Sprat <sup>2</sup>	Herring <sup>3</sup>	Norway pout	Blue whiting	
1974	8	71	76	13	-	168
1975	17	101	57	19	-	194
1976	22	59	38	42	-	161
1977	7	67	32	21	-	127
1978	23	78	16	25	-	142
1979	34	96	13	25	6	174
1980	39	84	25	26	14	188
1981	59	76	63	30	+	228
1982	18	40	54	44	5	161
1983	28	26	89	30	16	189
1984	19	36	112	46	15	228
1985	14	20	116	9	19	178
1986	80	11	65	6	9	171
1987	4	14	72	3	25	118
1988	22	9	97	8	15	151
1989	17	10	52	6	9	92
1990 <sup>4</sup>	16	10	51	27	10	114
1991 <sup>4</sup>	23	14	22	32	11	97
Mean 1974-1990	25	48	60	22	12 <sup>5</sup>	164

<sup>1</sup>Data from 1974-1984 from C.M.1986/Assess:6, 1985-1991 provided by Working Group members.

<sup>2</sup>Total landings from all fisheries.

<sup>3</sup>For years 1974-1985, human consumption landings used for reduction are included in these data.

<sup>4</sup>Preliminary.

<sup>5</sup>Mean 1979-1990.



**Table 3.2.1.2** Landings from the industrial fisheries for Sandeel, Sprat and Norway Pout in the North Sea ('000 t), 1974-1991. For 1991, the data are given both by year and quarters. (Data provided by Working Group members.)

Year	Major fisheries						Other <sup>5</sup>	Total <sup>5</sup>
	Sandeel	Clupeoids		Gadoid species		By-catch protected species <sup>1</sup>		
		Sprat <sup>3</sup>	Herring	Norway pout	Blue whiting			
1974	525	314	-	736	62	220		1,857
1975	428	641	-	560	42	128		1,799
1976	488	622	12	435	36	198		1,791
1977	786	304	10	390	38	147		1,675
1978	787	378	8	270	100	69		1,612
1979	578	380	15	320	64	77		1,434
1980	729	323	7	471	76	69		1,675
1981	569	209	84	236	62	85		1,245
1982	611	153	153	360	118	57	24	1,476
1983	537	88	155	423	118	38	42	1,401
1984	669	77	35	355	79	35	48	1,298
1985	622	50	63	197	73	29	66	1,100
1986	848	16	40	174	37	22	33	1,170
1987	825	33	47	147	30	24	73	1,179
1988	893	87	179	102	28	54	45	1,388
1989	1,035	63	146	162	28	40	59	1,533
1990	590	77	115	140	22	61	40	1,039
1991 <sup>2</sup>	842	110	131	155	28	45	38	1,349
1st Quarter	30.8	2.0	12.5	43.0	4.6	5.7	12.9	111.6
2nd Quarter	585.1	0.1	11.4	17.9	17.5	5.7	7.0	644.9
3rd Quarter	221.8	67.5	79.7	35.1	3.7	21.1	11.3	440.2
4th Quarter	4.2	38.2	27.4	58.6	2.3	12.1	8.2	151.0
Mean								
1974-1990	678	224	71	322	63	80	48 <sup>4</sup>	1,287 <sup>4</sup>

<sup>1</sup>Haddock, whiting and saithe summarized from Table 3.2.1.3.

<sup>2</sup>Preliminary.

<sup>3</sup>Includes human consumption landings. Quarterly data for Denmark, Norway and UK only.

<sup>4</sup>Mean 1982-1990.

<sup>5</sup>Data for other species not available for period 1974-1981.

**Table 3.2.1.3** North Sea. Total reported by-catch ('000 t) of HADDOCK, WHITING, and SAITHE from industrial fisheries. (Data provided by Working Group members.)

Species	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Haddock	22	17	19	13	10	6	3	4	4	2	3	5
Whiting	46	67	33	24	19	15	18	16	49	36	50	38
Saithe	-	1	5	1	6	8	1	4	1	1	8	1

<sup>1</sup>Preliminary.

**Table 3.2.1.4** Landings ('000 t) from the industrial fisheries for Sandeel, Sprat and Norway Pout in Division VIa. (Data officially reported to ICES.)

Year	Sandeel	Sprat	Norway pout	Total
1974	+	7,026	6,721	13,747
1975	+	9,053	8,655	17,708
1976	17	8,042	19,933	27,992
1977	67	4,844	5,206	10,117
1978	+	12,401	23,250	35,651
1979	-	1,321	20,502	21,823
1980	211	5,202	17,870	23,283
1981	5,972	3,414	7,757	17,143
1982	10,873	3,524	4,911	19,308
1983	13,051	3,834	8,325	25,210
1984	14,166	2,648	7,794	24,608
1985	18,586	3,554	9,697	31,837
1986	24,469	870	5,832	31,171
1987	14,479	851	38,267	53,597
1988	24,465	4,378	6,742	35,585
1989	18,785	1,293	28,196	48,274
1990 <sup>1</sup>	16,515	813	3,316	20,644
1991 <sup>1</sup>	7,777	1,459	4,348	13,584
Mean 1974-1990	9,509	4,298	13,116	26,923

<sup>1</sup>Preliminary.

**Table 3.2.2** Norway Pout. Annual landings (tonnes) in Division IIIa.  
(Data as officially reported to ICES.)

Country	1976	1977	1978	1979	1980	1981	1982	1983
Denmark	40,144	20,694	23,922	23,951	26,235	29,273	51,317	36,124
Norway	50 <sup>2</sup>	104	362	1,182	141	752	1,265	990
Sweden	2,255	318	591 <sup>3</sup>	32	39	60	60	52
Total	42,449	21,116	24,875	25,165	26,415	30,085	52,685	37,166

Country	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	67,007	85,082	32,056	47,527	45,034	16,873	41,215	49,303
Norway	947	831	400	1,680	1,178	309	40 <sup>1</sup>	23
Sweden	+	-	+	-	-	+	+	-
Total	67,954	85,913	32,456	49,207	46,212	17,182	41,255	49,326

<sup>1</sup>Preliminary.

<sup>2</sup>Including by-catch.

<sup>3</sup>Includes North Sea.

**Table 3.2.3** Norway Pout annual landings ('000 t) in Sub-area IV, the North Sea, by countries in 1958-1991. (Data provided by Working Group members.)

Year	Denmark	Faroes	Norway	Sweden	UK (Scotland)	Others	Total
1958	-	-	-	-	-	-	-
1959	-	-	7.8	-	-	-	69.3
1960	17.2	-	13.5	-	-	-	30.7
1961	20.5	-	8.1	-	-	-	28.6
1962	121.8	-	27.9	-	-	-	14.7
1963	67.4	-	70.4	-	-	-	137.8
1964	10.4	-	51.0	-	-	-	61.4
1965	8.2	-	35.0	-	-	-	43.2
1966	35.2	-	17.8	-	-	+	53.0
1967	169.6	-	12.9	-	-	+	182.6
1968	410.8	-	40.9	-	-	+	451.8
1969	52.5	19.6	41.4	-	-	+	113.5
1970	142.1	32.0	63.5	-	0.2	0.2	238.0
1971	178.5	47.2	79.3	-	0.1	0.2	305.3
1972	259.6	56.8	120.5	6.8	0.9	0.2	444.8
1973	215.2	51.2	63.0	2.9	13.0	0.6	345.9
1974	464.5	85.0	154.2	2.1	26.7	3.3	735.8
1975	251.2	63.6	218.9	2.3	22.7	1.0	559.7
1976	244.9	64.6	108.9	+	17.3	1.7	435.4
1977	232.2	50.9	98.3	2.9	4.6	1.0	389.9
1978	163.4	19.7	80.8	0.7	5.5	-	270.1
1979	219.9	21.9	75.4	-	3.0	-	320.2
1980	366.2	34.1	70.2	-	0.6	-	471.1
1981	167.5	16.6	51.6	-	+	-	235.7
1982	256.3	15.4	88.0	-	-	-	359.7
1983	301.1	24.5	97.3	-	+	-	422.9
1984	251.9	19.1 <sup>1</sup>	83.8	-	0.1	-	354.9
1985	163.7	9.9	22.8	-	0.1	-	196.5
1986	146.3	6.6	21.5	-	-	-	174.4
1987	108.3	4.8	34.1	-	-	-	147.2
1988	79.0	1.5	21.1	-	-	-	101.6
1989	95.6	0.6	65.3	-	0.1	-	161.6
1990	61.5	0.9	77.1	-	-	-	139.5
1991	85.0	1.2	68.3	-	-	-	154.5

<sup>1</sup>Including by-catch.

**Table 3.2.4** Norway Pout. Annual landings (t) in Division VIa. (Data officially reported to ICES).

Country	1974	1975	1976	1977	1978	1979	1980	1981
Denmark	-	193	-	-	4,443	15,609	13,070	2,877
Faroese	1,581	1,524	6,203	2,177	18,484	4,772	3,530	3,540
Germany	179	-	8	-	-	-	-	-
Netherlands	-	322	147	230	21	98	68	182
Norway	144 <sup>3</sup>	-	82 <sup>3</sup>	-	-	-	-	-
Poland	75	-	-	-	-	-	-	-
UK (Scotland) <sup>2</sup>	4,702	6,614	6,346	2,799	302	23	1,202	1,158
Russia	40	2	7,147	-	-	-	-	-
<b>Total</b>	<b>6,721</b>	<b>8,655</b>	<b>19,933</b>	<b>5,206</b>	<b>23,250</b>	<b>20,502</b>	<b>17,870</b>	<b>7,757</b>

Country	1982	1983	1984	1985	1986	1987	1988	1989
Denmark	751	530	4,301	8,547	5,832 <sup>4</sup>	37,714	5,849	28,180
Faroese	3,026	6,261	3,400	998	-	-	376	11
Germany	-	-	70	-	-	-	-	-
Netherlands	548	1,534	-	139	-	-	-	-
Norway	-	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-	-
UK (Scotland) <sup>2</sup>	586	-	23	13	-	553	517	5
Russia	-	-	-	-	-	-	-	-
<b>Total</b>	<b>4,911</b>	<b>8,325</b>	<b>7,794</b>	<b>9,697</b>	<b>5,832</b>	<b>38,267</b>	<b>6,742</b>	<b>28,196</b>

Country	1990	1991 <sup>1</sup>
Denmark	3,316	4,348
Faroese	-	-
Germany	-	-
Netherlands	-	-
Norway	-	-
Poland	-	-
UK (Scotland)	+	-
Russia	-	-
<b>Total</b>	<b>3,316</b>	<b>4,348</b>

<sup>1</sup>Preliminary.

<sup>2</sup>Amended using national data.

<sup>3</sup>Including by-catch.

<sup>4</sup>Includes Division VIb.

**Table 3.2.5**      Sandeel. Division IIIa. Landings in tonnes as officially reported to ICES except where indicated.

Country	1982	1983	1984	1985	1986	1987
Denmark	21,540	34,286 <sup>1</sup>	27,679 <sup>1</sup>	14,058	80,171	3,817
Norway	-	178	-	-	-	-
Sweden	5	31	-	-	2	-

Country	1988 <sup>2</sup>	1989 <sup>2</sup>	1990	1991 <sup>2</sup>
Denmark	22,356	17,236 <sup>1</sup>	25,574 <sup>1</sup>	23,424
Norway	-	-	-	-
Sweden	-	-	-	-

<sup>1</sup>Estimate provided by Working Group members.

<sup>2</sup>Preliminary.

**Table 3.2.6.1** Landings ('000 t) of Sandeel from the North Sea, 1952-1991. (Data provided by Working Group members.)

Year	Denmark	Germany	Faroes	Netherlands	Norway	Sweden	UK	Total
1952	1.6	-	-	-	-	-	-	1.6
1953	4.5	+	-	-	-	-	-	4.5
1954	10.8	+	-	-	-	-	-	10.8
1955	37.6	+	-	-	-	-	-	37.6
1956	81.9	5.3	-	+	1.5	-	-	88.7
1957	73.3	25.5	-	3.7	3.2	-	-	105.7
1958	74.4	20.2	-	1.5	4.8	-	-	100.9
1959	77.1	17.4	-	5.1	8.0	-	-	107.6
1960	100.8	7.7	-	+	12.1	-	-	120.6
1961	73.6	4.5	-	+	5.1	-	-	83.2
1962	97.4	1.4	-	-	10.5	-	-	109.3
1963	134.4	16.4	-	-	11.5	-	-	162.3
1964	104.7	12.9	-	-	10.4	-	-	128.0
1965	123.6	2.1	-	-	4.9	-	-	130.6
1966	138.5	4.4	-	-	0.2	-	-	143.1
1967	187.4	0.3	-	-	1.0	-	-	188.7
1968	193.6	+	-	-	0.1	-	-	193.7
1969	112.8	+	-	-	-	-	0.5	113.3
1970	187.8	+	-	-	+	-	3.6	191.4
1971	371.6	0.1	-	-	2.1	-	8.3	382.1
1972	329.0	+	-	-	18.6	8.8	2.1	358.5
1973	273.0	-	1.4	-	17.2	1.1	4.2	296.9
1974	424.1	-	6.4	-	78.6	0.2	15.5	524.8
1975	355.6	-	4.9	-	54.0	0.1	13.6	428.2
1976	424.7	-	-	-	44.2	-	18.7	487.6
1977	664.3	-	11.4	-	78.7	5.7	25.5	785.6
1978	647.5	-	12.1	-	93.5	1.2	32.5	786.8
1979	449.8	-	13.2	-	101.4	-	13.4	577.8
1980	542.2	-	7.2	-	144.8	-	34.3	728.5
1981	464.4	-	4.9	-	52.6	-	46.7	568.6
1982	506.9	-	4.9	-	46.5	0.4	52.2	610.9
1983	485.1	-	2.0	-	12.2	0.2	37.0	536.5
1984	596.3	-	11.3	-	28.3	-	32.6	668.6
1985	587.6	-	3.9	-	13.1	-	17.2	621.8
1986	752.5	-	1.2	-	82.1	-	12.0	847.8
1987	605.4	-	18.6	-	193.4	-	7.2	824.6
1988	686.4	-	15.5	-	185.1	-	5.8	892.8
1989	824.4	-	16.6	-	186.8	-	6.9	1034.7
1990	496.0	-	2.2	0.3	88.9	-	2.5	589.9
1991 <sup>1</sup>	701.4	-	11.2	-	128.8	-	0.5	841.9

<sup>1</sup>Preliminary.

+ = less than half unit.

**Table 3.2.6.2** Annual landings ('000 t) of Sandeels by area (see Figure 3.2.1) of the North Sea [Denmark, Norway and UK (Scotland)]. (Data provided by Working Group members.)

Year	Area											Assessment areas <sup>1</sup>	
	1A	1B	1C	2A	2B	2C	3	4	5	6	Shetland	Northern	Southern
1972	98.8	28.1	3.9	24.5	85.1	0.0	13.5	58.3	6.7	28.0	0.0	130.6	216.3
1973	59.3	37.1	1.2	16.4	60.6	0.0	8.7	37.4	9.6	59.7	0.0	107.6	182.4
1974	50.4	178.0	1.7	2.2	177.9	0.0	29.0	27.4	11.7	25.4	7.4	386.6	117.1
1975	70.0	38.2	17.8	12.2	154.7	4.8	38.2	42.8	12.3	19.2	12.9	253.7	156.5
1976	154.0	3.5	39.7	71.8	38.5	3.1	50.2	59.2	8.9	36.7	20.2	135.0	330.6
1977	171.9	34.0	62.0	154.1	179.7	1.3	71.4	28.0	13.0	25.3	21.5	348.4	392.3
1978	159.7	50.2		346.5	70.3		42.5	37.4	6.4	27.2	28.1	163.0	577.2
1979	194.5	0.9	61.0	32.3	27.0	72.3	34.1	79.4	5.4	44.3	13.4	195.3	355.9
1980	215.1	3.3	119.3	89.5	52.4	27.0	90.0	30.8	8.7	57.1	25.4	292.0	401.2
1981	105.2	0.1	42.8	151.9	11.7	23.9	59.6	63.4	13.3	45.1	46.7	138.1	378.9
1982	189.8	5.4	4.4	132.1	24.9	2.3	37.4	75.7	6.9	74.7	52.0	74.4	479.2
1983	197.4	-	2.8	59.4	17.7	-	57.7	87.6	8.0	66.0	37.0	78.2	419.0
1984	337.8	4.1	5.9	74.9	30.4	0.1	51.3	56.0	3.9	60.2	32.6	91.8	532.8
1985	281.4	46.9	2.8	82.3	7.1	0.1	29.9	46.6	18.7	84.5	17.2	79.7	513.5
1986	295.2	35.7	8.5	55.3	244.1	2.0	84.8	22.5	4.0	80.3	14.0	375.1	457.4
1987	275.1	63.6	1.1	53.5	325.2	0.4	5.6	21.4	7.7	45.1	7.2	395.9	402.8
1988	291.1	58.4	2.0	47.0	256.5	0.3	37.6	35.3	12.0	102.2	4.7	384.8	487.6
1989	227.1	31.0	0.5	167.8	331.4	1.5	125.3	30.5	4.5	95.1	3.5	489.7	525.0
1990	140.6	1.4	0.1	80.3	156.1	0.6	61.0	45.5	13.8	85.5	2.3	219.2	365.7
1991	228.2	7.1	0.7	114.0	252.2	1.3	110.6	22.6	1.0	93.1	+	371.9	458.9

<sup>1</sup>Assessment areas: Northern - Areas 1B, 1C, 2B, 2C, 3.  
Southern - Areas 1A, 2A, 4, 5, 6.



**Table 3.2.9** Sandeel. Division VIa.  
Landings in tonnes, 1984-1991, as used by the Working Group.

Country	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
UK (Scotland)	14,166	18,586	24,469	14,479	24,465	18,785	14,360	7,777

<sup>1</sup>Preliminary.

**Table 3.2.10** Landings of SPRAT in Division IIIa (tonnes 10<sup>-3</sup>). (Data provided by Working Group members).

Year	Skagerrak				Kattegat			Div. IIIa total
	Denmark	Sweden	Norway	Total	Denmark	Sweden	Total	
1974	17.9	2.0	1.2	21.1	31.6	18.6	50.2	71.3
1975	15.0	2.1	1.9	19.0	60.7	20.9	81.6	100.6
1976	12.8	2.6	2.0	17.4	27.9	13.5	41.4	58.8
1977	7.1	2.2	1.2	10.5	47.1	9.8	56.9	67.4
1978	26.6	2.2	2.7	31.5	37.0	9.4	46.4	77.9
1979	33.5	8.1	1.8	43.4	45.8	6.4	52.2	95.6
1980	31.7	4.0	3.4	39.1	35.8	9.0	44.8	83.9
1981	26.4	6.3	4.6	37.3	23.0	16.0	39.0	76.3

Year	Skagerrak		Kattegat		Division IIIa Total
	Denmark	Norway	Denmark	Sweden	
1982	10.5	1.9	21.4	5.9	39.7
1983	3.4	1.9	9.1	13.0	26.4
1984	13.2	1.8	10.9	10.2	36.1
1985	1.3	2.5	4.6	11.3	19.7
1986	0.4	1.1	0.9	8.4	10.8
1987	1.4	0.4	1.4	11.2	14.4
1988	1.7	0.3	1.3	5.4	8.7
1989	0.9	1.1	3.0	4.8	9.8
1990	1.3	1.3	1.1	6.0	9.7
1991 <sup>1</sup>	4.2	0.8	2.2	6.6	13.8

<sup>1</sup>Preliminary.

**Table 3.2.11** Sprat catches in the North Sea ('000 t), 1981-1991. Catches in fjords of western Norway excluded.  
(Data provided by Working Group members except where indicated.)

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
<b>Division IVa West</b>											
Denmark	2.8	-	-	-	0.9	0.6	0.2	0.1	+	-	
Germany	-	-	-	-	-	-	-	-	-	-	
Netherlands	-	-	-	-	6.7	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-	-	-	-	0.1
UK (Scotland)	1.0	+	-	+	6.1	+	+	-	-	+	-
Total	3.8	+	-	+	13.7	0.6	0.2	0.1	+	+	0.1
<b>Division IVa East (North Sea) stock</b>											
Denmark	-	+	-	-	+	0.2	+	+	+	-	-
Norway	-	0.3	-	-	-	-	-	-	-	-	-
Sweden	-	-	-	-	-	-	-	-	-	+ <sup>5</sup>	2.5
Total	-	0.3	-	-	+	0.2	+	+	+	+	2.5
<b>Division IVb West</b>											
Denmark	53.6	23.1	32.6	5.6	1.8	0.4	3.4	1.4	2.0	10.0	9.4
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-
Norway	0.2	10.2	0.9	0.5	-	-	-	3.5	0.1	1.2	4.4
UK (England)	-	-	-	+	-	-	-	-	-	-	-
UK (Scotland)	0.7	0.2	+	+	-	-	0.1	-	-	-	-
Total	54.5	33.5	33.5	6.1	1.8	0.4	3.5	4.9	2.1	11.2	13.8
<b>Division IVb East</b>											
Denmark	127.5	91.2	39.2	62.1	36.6	10.3	28.0	80.7	59.2	59.2	67.0
Germany	4.8	1.5	-	0.6	0.6	0.6 <sup>3</sup>	-	-	-	-	-
Norway	0.2	7.6	10.8	3.1	-	-	-	0.6	-	0.6	25.1
Sweden	-	-	-	-	-	-	-	-	-	+ <sup>2</sup>	+ <sup>2</sup>
Total	132.5	100.3	50.0	65.8	37.2	10.9	28.0	81.3	59.2	59.8	92.1
<b>Division IVc</b>											
Belgium	-	-	-	-	+	+	+	-	+ <sup>2</sup>	+ <sup>2</sup>	+ <sup>2</sup>
Denmark	4.3	2.4	1.0	0.5	+	0.1	+	0.1	0.5	1.5	1.7
France	-	-	-	-	-	+	-	-	+ <sup>2</sup>	-	+ <sup>2</sup>
Netherlands	-	-	-	0.1	-	-	-	0.4	0.4 <sup>2,3</sup>	-	+ <sup>2,3</sup>
Norway	-	2.2	0.5	3.4	-	-	-	-	-	-	-
UK (England)	14.0	14.9	3.6	0.9	3.4	4.1	0.7	0.6	0.9	0.2	1.8
Total	18.3	20.1	5.1	4.9	3.4	4.3	0.7	1.1	1.8	1.7	3.5
<b>Total North Sea</b>											
Belgium	-	-	-	-	+	+	+	-	+	+ <sup>2</sup>	+ <sup>2</sup>
Denmark	188.2	116.6	72.6	68.1	39.5	11.7	31.7	82.3	61.9	69.2	78.1
Faroe Islands	-	-	-	-	-	-	-	-	-	-	-
France	-	-	-	-	-	+	-	-	+	-	+ <sup>2,3</sup>
Germany	4.8	1.5	-	0.6	-	0.6	-	-	-	-	-
Netherlands	-	-	-	0.1	0.6	-	0.5	0.4	0.4	-	+ <sup>2,3</sup>
Norway	0.4	20.6	12.0	7.0	6.1	-	-	4.1	0.1	1.8	29.6
Sweden	-	-	-	-	-	-	-	-	-	+ <sup>2</sup>	+ <sup>2</sup>
UK (England)	14.0	14.9	3.6	0.9	3.4	4.1	0.7	0.6	0.9	0.2	1.8
UK (Scotland)	1.7	0.2	+	+	-	+	0.2	-	-	+	-
Total	209.1	153.8	88.4	76.7	49.6	16.4	33.1	87.4	63.3	71.2	109.5

<sup>1</sup>Preliminary. <sup>2</sup>Official statistics. <sup>3</sup>Includes Divisions IVa-e. <sup>5</sup>Includes Division IVb East.

+ = less than 0.1. - = magnitude known to be nil.

**Table 3.2.12** Sprat in Division VIa, 1982-1991. Landings in tonnes as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	-	-	-	-	269 <sup>2</sup>	364	-	-	-
Germany	-	-	-	-	-	-	-	-	-	-
Ireland	287	-	192	51	348	-	150	147	-	-
Netherlands	2,156	1,863	-	-	-	-	-	-	-	-
Norway	24	-	-	557	-	-	-	-	-	-
UK (Engl. & Wales)	-	-	-	-	2	-	-	-	+	-
UK (Scotland) <sup>3</sup>	1,057	1,971	2,456	2,946	520	582	3,844	1,146	813	1,459
Total	3,524	3,834	2,648	3,554	870	851	4,378	1,298	813	1,459

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division VIb.

<sup>3</sup>Amended from national data.

**Table 3.2.13** Sprat in Divisions VII d,e, 1982-1991. Landings in tonnes as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	-	3	-	-	-	-	-	-	-	-
Denmark	286	638	1,417	-	15	250	2,529	2,092	608	-
France	44	60	47	14	-	23	2	10	-	-
Germany	-	-	-	-	-	-	-	-	-	-
Netherlands	1,533	1,454	589	-	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-	-	-	-
UK (Engl. & Wales)	4,749	4,756	2,402	3,771	1,163	2,441	2,944	1,319	1,508	2,567
Total	6,612	6,011	4,455	3,785	1,178	2,714	5,475	3,421	2,116	2,567

<sup>1</sup>Preliminary.

**Table 3.3.2** Cod landings (in tonnes) from the Kattegat, 1971-1991.

Year	Kattegat			Total
	Denmark	Sweden	Germany <sup>2</sup>	
1971	11,748	3,962	22	15,732
1972	13,451	3,957	34	17,442
1973	14,913	3,850	74	18,837
1974	17,043	4,717	120	21,880
1975	11,749	3,642	94	15,485
1976	12,986	3,242	47	16,725
1977	16,668	3,400	51	20,119
1978	10,293	2,893	204	13,390
1979	11,045	3,763	22	14,830
1980	9,265	4,206	38	13,509
1981	10,673	4,380	284	15,337
1982	9,320	3,087	58	12,465
1983	9,149	3,625	54	12,828
1984	7,590	4,091	205	11,886
1985	9,052	3,640	14	12,706
1986	6,930	2,054	112	9,096
1987	9,396	2,006	89	11,491
1988	4,054	1,359	114	5,527
1989	7,056	1,483	51	8,590
1990	4,715	1,186	35	5,936
1991 <sup>1</sup>	4,664	2,066	104	6,834

<sup>1</sup>Preliminary.

<sup>2</sup>Landings statistics incomplete split on the Kattegat and the Skagerrak.  
The figures are estimated by the Study Group members.

**Table 3.3.4** Catch (in tonnes) of Sole from Division IIIa provided by Study Group members.

Year	Denmark		Netherlands	Sweden	Germany	Belgium <sup>2</sup>	WG corrections	Total
	Skagerrak	Kattegat	Skagerrak	Kattegat	Kattegat	Skagerrak		
1970	25	158	-	-	-	-	-	183
1971	32	242	-	-	9	-	-	283
1972	31	327	-	-	12	-	-	370
1973	52	260	-	-	12	-	-	325
1974	39	388	-	-	9	-	-	436
1975	55	381	9	16	16	-	-9	468
1976	34	367	155	11	21	2	-155	435
1977	91	400	276	13	8	1	-276	513
1978	141	336	141	9	9	-	-141	495
1979	57	301	84	8	6	1	-84	373
1980	73	228	5	9	12	2	-5	324
1981	59	199	-	7	16	1	-	282
1982	52	147	1	4	8	1	-1	212
1983	70	180	31	11	15	-	-31	276
1984	76	235	54	13	13	-	-54	337
1985	102	275	132	19	1	+	-132	397
1986	158	456	109	26	1	2	-109	643
1987	137	564	70	19	-	2	-70	722
1988	138	540	-	24	-	4	-	706
1989	217	578	-	21	7	1	-	824
1990	128 <sup>2</sup>	464 <sup>2</sup>	-	29	8	2	-	629
1991 <sup>1</sup>	216	746		38	11 <sup>3</sup>			1,011

<sup>1</sup>Preliminary.

<sup>2</sup>Data as officially reported to ICES.

<sup>3</sup>1 tonne in the Skagerrak.

Table 3.3.5 COD landings (t) from the Skagerrak as estimated by the Working Group, 1971-1991.

Year	Open Skagerrak					Total	Norwegian Fjords
	Denmark	Sweden	Norway	Others	Germany		Norway
1971	5,914	2,040	1,355	13	-	9,322	-
1972	6,959	1,925	1,201	22	-	10,107	-
1973	6,673	1,690	1,253	27	-	9,643	-
1974	6,694	1,380	1,197	92	-	9,363	-
1975	14,171	917	1,190	52	-	16,330	-
1976	18,847	873	1,241	466	-	21,427	-
1977	18,618	560	-	675	-	19,853	-
1978	23,614	592	-	260	-	24,466	1,305
1979	14,007	1,279	-	213	-	15,499	1,752
1980	21,551	1,712	402	341	-	24,006	1,580
1981	25,498	2,835	286	294	-	28,913	1,792
1982	23,377	2,378	314	41	-	26,110	1,466
1983	18,467	2,803	346	163	-	21,784	1,520
1984	17,443	1,981	311	156	-	19,891	1,187
1985	14,521	1,914	193	-	-	16,628	990
1986	18,424	1,505	174	-	-	20,103	917
1987	17,824	1,924	152	-	-	19,900	838
1988	14,806	1,648	392	106	-	16,952	769
1989	16,634	1,902	256	34	12	18,838	888
1990	15,788	1,694	143	65	110	17,800	846
1991 <sup>1</sup>	10,396	1,579	72	12	12	12,059	854

Table 3.3.6 Landings of HADDOCK in Division IIIa (in tonnes) as supplied by Working Group members.

Year	Denmark		Total	Norway	Sweden	Others	Total consumption	Total reduction and consumption
	Human consumption	Reduction		Human consumption				
1975	-	-	5,015	122	921	57	-	6,115
1976	-	-	7,488	191	1,075	301	-	9,055
1977	-	-	6,907	156	2,485	215	-	9,763
1978	-	-	4,978	168	1,435 <sup>2</sup>	56	-	6,637
1979	-	-	4,120	248	361	56	-	4,785
1980	-	-	7,172	288	373	57	-	7,890
1981	-	-	9,568	271	391	120	-	10,350
1982	-	-	11,151	196	396	329	-	12,072
1983	6,425	7,225	13,650	756	608	221	8,010	15,235
1984	5,516	2,707	8,223	321	499	30	6,366	9,073
1985	6,522	954	7,476	279	351	15	7,167	8,121
1986	3,265	1,682	4,947	226	151	5	3,647	5,329
1987	3,584	1,449	5,033	148	71	36	3,803	5,288
1988	2,543	1,480	4,023	245	64	48	2,852	4,380
1989	3,889	360	4,249	138	66	5	4,098	4,458
1990	3,887	1,968	5,855	84	102	27	4,100	6,068
1991	3,894	2,593	6,487	111	80	1	4,086	6,679

**Table 3.3.7** Nominal landings (in tonnes) of WHITING from Division IIIa as supplied by the Study Group on Division IIIa Demersal Stocks.

Year	Denmark			Norway	Sweden	Others	Total
1975	19,018			57	611	4	19,690
1976	17,870			48	1,002	48	18,968
1977	18,116			46	975	41	19,178
1978	48,102			58	899	32	49,091
1979	16,971			63	1,033	16	18,083
1980	21,070			65	1,516	3	22,654
	Total consumption	Total industrial	Total				
1981	1,027	23,915	24,942	70	1,054	7	26,073
1982	1,183	39,758	40,941	40	670	13	41,664
1983	1,311	23,505	24,816	48	1,061	8	25,933
1984	1,036	12,102	13,138	51	1,168	60	14,417
1985	557	11,967	12,524	45	654	2	13,225
1986	484	11,979	12,463	64	477	1	13,005
1987	443	15,880	16,323	29	262	43	16,657
1988	391	10,872	11,263	42	435	24	11,764
1989	777	11,662	12,439	29	675	-	13,215
1990	1,016	17,829	18,845	46	435	73	19,333
1991 <sup>1</sup>	881	12,463	13,344	56	557	97	14,054

<sup>1</sup>Preliminary.

**Table 3.3.8** PLAICE landings from Division IIIa (in tonnes) as supplied by the Study Group on Division IIIa Demersal Stocks.

Skagerrak								
Year	Denmark	Sweden	Netherlands	Germany	Belgium	Norway	Correction	Total
1972	5,095	70	-		-	-		5,165
1973	3,871	80	-		-	-		3,951
1974	3,429	70	-		-	-		3,499
1975	4,888	77	-		-	-		4,965
1976	9,251	81	-		-	-		9,332
1977	12,855	142	-		-	-		12,997
1978	13,383	94	-		-	-		13,477
1979	11,045	105	-		-	-		11,150
1980	9,514	92	-		-	-		9,606
1981	8,115	123	-		-	-		8,238
1982	7,789	140	-		-	-		7,929
1983	6,828	170	594		133	14	-594	7,145
1984	7,560	356	1,580		27	22	-1,580	7,965
1985	9,646	296	2,225		136	18	-2,225	10,096
1986	10,653	215	4,024		505	24	-4,024	11,397
1987	11,370	222	2,209		907	25	-2,209	12,519
1988	9,781	281	2,087		716	41	-2,087	10,819
1989	5,387	320	-	0.1	230	33	-	5,939
1990	8,726	777	-	0.7	471	69	-	10,044
1991 <sup>1</sup>	5,849	472	-	3.9	324	68	-	6,717

<sup>1</sup>Preliminary

Kattegat					
Year	Denmark	Sweden	Germany	Total Kattegat	Total IIIa
1972	15,504	348	-	15,852	21,017
1973	10,021	231	-	10,252	14,203
1974	11,401	255	-	11,656	15,155
1975	10,158	369	-	10,527	15,492
1976	9,487	271	-	9,758	19,090
1977	11,611	300	-	11,911	24,908
1978	12,685	368	-	13,053	26,530
1979	9,721	281	-	10,002	21,152
1980	5,582	289	-	5,871	15,477
1981	3,803	232	-	4,035	12,273
1982	2,717	201	-	2,918	10,847
1983	3,280	291	-	3,571	10,716
1984	3,252	323	32	3,607	11,572
1985	2,979	403	4	3,386	13,482
1986	2,468	170	+	2,638	14,935
1987	2,868	283	104	3,255	15,775
1988	1,818	210	2.8	2,031	12,850
1989	1,596	135	4.0	1,735	7,674
1990	1,831	201	2.0	2,034	12,078
1991 <sup>1</sup>	1,756	267	5.6	2,029	8,746



**Table 3.4.1.2.1** Nominal landings (tonnes) of *Pandalus borealis* in ICES Division IIIa and Sub-area IV as officially reported to ICES.

Year	Division IIIa				Sub-area IV					
	Denmark	Norway	Sweden	Total	Denmark	Norway	Sweden	UK(Engl) <sup>1</sup>	UK(Scotl) <sup>2</sup>	Total
1970	757	982	2,740 <sup>3</sup>	4,479	3,460	1,107	-	14	100	4,681
1971	834	1,392	2,906 <sup>3</sup>	5,132	3,572	1,265	-	-	438	5,275
1972	773	1,123	2,524 <sup>3</sup>	4,420	2,448	1,216	-	692	187	4,543
1973	716	1,415	2,130 <sup>3</sup>	4,261	196	931	-	1,021	163	2,311
1974	475	1,186	2,003 <sup>3</sup>	3,664	337	767	-	50	432	1,586
1975	743	1,463	1,740	3,946	1,392	604	261	-	525	2,782
1976	865	2,541	2,212	5,618	1,861	1,051	136	186	2,006	5,240
1977	763	2,167	1,895	4,825	782	960	124	265	1,723	3,854
1978	757	1,841	1,529	4,127	1,592	692	78	98	2,044	4,504
1979	973	2,489	1,752	5,214	962	594	34	238	309	2,137
1980	1,679	3,498	2,121	7,298	1,273	1,140	38	203	406	3,060
1981	2,593	3,753	2,210	8,556	719	1,435	31	1	341	2,527
1982	2,920	3,877	1,421	8,218	1,069	1,545	92	-	354	3,060
1983	1,571	3,722	988	6,281	5,725	1,657	112	65	1,836	9,395
1984	1,717	3,509	933	6,159	4,638	1,274	120	277	25	6,334
1985	4,105	4,772	1,474	10,351	4,582	1,785	128	415	1,347	8,257
1986	4,686	4,811	1,357	10,854	3,896	1,681	157	458	358	6,550
1987	4,140	5,198	1,085	10,423	9,223	3,145	252	526	774	13,920
1988	2,278	3,047 <sup>4</sup>	1,075	6,400	2,647	4,615 <sup>4</sup>	220	489	109	8,080
1989	2,527	3,156	1,304	6,987	3,298	3,418	122	353	590	7,781 <sup>5</sup>
1990	2,277	3,006 <sup>6</sup>	1,471	6,754	2,079	3,146	137	279	365	6,006
1991 <sup>6</sup>	3,257	3,424	1,579	8,260	749	2,673	149	-	-	3,571

<sup>1</sup>Includes other Pandalid shrimp.

<sup>2</sup>Includes small amounts of other Pandalid shrimp.

<sup>3</sup>Includes Sub-area IV.

<sup>4</sup>Working Group figure.

<sup>5</sup>Includes 21 t by the Netherlands.

<sup>6</sup>Preliminary.

**Table 3.4.1.2.2** *Pandalus borealis* landings (t) from Divisions IIIa (Skagerrak) and IVa (eastern part) (Norwegian Deep) as estimated by the Working Group.

Year	Denmark	Norway	Sweden	Total
1970	1,102	1,729	2,742	5,573
1971	1,190	2,486	2,906	6,582
1972	1,017	2,477	2,524	6,018
1973	755	2,333	2,130	5,218
1974	530	1,809	2,003	4,342
1975	817	2,339	2,003	5,159
1976	1,204	3,348	2,529	7,081
1977	1,120	3,004	2,019	6,143
1978	1,459	2,440	1,609	5,508
1979	1,062	3,040	1,787	5,889
1980	1,678	4,562	2,159	8,399
1981	2,593	5,183	2,241	10,017
1982	3,766	5,042	1,450	10,258
1983	1,567	5,361	1,136	8,064
1984	1,747	4,783	1,022	7,552
1985	3,827	6,646	1,571	12,044
1986	4,834	6,490	1,463	12,787
1987	4,599	8,343	1,321	14,263
1988	3,068	7,661	1,278	12,007
1989	3,150	6,411	1,433	10,994
1990	2,479	6,139	1,540	10,158
1991	3,583	6,106	1,917	11,606

**Table 3.4.2** Landings (t) of *Pandalus borealis* from the Fladen Ground (Division IVa) as estimated by the Working Group.

Year	Denmark	Sweden	Norway	UK (Scotland)	Total
1972	2,204	-	-	187	2,391
1973	157	-	-	163	320
1974	282	-	-	434	716
1975	1,308	-	-	525	1,833
1976	1,552	-	-	1,937	3,489
1977	425	-	112	1,692	2,229
1978	890	-	81	2,027	2,998
1979	565	-	44	268	877
1980	1,122	-	76	377	1,575
1981	685	-	1	347	1,033
1982	283	-	-	352	635
1983	5,729	-	8	1,827	7,564
1984	4,553	-	13	25	4,591
1985	3,649	-	-	1,341	4,990
1986	3,416	-	-	301	3,717
1987	7,326	-	-	686	8,012
1988	1,077	-	2	84	1,163
1989	2,438	-	25	547	3,010
1990	1,681	4	3	365	2,053
1991 <sup>1</sup>	422	-	-	53	475

<sup>1</sup>Provisional.

**Table 3.4.3** Landings (t) of *Pandalus borealis* from Division IVb, the Farn Deep as estimated by the Working Group.

Year	UK (England)	UK (Scotland)	Denmark	Total	CPUE kg/hr (Scotland)
1977	227	-	No data	-	-
1978	91	2	-	-	No data
1979	235	34	-	-	No data
1980	203	17	-	-	60
1981	1	-	-	-	-
1982	-	-	-	-	-
1983	65	-	-	-	-
1984	30	-	-	-	-
1985	2	6	-	-	70
1986	137	57	106	300	127
1987	212	86	92	390	101
1988	91	25	384	500	67
1989	168	8	72	248	44
1990	144	+	1	145	No data
1991	3	-	-	3	No data

Table 3.5.2 Nominal catch (in tonnes) of COD in Sub-area IV, 1981-1991, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgium	8,744	6,604	6,704	5,804	4,815	6,604	6,693	5,508	3,398	2,934	2,331
Denmark	64,968	61,454	48,828	46,751	42,547	32,892	36,948	34,905	25,782	21,601	18,998
Faroe Islands	38	65	361	-	71	15	57	46	35	96	23 <sup>1</sup>
France	11,369	8,399	7,159	8,129	4,834	8,402	8,199	8,323	2,578 <sup>1,3</sup>	n/a	975 <sup>1,3</sup>
Germany	29,741	18,525	20,333	13,453	7,675	7,667	8,230	7,707	11,430	11,725	7,085 <sup>1</sup>
Netherlands	51,281	36,490	34,111	25,460	30,844	25,082	21,347	16,968	12,028	8,445 <sup>1</sup>	6,830 <sup>1</sup>
Norway <sup>2</sup>	6,766	12,163	6,625	7,005	5,766	4,864	5,000	3,585	4,813	5,168	5,314 <sup>1</sup>
Poland	7	62	75	7	-	10	13	19	24	53	15
Sweden	321	453	422	575	748	839	688	367	501	620	784
UK (Engl. & Wales)	59,856	54,277	53,860	35,605	29,692	25,361	29,960	23,496	18,250	15,596	12,878 <sup>1</sup>
UK (Isle of Man)	-	-	-	-	-	-	-	-	1	-	-
UK (N. Ireland)	-	-	-	-	-	-	-	-	124	26	26
UK (Scotland)	53,921	57,308	58,581	54,359	60,931	45,748	49,671	41,382	31,480	31,120	28,419 <sup>1</sup>
Russia	-	-	-	-	-	-	-	-	-	-	-
Total	287,012	255,800	237,059	197,148	187,923	157,484	166,806	142,306	110,444	105,000 <sup>4</sup>	83,678

<sup>1</sup>Preliminary.<sup>2</sup>Figures do not include cod caught as industrial by-catch.<sup>3</sup>Includes Division IIa (EC).<sup>4</sup>Working Group estimate.

n/a = Not available.

**Table 3.5.3 Nominal catch (in tonnes) of HADDOCK in Sub-area IV, 1981-1991, as officially reported to ICES.**

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	1,217	966	985	494	719	317	165	220	145	192	168
Denmark	13,198	22,704	25,653	16,368	23,821	16,397	7,767	9,174	2,789	1,993	1,330
Faroe Islands	46	6	51	-	5	4	23	35	16	6	15
France	11,966	15,988	11,250	8,103	5,389	4,802	3,889	2,193	1,702 <sup>1</sup>	n/a	631 <sup>4</sup>
Germany, Fed. Rep.	3,387	4,510	3,654	2,571	2,796	1,984	1,231	802	447	714	565
Netherlands	2,279	1,021	1,722	1,052	3,875	1,627	1,093	895 <sup>3</sup>	328	n/a	103
Norway <sup>2</sup>	2,283	2,888	3,862	3,959	3,498	5,190	2,610	1,590	1,664 <sup>1</sup>	1,483	1,840
Poland	31	317	150	17	-	1	-	-	-	-	-
Sweden	1,301	1,874	1,360	1,518	1,942	1,550	937	614	1,051	900	957
UK (Engl. & Wales)	14,570	16,403	15,476	12,340	13,614	8,137	7,491	5,537	2,704	2,093	2,073
UK (N. Ireland)	-	-	-	-	-	-	-	-	137	11	2
UK (Scotland)	82,798	107,773	100,390	87,479	112,549	126,650	84,063	84,104	53,252	34,459	36,272
Total	133,076	174,450	164,553	133,901	168,208	166,659	109,269	104,269	64,235	n/a	43,956

<sup>1</sup>Preliminary.

<sup>2</sup>Figures do not include haddock caught as industrial by-catch.

<sup>3</sup>Working Group estimate.

<sup>4</sup>Includes Division IIa (EC).

n/a = Not available.

Table 3.5.4 Nominal catch (in tonnes) of WHITING in Sub-area IV, 1981-1991, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	2,623	2,272	2,864	2,798	2,177	2,275	1,404	1,984	1,271	1,040	913
Denmark	16,430	27,043	18,054	19,771	16,152	9,076	2,047	12,112	803	1,207	1,529
Faroe Islands	12	57	18	-	6	-	12	222	1	26	- <sup>1</sup>
France	24,744	23,780	21,263	19,209	10,853	8,250	10,493	10,569	5,277 <sup>1,2</sup>	n/a	5,188 <sup>1,2</sup>
Germany, Fed. Rep.	601	223	317	286	226	313	274	454	415	692	1,014 <sup>1</sup>
Netherlands	14,600	12,218	10,935	8,767	6,973	13,741	8,542	5,087 <sup>3</sup>	3,860	3,272 <sup>1</sup>	4,029 <sup>1</sup>
Norway	27	17	39	88	103	103	74	52	32	55	94 <sup>1</sup>
Poland	-	-	1	2	-	-	-	-	-	-	-
Sweden	9	11	44	53	22	33	17	5	17	16	48
UK (Engl. & Wales)	5,964	4,743	4,366	5,017	5,024	3,805	4,485	4,007	1,896	2,124	2,554 <sup>1</sup>
UK (N. Ireland)	-	-	-	-	-	-	-	1	61	30	1
UK (Scotland)	31,399	29,640	41,248	42,967	30,398	29,113	37,630	31,804	26,491	27,632	30,458 <sup>1</sup>
Total	96,409	100,004	99,149	99,958	71,934	66,709	64,978	66,294	40,124	n/a	45,828

<sup>1</sup>Preliminary.<sup>2</sup>Includes Division IIa (EC).<sup>3</sup>Working Group estimate.

n/a = Not available.

Table 3.5.5 Nominal catch (in tonnes) of saithe in Sub-area IV and Division IIIa, 1981-1991, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgium	12	4	7	32	31	16	4	60	13	23	29
Denmark	6,454	10,114	10,530	8,526	9,033	10,343	7,928	6,868	6,550	5,800	6,314
Faroe Islands	614	746	806	-	895	224	691	276	739	1,650	671 <sup>1</sup>
France	42,649	47,064	38,782	43,592	42,200	43,958	38,356	28,913	30,761 <sup>1,2</sup>	n/a	14,795 <sup>1,2</sup>
Germany	8,246	13,517	13,649	25,262	22,551	22,277	22,400	18,528	14,339	15,006	16,983 <sup>1</sup>
Netherlands	123	36	89	181	233	134	334	345	257	207 <sup>1</sup>	190 <sup>1</sup>
Norway	55,882	72,669	81,330	88,420	101,808	67,341	66,400	40,021	24,737	19,122	33,540 <sup>1</sup>
Poland	698	793	415	413	-	495	832	1,016	809	1,244	1,336
Sweden	156	372	548	522	1,764	1,987	1,732	2,064	797	838	1,514
UK (Engl. & Wales)	4,309	5,627	6,845	8,183	5,455	4,480	3,233	3,790	4,441	3,654	1,172 <sup>1</sup>
UK (N. Ireland)	-	-	-	-	-	-	-	-	24	-	-
UK (Scotland)	6,529	8,136	6,321	6,970	9,932	15,520	11,911	10,850	8,26	7,383	3,471 <sup>1</sup>
Total	125,672	159,078	159,322	182,101	193,902	166,775	153,821	112,731	92,193	n/a	80,015

<sup>1</sup>Preliminary.

<sup>2</sup>Includes IIa(EC), IIIa-d(EC).

n/a = not available.

Table 3.5.6 North Sea PLAI CE. Nominal landings (tonnes) in Sub-area IV as officially reported to ICES, 1981-1991.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	6,091	7,103	8,916	10,220	9,965	7,232	8,554	11,527	10,939	13,940	14,328
Denmark	23,395	24,532	19,114	23,361	28,236	26,332	21,597	20,259	23,481	26,474	24,305
Faroe Islands	-	-	-	-	-	-	-	43	-	-	-
France	689	1,046	1,185	1,145	1,010	751	1,580	1,773	2,037	n/a	508
Germany	3,453	3,628	2,397	2,485	2,197	1,809	1,794	2,566	5,341	8,747	7,748
Netherlands	40,049	55,715	53,608	61,478	90,950	74,447	76,612	77,724	84,173	n/a	68,266
Norway	18	16	17	17	23	21	12	21	321	1,756	553
Sweden	3	6	22	14	18	16	7	2	12	169	103
UK (Engl. & Wales)	17,230	16,534	13,248	12,988	11,335	12,428	14,891	17,613	19,735	17,563	12,153
UK (N.Ireland)	-	-	-	-	-	-	-	-	540	176	859
UK (Scotland)	4,394	4,355	4,159	4,195	4,577	4,866	5,747	6,884	5,516	6,789	6,587
Total reported	95,322	112,935	102,666	115,903	148,311	127,902	130,794	138,412	152,095	75,614	135,410
Unreported landings <sup>2</sup>	44,425	41,614	41,369	40,244	11,526	37,445	29,700	24,059	17,547	92,092	18,323
Landings as used by WG	139,747	154,549	144,035	156,147	159,837	165,347	160,494	162,471	169,642	167,706	153,733

<sup>1</sup>Provisional.<sup>2</sup>Estimated by the Working Group.



**Table 3.5.7** Nominal catch (tonnes) of SOLE in Sub-area IV and landings as estimated by the Working Group, 1982-1991.

Year	Belgium	Denmark	France	Germany, Fed. Rep	Netherlands	UK (Engl. & Wales)	Other countries	Total reported	Unreported landings	Grand Total
1982	1,927	522	686	290	17,749	403	-	21,577	2	21,579
1983	1,740	730	332	619	16,101	435	+	19,957	4,970	24,927
1984	1,771	818	400	1,034	14,330	586	1	18,940	7,899	26,839
1985	2,390	692	875	303	14,897	774	3	19,934	4,313	24,247
1986	1,833	443	296	155	9,558	647	2	12,934	5,267	18,201
1987	1,644	342	318	210	10,635	676	4	13,829	3,539	17,368
1988	1,199	616	487	452	9,841	740	28	13,363	8,227	21,590
1989	1,596	1,020	313	864	9,620	966	65	14,444	7,377	21,821
1990	2,389	1,428	-	2,296	-	1,484	276	7,873	27,260	35,133
1991	2,977	1,301	465	1,823	18,771	917	145	26,399	11,649	38,048

All landings reported to ICES.

Unreported landings estimated by the Working Group.

1991 data are provisional.

No data on discards available.

Table 3.6.1.1

1)  
A summary of countries currently providing assessment data for the stocks covered by this Working Group.

Data	Cod			Haddock		Whiting		Plaice	Sole	Saithe	Mergim		Anglerfish	
	VIa	VIb	VIIa	VIa	VIb	VIa	VIb	VIIa	VIIa	VI	VIa	VIb	VIa	VIb
Catch weight (main exploiters)	BE Fr S GNI IR No	Fr S E No	SE B Fr GIR NI	Fr G No E NI S IR	No E S NI	Fr S IR E NI	S	EB Fr S IR NI	EB Fr S IR NI	Fr G No E NI S	Fr E S Sp IR NI	E S	Fr Sp E S NI IR	E S
Discard weight	-	-	-	S	-	-	-	NI IR	-	-	Fr	-	-	-
Catch length	SE IR Fr	-	E NI IR	ES Fr IR	S NI	S IR	-	EB IR NI	E B IR	G Fr ES	Fr S	-	Fr S Sp	-
Discard length	-	-	-	S	-	-	-	NI IR	-	-	Fr	-	-	-
Catch Alk	SE IR Fr	-	IR E NI	E Fr S IR	S	S IR	-	EB IR	E B IR	G Fr ES	Fr S	-	S	-
Discard Alk	-	-	-	S	-	-	-	NI IR	-	-	Fr	-	-	-
Catch wt-at-age	S	-	E IR NI	E IR NI	-	-	-	NI IR	E B	-	S Fr	-	S	-
Effort	S Fr	-	E NI	S Fr	S	S	-	E B	E B	S Fr	S Fr	-	S	-
CPUE	S Fr	-	E Fr NI	S Fr	S	S	-	E Fr NI	E B	S Fr	Fr	-	-	-
Pre-recruit survey index	S	-	E IR	S	S	S	-	E IR	E	-	-	-	-	-
Pre-recruit commercial index	S Fr	-	-	S Fr	-	S	-	-	E B	-	-	-	-	-

B = Belgium  
Fr = France  
S = Scotland

IR = Republic of Ireland  
No = Norway  
Ic = Iceland

E = England and Wales  
G = Germany  
Fa = Faroe

NI = Northern Ireland  
Sp = Spain

1) The Working Group on the Assessment of Northern Shelf Demersal Stocks.

(cont'd)

Table 3.6.1.1.1 Cont'd

Data	Blue ling					Ling				Tusk			
	Va	Vb	VIa	VIb	XIV	Va	Vb	VIa	VIb	Va	Vb	VIa	VIb
Catch weight (main exploiters)	Fa Ic	Fa Fr G No	G Fr No	Fa Fr G No	G	B Fa Ic	Fa Fr No	Fr IR No E	No Sp E	Fa Ic	Fa No	Fr No	No
Discard weight	-	-	-	-	-	-	-	-	-	-	-	-	-
Catch length	-	Fa	Fr	-	-	-	Fa	-	-	-	Fa	-	-
Discard length	-	-	-	-	-	-	-	-	-	-	-	-	-
Catch Alk	-	-	Fr	-	-	-	-	-	-	-	-	-	-
Discard Alk	-	-	-	-	-	-	-	-	-	-	-	-	-
Catch wt-at-age	-	-	Fr	-	-	-	-	-	-	-	-	-	-
Effort	-	Fr	Fr	-	-	-	No	No	No	-	No	No	No
CPUE	-	Fr Fa	Fr Fa	-	-	-	No Fa	No	No	-	No Fa	No	No
Pre-recruit survey index	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-recruit commercial index	-	-	-	-	-	-	-	-	-	-	-	-	-

B = Belgium  
Fr = France  
S = Scotland

IR = Republic of Ireland  
No = Norway  
Ic = Iceland

E = England and Wales  
G = Germany  
Fa = Faroe

NI = Northern Ireland  
Sp = Spain

Table 3.6.1.1.2

Proportion (%) of landings by stocks and nation, based on mean of nominal catch 1989 and 1991. No official catch data for France in 1990.

	Cod			Haddock		Whiting			Plaice	Sole	Saithe	Megrin		Anglerfish	
	Vla	Vlb	VIIa	Vla	Vlb	Vla	Vlb	VIIa	VIIa	VIIa	VI	Vla	Vlb	Vla	Vlb
Scotland	60	44	5	81	82	77	57	2	3	2	16	54	86	53	77
England/Wales	2	10	23	2	10	1	+	12	50	26	2	3	14	2	15
Northern Ireland	2	+	35	+	+	1	2	49	9	3	+	+	+	+	+
Republic of Ireland	9	18	30	11	7	17	41	30	31	9	2	22	-	8	-
France	24	+	4	6	+	4	+	6	1	+	72	21	+	36	+
Belgium	+	-	3	+	-	+	-	1	6	60	+	+	-	+	-
Norway	1	28	-	+	1	-	-	-	-	-	+	-	-	+	7
Faroe Islands	+	-	-	+	-	-	-	-	-	-	+	-	-	+	+
Germany	2	+	-	+	+	-	-	-	-	-	7	+	-	+	-
Iceland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

+ = some catch, but <1.0% of total

(cont'd)

Table 3.6.1.1.2 Cont'd

	Blue ling					Ling				Tusk			
	Va	Vb	VIa	VIb	XIV	Va	Vb	VIa	VIb	Va	Vb	VIa	VIb
Scotland	-	+	+	+	-	-	+	21	12	-	-	1	2
England/Wales	-	-	+	2	20	-	+	+	+	-	+	+	-
Northern Ireland	-	-	-	-	-	-	-	-	-	-	-	-	-
Republic of Ireland	-	-	-	-	-	-	-	-	-	-	-	-	-
France	-	+	99	+	-	-	+	-	-	-	+	+	-
Belgium	-	-	-	-	-	2	-	+	-	-	-	-	-
Norway	+	11	1	14	-	-	55	79	87	+	47	98	96
Faroe Islands	14	88	+	83	14	10	45	+	1	51	53	1	2
Germany	-	1	-	1	66	-	+	+	-	-	+	+	-
Iceland	86	-	-	-	-	88	-	-	-	49	-	-	-

+ = some catch, but <1.0% of total

**Table 3.6.2** Nominal catch (in tonnes) of COD in Division VIa, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	57	30	35	21	22	48	88	33	44	28	-	6
Denmark	27 <sup>2</sup>	-	3	-	-	-	-	4	1	3	2	2
Faroe Islands	3	-	2	-	-	-	-	-	11	26	-	-
France	5,495	7,601	7,160	8,140	7,637	7,411	5,096	5,044	7,669	3,640 <sup>1,4</sup>	n/a	2,503 <sup>4</sup>
Germany, Fed. Rep.	1	21	8	205	75	66	53	12	25	281	586	94 <sup>2</sup>
Ireland	2,331	2,725	3,527	2,695	2,316	2,564	1,704	2,442	2,551	1,642	n/a	n/a
Netherlands	1	-	-	-	-	1	-	-	-	-	n/a	n/a
Norway	48	40	238	267	231	204	174	77	186	207	150	40
Spain	-	-	41	52	64	28	-	-	-	n/a	n/a	-
Sweden	-	-	1	-	-	-	-	-	-	-	-	-
UK (Engl. & Wales)	2,302	3,187 <sup>3</sup>	2,948	1,141	692	243	106	306	184	439	379	133
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	3	-	-
UK (N. Ireland)	2	7	33	37	32	17	54	138	46	129	93	312
UK (Scotland)	7,603	10,339	7,969	8,933	9,483	8,032	4,251	11,143	8,465	8,942	7,151	6,585
Total	17,870	23,950	21,965	21,491	20,552	18,614	11,526	19,199	19,182			

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division VIb.

<sup>3</sup>Including 37 t caught in Sub-area VI.

<sup>4</sup>Includes Divisions Vb(EC) and VIb.

n/a = Not available.

**Table 3.6.3** Nominal catch (in tonnes) of COD in Division VIb, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	75	2	77	112	18	-	1	-	31	5	-	-
France	1	4	27	97	9	17	5	7	2	... <sup>2</sup>	n/a	... <sup>2</sup>
Germany, Fed.Rep.	136	443	+	195	-	3	-	-	3	+	-	... <sup>2</sup>
Norway	80	134	51	462	373	202	95	130	195	148	119	282
Spain	-	70	58	42	241	1,200	1,219	808	1,345	n/a	n/a	n/a
UK (England & Wales)	1	67	3	163	161	114	93	69	56	130	25	20
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	1	-	-
UK (N. Ireland)	-	-	-	-	-	-	1	-	-	3	2	2
UK (Scotland)	370	143	157	35	221	437	187	284	254	262	739	810
Total	696	863	373	1,106	1,023	1,973	1,601	1,298	1,886			

<sup>1</sup>Preliminary.

<sup>2</sup>Included in Division VIa.

n/a = Not available.

**Table 3.6.4** Nominal catch (tonnes) of HADDOCK in Division VIa, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Belgium	3	1	2	1	6	7	-	29	8	9	-	9
Denmark	-	-	+	-	-	-	-	4	+	+	+	+
Faroe Islands	-	-	-	-	-	-	1	-	-	13	-	1
France	2,808	3,403	3,760	4,520	4,240	5,930	4,956	5,456	3,001	1,335 <sup>1,2</sup>	n/a	761 <sup>2</sup>
Germany, Fed.Rep.	3	7	71	65	83	38	25	21	4	4	15	3 <sup>2</sup>
Ireland	726	1,891	4,402	3,450	3,932	3,512	2,026	2,628	2,731	2,171	n/a	n/a
Netherlands	2	3	391	25	-	-	-	-	n/a	-	n/a	n/a
Norway	16	29	37	68	33	76	45	13	54	74	46	12
Spain	-	-	97	201	129	166	-	-	-	n/a	n/a	n/a
UK (England & Wales)	1,279	1,052	2,035	1,376	1,042	348	222	425	114	476	271	44
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	4	-	n/a
UK (N. Ireland)	+	-	1	4	5	-	155	1	35	73	56	61
UK (Scotland)	8,198	12,051	19,249	21,593	18,472	15,036	12,955	18,503	15,151	19,651	10,803	7,968
Total	13,935	18,437	30,045	31,303	27,942	25,114	20,385	27,080	21,098			

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Divisions Vb(EC) and VIb.

<sup>3</sup>Includes Division VIb.

n/a = Not available.

**Table 3.6.5** Nominal catch (tonnes) of HADDOCK in Divisions VIb, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	5	1	21	3	3	1	-	-	5	-	-	-
France	1	10	32	48	12	116	103	99	5	... <sup>2</sup>	n/a	... <sup>2</sup>
Germany, Fed. Rep.	17	-	4	1	-	4	-	-	4	1	-	... <sup>2</sup>
Norway	2	10	3	20	45	31	83	33	20	47	38	58
Spain	6	88	121	79	128	892	756	371	245	n/a	n/a	n/a
UK (England & Wales)	6,261	9,005	3,736	113	788	1,876	703	1,271	753	1,007	568	154
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	+	-	-
UK (N. Ireland)	-	-	-	-	-	-	157	-	-	8	6	11
UK (Scotland)	1,051	27	5	136	1,654	6,397	2,961	6,221	6,542	5,210	6,797	4,685
Total	7,343	9,141	3,992	400	2,630	9,317	4,763	7,995	7,574	6,273 <sup>1</sup>		
Total as used by WG	-	-	-	-	-	9,902	5,031	8,438	7,933	6,732	3,887	5,438

<sup>1</sup>Preliminary.

<sup>2</sup>Included in Division VIa.

n/a = Not available.

**Table 3.6.6** Nominal catch (tonnes) of WHITING in Division VIa, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	+	-	2	-	-	3	-	4	3	1	-	+
Denmark	32	-	+	-	-	-	-	5	-	1	+	3
France	2,609	1,637	1,798	2,029	1,887	1,502	829	1,644	1,249	199 <sup>1,2</sup>	n/a	352 <sup>2</sup>
Germany, Fed. Rep.	1	49	53	43	6	9	1	+	4	+	-	-
Ireland	4,407	8,148	3,406	3,578	3,454	1,917	1,683	2,868	2,640	1,315	n/a	n/a
Netherlands	2	6	285	811	-	14	-	-	-	-	n/a	n/a
Spain	-	-	99	76	40	61	-	-	-	n/a	n/a	n/a
UK (Engl. & Wales)	227	145	166	157	162	63	26	62	30	83	82	34
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	2	-	-
UK (N. Ireland)	-	-	-	52	40	17	5	13	89	18	73	138
UK (Scotland)	7,386	8,519	8,419	10,019	11,270	9,051	5,848	7,803	7,864	6,047	4,718	4,995
Total	14,664	18,504	14,235	16,765	16,859	12,637	8,392	12,399	11,879	7,666 <sup>1</sup>		

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Divisions Vb (EC) and VIb.

n/a = Not available.



**Table 3.6.7** Nominal catch (tonnes) of WHITING in Division VIb, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
France	3	-	-	-	3	2	-	-	-	... <sup>1,2</sup>	n/a	... <sup>2</sup>
Spain	-	196	112	88	16	123	-	-	-	n/a	n/a	n/a
UK (Engl. & Wales)	+	-	-	+	2	+	5	4	-	2	5	1
UK (N. Ireland)	-	-	-	-	-	-	-	-	-	15	-	+
UK (Scotland)	59	+	-	5	25	6	13	108	23	18	482	431
Total	62	196	112	93	46	131	18	112	23	35 <sup>1</sup>		

<sup>1</sup>Preliminary.

<sup>2</sup>Included in Division VIa.

n/a = Not available.

**Table 3.6.8** Nominal catch (tonnes) of SAITHE in Sub-area VI, 1980-1991, as officially reported to ICES.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	2	2	-	-	-	2	-	12	14	15	-	6
Denmark	-	-	4	-	-	-	-	7	+	2	-	+
Faroe Islands	4	3	5	-	-	-	-	-	8	-	-	24
France	15,427	16,654	17,102	13,470	19,706	19,120	26,521	24,581	24,656	17,106 <sup>1,2</sup>	n/a	12,423 <sup>2</sup>
Germany, Fed. Rep.	49	581	441	179	713	838	2,345	1,486	1,584	1,116	275	1,579
Ireland	295	250	322	698	599	670	660	704	544	593	n/a	n/a
Netherlands	91	-	-	32	-	-	-	-	-	-	n/a	n/a
Norway	62	25	19	55	66	51	72	38	50	72	64	30
Spain	-	120	243	330	882	624	824	533	857	n/a	n/a	n/a
UK (Engl. & Wales)	1,594	1,364	1,966	2,760	1,800	1,349	1,259	1,708	1,193	555	1,027	198
UK (Isle of Man)	-	-	-	-	-	-	-	-	-	+	n/a	-
UK (N. Ireland)	9	10	7	12	49	15	21	26	13	21	53	91
UK (Scotland)	2,902	3,117	2,141	2,642	3,170	3,118	3,697	3,442	3,925	2,851	3,035	3,768
Total	20,435	22,126	22,250	26,178	26,985	25,787	35,399	32,537	32,844			

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division Vb (EC).

n/a = Not available.

Table 3.6.9

MEGRIM in Sub-area VI. Nominal landings (tonnes) as officially reported to ICES, 1981-1991.

## A. Division VIa

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	-	1	-	-	-	-	1	1	1	-	1
Denmark	-	-	-	-	-	-	-	-	1	-	-
France	1,373	1,337	1,530	1,398	1,411	777	997	1,295	457 <sup>1,2</sup>	n/a	455 <sup>2</sup>
Germany, Fed. Rep.	-	-	-	1	+	-	-	2	+	+	n/a
Ireland	73	112	113	134	151	243	403	685	474	n/a	n/a
Spain	-	510	601	310	422	137	102	121	n/a	n/a	n/a
UK (Engl. & Wales)	78	28	9	14	84	55	369	284	115	29	30
UK (N. Ireland)	-	-	+	-	-	+	11	70	1	8	9
UK (Scotland)	694	436	424	862	919	660	991	1,068	1,165	1,083	1,198
Total	2,218	2,424	2,677	2,719	2,987	1,872	2,874	3,526			

<sup>1</sup>Preliminary.<sup>2</sup>Includes Divisions Vb (EC) and VIb.

n/a = Not available.

## B. Division VIb

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
France	-	9	2	9	6	11	2	1	... <sup>2</sup>	n/a	... <sup>2</sup>
Spain	491	816	784	640	646	730	583	751	n/a	n/a	n/a
UK (Engl. & Wales)	+	-	6	6	32	88	261	77	49	46	7
UK (N. Ireland)	-	-	-	-	-	-	-	-	1	1	2
UK (Scotland)	+	-	-	10	82	79	174	185	145	198	202
Total	491	825	792	665	766	908	1,020	1,014			

<sup>1</sup>Preliminary.<sup>2</sup>Included in Division VIa.

n/a = Not available.

## C. Total for Sub-area VI

1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
2,709	3,249	3,469	3,384	3,753	2,780	3,894	4,540			

**Table 3.6.10.1** ANGLERFISH in Sub-area VI. Nominal landings (tonnes) as officially reported to ICES, 1981-1991.

A. Division VIa											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	-	-	-	-	4	2	15	2	8	-	3
Denmark	-	+	-	-	-	-	4	+	34	+	1
Faroe Islands	-	-	-	-	-	-	-	-	1	-	-
France	13	1,421	1,543	1,723	2,036	1,505	1,601	2,329	1,901 <sup>1,2</sup>	n/a	1,910 <sup>2</sup>
Germany, Fed.Rep.	2	5	+	4	24	3	4	9	10	+	n/a
Ireland	62	113	110	172	119	295	187	324	556	n/a	n/a
Norway	4	6	9	6	5	6	3	8	27	8	6
Spain	-	358	405	355	281	142	130	269	n/a	n/a	n/a
UK (Engl. & Wales)	93	74	36	56	52	36	241	403	176	130	40
UK (N. Ireland)	-	-	2	2	-	2	2	30	15	21	17
UK (Scotland)	1,213	1,177	1,312	1,617	1,522	1,099	1,768	2,629	2,975	2,841	2,533
Total	1,387	3,154	3,417	3,935	4,043	3,090	3,955	6,003			

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Divisions Vb(EC) and VIb.

n/a = Not available.

B. Division VIb											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	1	3	-	5	4	-	-	6	1	-	-
France	7	24	24	35	13	19	4	4	... <sup>1,2</sup>	n/a	... <sup>2</sup>
Germany, Fed.Rep.	1	1	-	-	-	-	-	-	-	-	n/a
Norway	2	1	8	14	7	9	11	7	13	16	16
Spain	315	423	377	598	642	990	730	1,340	n/a	n/a	n/a
UK (Engl. & Wales)	2	-	22	20	85	112	253	123	48	41	20
UK (N. Ireland)	-	-	-	-	-	-	-	-	2	1	1
UK (Scotland)	3	2	2	35	262	196	296	250	167	225	182
Total	331	454	433	707	1,013	1,326	1,294	1,730			

<sup>1</sup>Preliminary.

<sup>2</sup>Included in Division VIa.

n/a = Not available.

C. Total for Sub-area VI										
1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
1,718	3,608	3,850	4,642	5,056	4,416	5,249	7,733			

**Table 3.6.10.2** Anglerfish in Division VIa. Tonnes landed in 1991 as used by the Working Group.

Country	Landings
France	2,378
Ireland	280
Spain	212
UK (England and Wales)	393
UK (N. Ireland)	26
UK (Scotland)	2,068
Total	5,357

**Table 3.6.11.1** Nominal catch (tonnes) of BLUE LING in Division Va, 1981-1991, as officially reported to ICES.

BLUE LING Va											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	220	224	1,195	353	59	69	75	271	403	1,029	241
Iceland	7,952	5,945	5,117	3,122	1,407	1,774	1,693	1,093	2,124	1,992	1,582
Norway	229	64	402	31	7	8	8	7	5	-	-
Total	8,401	6,233	6,714	3,506	1,473	1,851	1,776	1,371	2,532	3,021	1,823

<sup>1</sup>Preliminary.

**Table 3.6.11.2** Nominal catch (tonnes) of BLUE LING in Division Vb, 1981-1991, as officially reported to ICES.

BLUE LING Vb											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	1,529	2,889	4,396	7,210	4,434	4,880	3,071	6,275	3,090	1,014	1,465
France	371	843	668	515	1,193	2,578	3,246	3,036	1,802 <sup>2</sup>	n/a	n/a
Germany, Fed.Rep.	2,867	2,538	223	214	217	197	152	49	51	71	n/a
Norway	260	187	438	155	210	126	171	166	323	641	246
UK (Scotland)	-	-	-	-	-	-	-	-	-	-	2
Total	5,027	6,457	5,725	8,094	6,054	7,781	6,640	9,526	5,266		

<sup>1</sup>Preliminary.<sup>2</sup>Working Group estimate.**Table 3.6.11.3** Nominal catch (tonnes) of BLUE LING in Sub-area VI, 1981-1991, as officially reported to ICES.

BLUE LING Division VIa											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	-	-	-	-	56	-	-	14	6	-	8
France	3,338	3,430	5,233	3,653	5,670	7,628	9,389	6,335	7,383 <sup>2</sup>	n/a	n/a
Germany, Fed.Rep.	335	79	11	183	5	7	44	2	2	44	n/a
Norway	11	16	118	45	75	50	51	29	143	54	63
UK	1	99	13	5	2	3	13	3	+	1	35
Total	3,685	3,624	5,375	3,886	5,808	7,688	9,497	6,383	7,534 <sup>2</sup>		

<sup>1</sup>Preliminary.<sup>2</sup>Working Group estimate.

BLUE LING Division VIb											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	-	-	-	133	11	1,845	-	2,000	1,292	360	111
France	534	263	243	3,281	7,263	2,141	10	499	n/a	n/a	n/a
Germany, Fed.Rep.	3,944	554	38	-	31	39	333	37	22	-	n/a
Norway	5	13	50	43	38	66	76	42	217	127	102
UK	-	1	2	-	-	8	72	23	16	3	15
Total	4,483	831	333	3,457	7,343	4,099	491	2,601			

<sup>1</sup>Preliminary.

**Table 3.6.11.4** Nominal catch (tonnes) of BLUE LING in Sub-area XIV, 1981-1991, as officially reported to ICES.

BLUE LING XIV											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	-	-	-	-	-	-	-	21	13	-	-
Germany, Fed.Rep.	1,206	1,946	621	537	314	150	199	218	58	64	n/a
Greenland	-	-	-	-	-	-	-	3	-	5	5
Norway	-	-	-	-	-	-	-	-	-	-	+
UK (England & Wales)	-	-	-	-	-	-	-	-	-	11	19
Total	1,206	1,946	621	537	314	150	199	242	71	80	

<sup>1</sup>Preliminary.

**Table 3.6.11.5** BLUE LING, landings (tonnes) in Divisions Va and Vb, Sub-areas VI and XIV, as used by the Working Group.

Year	Va	Vb	VIa	VIb	XIV	Total
1980	8399	10020	2907	9361	746	31433
1981	8401	5027	3685	4483	1206	22802
1982	6233	6282	3624	831	1946	18916
1983	6714	5725	5375	333	621	18768
1984	3506	8094	3886	3457	537	19480
1985	1473	6054	5808	7343	314	20992
1986	1851	7781	7688	4099	150	21569
1987	1776	6640	9497	491	199	18603
1988	1371	9526	6383	2601	242	20123
1989	2532	5135	7533	1608	71	16879
1990	3021	3432	4588	4977	80	16098
1991	1985	2334	3422	3659	88	11488
Avg 80-91	4116	6701	5543	3599	556	20515

**Table 3.6.11.6** Nominal catch (tonnes) of LING in Division Va, 1981-1991, as officially reported to ICES.

LING Va											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	196	116	128	103	59	88	157	134	95	42	69
Faroe Islands	489	524	644	450	384	556	657	619	614	399	530
Iceland	3,348	3,733	4,256	3,304	2,980	2,946	4,161	5,098	4,896	5,153	5,206
Norway	415	612	115	21	17	4	6	10	5	-	-
Total	4,448	4,985	5,143	3,878	3,440	3,594	4,981	5,861	5,610	5,594	5,805

<sup>1</sup>Preliminary.**Table 3.6.11.7** Nominal catch (tonnes) of LING in Division Vb, 1981-1991, as officially reported to ICES.

LING Vb											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	-	-	-	-	4	16	4	-	-	-
Faroe Islands	1,400	2,370	2,505	2,821	3,190	2,583	3,958	2,215	1,860	1,737	2,157
France	13	16	155	11	40	123	384	53	- <sup>1</sup>	-	-
Germany, Fed.Rep.	1	3	5	6	3	6	8	4	2	1	-
Norway	2,776	3,614	2,746	1,566	1,955	2,240	1,999	2,168	2,743	2,074 <sup>1</sup>	2,113
UK	28	94	48	4	2	1	2	6	3	9	3
Total	4,218	6,097	5,459	4,408	5,190	4,957	6,367	4,450	4,608	3,820	4,273

<sup>1</sup>Preliminary.



**Table 3.6.11.8** Nominal catch (tonnes) of LING in Sub-area VI, 1981-1991, as officially reported to ICES.

**LING Division VIa**

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	-	4	-	1	4	-	4	4	6	-	3
Denmark	-	1	-	-	-	-	1	+	1	+	+
Faroe Islands	-	20	-	-	-	-	-	-	6	8	3
France	3,820	5,049	5,362	5,757	6,061	4,620	4,338	5,118	n/a	n/a	n/a
Germany, Fed.Rep.	-	-	-	14	8	6	2	6	11	1	n/a
Ireland	44	34	62	49	81	255	287	196	138	-	n/a
Norway	2,150	4,499	5,943	4,667	4,779	5,426	3,842	3,392	3,858	3,263	2,053
Spain	-	461	604	720	388	620	975	580	n/a	n/a	n/a
UK	502	389	314	442	640	435	1,087	2,002	1,252	911	709
<b>Total</b>	<b>6,516</b>	<b>10,457</b>	<b>12,285</b>	<b>11,650</b>	<b>11,961</b>	<b>11,362</b>	<b>10,536</b>	<b>11,298</b>			

<sup>1</sup>Preliminary.

**LING Division VIb**

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	4	123	204	153	24	6	-	196	17	3	-
France	5	13	8	34	140	24	4	8	n/a	n/a	n/a
Germany, Fed.Rep.	+	-	-	-	-	-	2	-	-	-	n/a
Norway	1,083	1,711	2,315	2,345	1,973	2,157	1,933	1,253	3,616	1,315	2,454
Spain	590	1,911	1,889	986	2,381	2,762	4,036	2,995	n/a	n/a	n/a
UK	192	84	30	57	202	236	315	317	125	174	124
<b>Total</b>	<b>1,874</b>	<b>3,842</b>	<b>4,446</b>	<b>3,575</b>	<b>4,720</b>	<b>5,185</b>	<b>6,290</b>	<b>4,769</b>			

<sup>1</sup>Preliminary.

**Table 3.6.11.9** Nominal catch (tonnes) of LING in Sub-area XIV, 1981-1991, as officially reported to ICES.

LING XIV											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	13	-	-	-	-	17	-	-	-	-	-
Germany, Fed.Rep.	298	8	1	6	1	2	1	3	1	1	n/a
Norway	-	-	-	-	-	-	-	-	-	2	+
UK (England & Wales)	-	-	-	-	-	-	-	-	-	6	1
Total	311	8	1	6	1	19	1	3	1	9	

<sup>1</sup>Preliminary.**Table 3.6.11.10** Nominal catch (tonnes) of TUSK (Cusk) in Division Va, 1981-1991, as officially reported to ICES.

TUSK Va											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	2,624	2,410	4,046	2,008	1,885	2,811	2,638	3,757	3,908	2,475	2,286
Iceland	2,827	2,804	3,469	3,430	3,068	2,549	2,984	3,078	3,131	4,813	6,439
Norway	1,025	666	772	254	111	21	19	20	10	-	-
Total	6,476	5,880	8,287	5,692	5,064	5,381	5,641	6,855	7,049	7,288	8,725

<sup>1</sup>Preliminary.**Table 3.6.11.11** Nominal catch (tonnes) of TUSK (Cusk) in Division Vb, 1981-1991, as officially reported to ICES.

TUSK Vb											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	-	-	-	-	+	2	+	+	-	-
Faroe Islands	2,066	4,148	3,450	4,394	5,288	3,625	4,262	3,372	1,991	3,193	3,836
France	14	14	15	25	34	24	54	81	-	-	-
Germany, Fed.Rep.	7	12	11	16	10	15	13	8	2	26	-
Norway	2,748	2,092	1,935	1,537	1,975	1,566	2,198	2,204	3,065	2,896 <sup>1</sup>	1,996
UK	15	125	73	2	+	+	+	+	+	-	-
Total	4,850	6,391	5,484	5,974	7,307	5,220	6,529	5,665	5,058 <sup>1</sup>	6,115 <sup>1</sup>	5,832

<sup>1</sup>Preliminary.

**Table 3.6.11.12** Nominal catch (tonnes) of TUSK (Cusk) in Sub-area VI, 1981-1991, as officially reported to ICES.

**TUSK Division VIa**

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	-	-	-	-	-	-	-	+	-	-
Faroe Islands	-	-	-	-	-	-	-	-	6	9	5
France	322	355	418	514	767	608	627	724	n/a	n/a	n/a
Germany, Fed.Rep.	1	-	-	1	1	+	+	1	3	+	n/a
Ireland	-	-	-	-	-	-	1	-	2	n/a	n/a
Norway	802	1,052	1,733	1,305	1,609	1,873	1,238	1,310	1,583	1,506	998
Spain	-	414	250	-	-	-	-	-	-	-	-
Sweden	-	2	-	-	-	-	-	-	-	-	-
UK	95	7	3	6	2	6	16	43	10	20	21
<b>Total</b>	<b>1,220</b>	<b>1,830</b>	<b>2,404</b>	<b>1,826</b>	<b>2,379</b>	<b>2,487</b>	<b>1,882</b>	<b>2,078</b>			

<sup>1</sup>Preliminary.

**TUSK Division VIb**

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	1	159	188	53	48	106	-	217	41	6	-
France	1	3	3	4	3	9	2	4	n/a	n/a	n/a
Germany, Fed.Rep.	1	+	-	-	-	-	-	-	-	-	n/a
Norway	568	468	1,080	960	944	952	1,385	601	1,537	738	1,051
Spain	-	2,098	1,902	-	-	-	-	-	-	-	-
UK (Scotland)	181	101	25	+	20	24	21	42	17	24	29
<b>Total</b>	<b>752</b>	<b>2,829</b>	<b>3,198</b>	<b>1,017</b>	<b>1,015</b>	<b>1,091</b>	<b>1,408</b>	<b>864</b>	<b>1,595<sup>1</sup></b>	<b>768<sup>1</sup></b>	<b>1,080</b>

<sup>1</sup>Preliminary.

**Table 3.6.11.13** Nominal catch (tonnes) of TUSK (Cusk) in Sub-area XIV, 1981-1991, as officially reported to ICES.

TUSK XIV											
Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	110	-	74	-	-	33	13	19	13	-	-
Germany, Fed.Rep.	10	10	11	5	4	2	2	2	1	2	n/a
Norway	-	-	-	-	-	-	-	-	-	-	68
UK (England & Wales)	-	-	-	-	-	-	-	-	-	-	1
Total	120	10	85	5	4	35	15	21	14	2	69

<sup>1</sup>Preliminary.

**Table 3.6.11.14** TUSK, landings (tonnes) in Divisions Va, and Vb and in Sub-areas VI and XIV, as used by the Working Group.

Year	Va	Vb	VIa	VIb	XIV	Total
1980	6,890	7,810	912	913	13	16,538
1981	6,476	4,850	1,220	752	10	13,308
1982	5,880	6,391	1,830	2,829	10	16,940
1983	8,287	5,484	2,404	3,198	85	19,458
1984	5,692	5,361	1,826	1,017	5	13,901
1985	5,064	7,307	2,379	1,015	4	15,769
1986	5,381	5,220	2,487	1,091	35	14,214
1987	5,641	6,529	1,882	1,408	15	15,475
1988	6,855	5,665	2,078	864	21	15,483
1989	7,049	5,122	2,180	1,596	14	15,961
1990	7,314	6,146	2,246	765	2	16,473
1991	11,716	5,832	1,524	1,080	69	20,221
Avg. 80-91	6,412	5,990	1,949	1,404	19	15,775

**Table 3.7.2** Nominal catch (tonnes) of COD in Division VIIa, 1981-1991, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	395	269	139	135	185	222	344	269	467	310	78
Denmark	-	6	-	-	-	-	-	-	-	-	-
France	1,178	1,066	815	912	1,782	1,480	1,717	2,406	352 <sup>1</sup>	n/a	320
Ireland	6,552	4,758	4,032	2,885	4,121	3,991	5,017	5,821	3,656	n/a	n/a
Netherlands	94	48	34	38	104	-	-	-	-	n/a	n/a
UK (Engl.& Wales)	2,712	2,544	1,405	1,253	1,200	847	1,922	2,667	2,554	1,310	1,338
UK (Isle of Man)	221	161	103	98	119	80	44	118	39	48	n/a
UK (N. Ireland)	3,360	3,852	3,463	2,658	2,541	2,992	3,565	4,080	3,864	3,486	2,214
UK (Scotland)	376	583	336	669	1,038	446	574	472	351	1,700	517
<b>Total</b>	<b>14,894</b>	<b>13,281</b>	<b>10,327</b>	<b>8,648</b>	<b>11,090</b>	<b>10,058</b>	<b>13,183</b>	<b>15,833</b>	<b>11,283<sup>1</sup></b>	<b>6,854<sup>3</sup></b>	<b>4,467</b>
<b>Unallocated</b>	<b>13</b>	<b>-</b>	<b>-312<sup>2</sup></b>	<b>-265<sup>2</sup></b>	<b>-607<sup>2</sup></b>	<b>-206<sup>2</sup></b>	<b>-289<sup>2</sup></b>	<b>-1,665<sup>2</sup></b>	<b>1,468</b>	<b>560<sup>4</sup></b>	<b>2,247<sup>4</sup></b>
<b>Total figures used by Working Group for stock assessment</b>	<b>14,907</b>	<b>13,381</b>	<b>10,015</b>	<b>8,383</b>	<b>10,483</b>	<b>9,852</b>	<b>12,894</b>	<b>14,168</b>	<b>12,751</b>	<b>7,379<sup>5</sup></b>	<b>6,714</b>

<sup>1</sup>Preliminary.

<sup>2</sup>Overreporting.

<sup>3</sup>Incomplete official statistics.

<sup>4</sup>Incomplete official statistics and misreporting from Division VIa.

<sup>5</sup>Revised.

n/a = Not available.

**Table 3.7.3** Nominal catch (tonnes) of WHITING in Division VIIa, 1981-1991, as officially reported to ICES and Working Group estimates of human consumption and discards.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	85	45	78	99	100	70	109	90	92	142	53
France	1,283	1,333	1,021	930	956	770	826	1,063	533 <sup>1</sup>	n/a	611
Ireland	5,863	4,710	3,047	4,276	5,521	3,101	4,067	4,394	3,871	n/a	n/a
Netherlands	12	14	18	5	30	-	-	-	-	n/a	n/a
UK (Engl. & Wales)	816	1,195	1,200	1,224	1,379	1,004	1,529	1,202	946	1,106	1,134
UK (Isle of Man)	300	268	127	68	57	25	14	15	26	75	n/a
UK (N. Ireland)	9,049	9,927	5,218	5,660	8,382	4,940	4,858	4,621	5,651	4,029	3,098
UK (Scotland)	103	189	120	275	368	129	281	107	184	280	232
Total human consumption	17,511	17,681	10,829	12,537	16,793	10,039	11,684	11,492	11,303	5,632 <sup>4</sup>	5,128 <sup>4</sup>
Unallocated	-482 <sup>2</sup>	-462 <sup>2</sup>	-321 <sup>2</sup>	-976 <sup>2</sup>	-841 <sup>2</sup>	47	-987 <sup>2</sup>	-1,537 <sup>2</sup>	95	2,341 <sup>4</sup>	1,804 <sup>4</sup>
Total human consumption figures used by the Working Group for stock assessment	17,029	17,219	10,508	11,561	15,952	10,086	10,697	9,955 <sup>3</sup>	11,208 <sup>3</sup>	7,973	6,932
Estimated discards from <i>Nephrops</i> fishery <sup>5</sup>	3,577	893	1,837	3,674	2,284	2,329	3,721 <sup>3</sup>	1,901 <sup>3</sup>	2,014 <sup>2</sup>	2,683	2,679

<sup>1</sup>Preliminary.

<sup>2</sup>Overreporting.

<sup>3</sup>Revised.

<sup>4</sup>Incomplete official statistics.

<sup>5</sup>Based on UK (N. Ireland) data.

n/a = Not available.

Table 3.7.4 Nominal landings (t) of PLAICE in Division VIIa, 1981-1991, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>4</sup>
Belgium	231	130	195	118	285	384	403	243	265	301	138
France	51	60	99	38	110	165	87	58	11 <sup>4</sup>	n/a	20
Ireland	1,243	923	1,384	1,420	2,000	1,858	2,132	2,009	1,406	n/a	n/a
Netherlands	40	29	73 <sup>1</sup>	30 <sup>1</sup>	1,091	-	-	-	-	n/a	n/a
UK (Engl. & Wales)	2,117	1,868	1,666	2,301	2,295	1,774	2,366	1,630	2,017	1,644	1,313
UK (Isle of Man)	27	12	11	11	26	12	9	12	18	27	n/a
UK (N. Ireland)	132	159	183	203	198	272	332	286	370	325	251
UK (Scotland)	64	47	42	86	118	119	243	127	94	204	104
Others	1	-	-	-	-	-	-	-	-	-	-
Total	3,906	3,228	3,653	4,207	6,123	4,584	5,572	4,365	4,181	n/a	n/a
Discards <sup>2</sup>	-	-	-	-	-	250	270	220	0	0	0
Unallocated	0	9	-14 <sup>3</sup>	34	-1,048 <sup>3</sup>	-28 <sup>3</sup>	378	420	191	0	0
Total figures used by the Working Group for stock assessment	3,906	3,237	3,639	4,241	5,075	4,806	6,220	5,005	4,372	3,275	2,542

<sup>1</sup>EC figures.

<sup>2</sup>Estimated discards as a result of UK (England and Wales) by-catch restrictions.

<sup>3</sup>Overreporting.

<sup>4</sup>Preliminary.

n/a = Not available.

**Table 3.7.5** Irish Sea SOLE. Nominal catches (t), 1981-1991, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	884	669	544	425	589	930	987	915	1,010	786	371
Denmark	15	-	-	-	-	-	-	-	-	-	-
France	13	9	3	10	9	17	5	11	5 <sup>1</sup>	n/a	3
Ireland	167	161	203	187	180	235	312	366	155	n/a	n/a
Netherlands	186	138	224	113	546	-	-	-	-	n/a	n/a
UK (Engl. & Wales)	311	277	219	230	269	637	599	507	527	493	512
UK (Isle of Man)	7	10	10	6	12	1	3	1	2	10	n/a
UK (N. Ireland)	41	31	33	38	36	50	72	47	83	73	54
UK (Scotland)	45	44	29	17	28	46	63	38	40	41	24
Total	1,669	1,339	1,265	1,026	1,669	1,916	2,041	1,885	1,822	n/a	n/a
Unallocated	2	1	-96 <sup>2</sup>	32	-523 <sup>2</sup>	79	767 <sup>3</sup>	103	11	0	0
Total figures used by Working Group for stock assessment	1,667	1,338	1,169	1,058	1,146	1,995	2,808	1,999 <sup>4</sup>	1,833	1,583	1,214

<sup>1</sup>Preliminary.

<sup>2</sup>Overreporting.

<sup>3</sup>Excess catches.

<sup>4</sup>Revised.

n/a = Not available.



**Table 3.8.1** Nominal catches of COD in Divisions VII<sub>f</sub> and VII<sub>g</sub> as used by Working Group in 1992.

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	172	244	229	451	372	216	542	888	612	296
France	5,984	4,602	4,900	5,237	7,050	6,998	10,535	12,981	7,334	4,945
Ireland	142	274	204	198	226	380	612	1,003	177	246
UK (England and Wales)	302	188	287	307	302	355	351	379	554	507
Total	6,600	5,308	5,620	6,193	7,950	7,949	12,040	15,251	8,677	5,994

**Table 3.8.2** Nominal catches of WHITING in Divisions VII<sub>f</sub> and VII<sub>g</sub> as used by the Working Group in 1992.

Year	Belgium	France	Ireland	UK (England and Wales)	Total
1982	70	7,172	62	187	7,491
1983	120	8,080	124	162	8,486
1984	154	6,552	299	224	7,229
1985	164	6,798	138	175	7,275
1986	104	6,149	138	117	6,845
1987	109	8,123	198	258	8,688
1988	155	9,013	189	322	9,679
1989	293	10,530	1,334	285	12,442
1990	303	9,265	174	322	10,132
1991 <sup>1</sup>	285	8,584	190	450	9,509

<sup>1</sup>Preliminary.

**Table 3.8.3** Nominal landings (t) of PLAICE in Divisions VIIIf,g, 1982-1991.

Country	Year									
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	341	314	283	357	544	576	635	835	777	479
France	568	532	558	493	598	708	687	649	642	533
Ireland	198	48	72	91	59	122	164	195	167	94
UK (Engl. + Wales)	196	279	366	466	324	495	630	472	496	395
UK (Others)	0	0	0	0	21	0	0	0	0	0
Total	1,303	1,173	1,279	1,407	1,546	1,901	2,116	2,151	2,082	1,501
Total figures used by Working Group for stock assessment	1,303	1,146	1,210	1,752	1,691	1,901	2,116	2,151	2,082	1,501

<sup>1</sup>Provisional.

NB: ICES receives statistics from some countries only for Divisions VIIg-k combined and not for each division separately. The figures up to 1982 and 1987 onwards are provided by members of the Working Group; from 1983-1986, they are figures submitted to the EC by member states.

**Table 3.8.4** Celtic Sea SOLE. Divisions VIIIf and VIIg. Nominal landings (tonnes), 1981- 1991. Data used by the Working Group.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	938	819	871	786	786	1,092	704	725	660	689	839
France	91	100	124	115	126	92	72	89	97	100	80
Ireland	8	3	48	4	13	12	9	15	32	41	N/A
UK (Engl. & Wales)	175	206	330	361	403	404	437	317	203	359	395
Others	-	-	-	-	-	-	-	-	-	-	10
Total	1,212	1,128	1,373	1,266	1,328	1,600	1,222	1,146	992	1,189	1,324
Unallocated	-	-	-	-	-	-	-	-	-	-	-217
Total used by Working Group in Assessment	1,212	1,128	1,373	1,266	1,328	1,600	1,222	1,146	992	1,189	1,107

<sup>1</sup>Preliminary

**Table 3.8.5** Western Channel COD. Nominal catches (t) of cod in Division VIIe as used by the Working Group.

Country	1987	1988	1989	1990	1991
Belgium	10	12	19	6	6
Denmark	-	-	-	5	-
France	1,119	1,899	1,453	654	341
UK (Engl. & Wales)	524	850	734	605	405
UK (Scotland)	-	-	2	4	-
Total	1,653	2,761	2,208	1,274	752

**Table 3.8.6** Western Channel WHITING. Nominal catches (t) of whiting in Division VIIe as used by the Working Group.

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Belgium	2	4	3	4	2
France	1,510	1,485	915	479	667
UK (Engl. & Wales + Scotland)	753	1,183	922	1,385	1,452
Total	2,265	2,672	1,840	1,868	2,121

<sup>1</sup> Preliminary.

**Table 3.8.7** English Channel PLAICE. Nominal landings (tonnes) in Division VIIe, 1976-1991, as officially reported to ICES, and as used by the Working Group.

Year	Belgium	Denmark	France	UK (Engl. & Wales)	Others	Total reported	Unreported <sup>2</sup>	Total as used by WG
1976	5	- <sup>1</sup>	323	312	-	640	-	640
1977	3	- <sup>1</sup>	336	363	-	702	-	702
1978	3	- <sup>1</sup>	314	467	-	78	-	784
1979	2	- <sup>1</sup>	458	515	-	975	2	977
1980	23	- <sup>1</sup>	325	609	9	966	113	1,079
1981	27	-	537	953	-	1,517	-16	1,501
1982	81	-	363	1,109	-	1,553	135	1,688
1983	20	-	371	1,195	-	1,586	-91	1,495
1984	24	-	278	1,144	-	1,446	101	1,547
1985	39	-	197	1,122	-	1,358	83	1,441
1986	26	-	276	1,389	- <sup>1</sup>	1,691	119	1,810
1987	68	-	435	1,419	-	1,922	36	1,958
1988	90	-	584	1,654	-	2,328	130	2,458
1989	89	-	448 <sup>2</sup>	1,708	2	2,247	111	2,358
1990	82	- <sup>1</sup>	N/A	1,867	18	1,967	626	2,593
1991 <sup>3</sup>	57	-	N/A	1,300	-	1,357	491	1,848

<sup>1</sup>Included in Division VIId.

<sup>2</sup>Estimated by the Working Group.

<sup>3</sup>Provisional.

**Table 3.8.8** Division VIIe SOLE. Nominal landings (tonnes), 1972-1991 as officially reported to ICES and as used by the Working Group.

Year	Belgium	France	UK (Engl. & Wales)	Other	Total Reported	Unreported <sup>2</sup>	Total as used by WG
1972	6	230 <sup>1</sup>	201	-	437	-	437
1973	2	263 <sup>1</sup>	194	-	459	-	459
1974	6	237	181	-	424	3	427
1975	3	271	217	-	491	-	491
1976	4	352	260	-	616	-	616
1977	3	331	271	-	606	-	606
1978	4	384	453	20	861	-	861
1979	1	515	665	-	1,181	-	1,181
1980	45	447	764	13	1,269	-	1,269
1981	16	415	788	1	1,220	-5	1,215
1982	98	321	1,028	-	1,447	-1	1,446
1983	47	405	1,043	3	1,498	-	1,498
1984	48	421	901	-	1,370	-	1,370
1985	58	130	911	-	1,099	310	1,409
1986	62	467	840	127	1,496	-128	1,368
1987	48	432	632	-	1,112	47	1,159
1988	67	98	784	-	949	401	1,350
1989	69	112 <sup>3</sup>	611	7	799	362	1,161
1990 <sup>3</sup>	41	N/A	630	1	672	410	1,082
1991 <sup>3</sup>	35	325	458	-	818	-87	731

<sup>1</sup>Estimated from Division VIIId, e total by the Working Group.

<sup>2</sup>Estimated by the Working Group.

<sup>3</sup>Provisional

**Table 3.8.9.1** Nominal catch (t) of COD in Divisions VIIb,c,h-k, 1981-1991 as officially reported to ICES.

Country	1981	1982	1983	1984	1985
Belgium	-	-	-	-	13
Denmark	-	-	-	-	-
France	1,465	587	636	946	1,115
Germany, Fed. Rep.	-	-	-	-	-
Ireland	1,434	1,764	1,192	1,211	1,176
Netherlands	-	+	80	325	208
Norway	-	-	4	1	22
Spain	37	29	28	56	26
UK (Engl. & Wales)	171	304	41	408	546
UK (Scotland)	+	-	-	45	+
UK (N. Ireland)	-	-	-	-	-
Total	3,107	2,684	1,981	2,991	3,106

Country	1986	1987	1988	1989	1990	1991
Belgium	3	63	102 <sup>2</sup>	229 <sup>2</sup>	86	51 <sup>2</sup>
Denmark	-	+ <sup>2</sup>	+ <sup>2</sup>	-	-	-
France	1,599	1,214	2,551	n/a	n/a	n/a
Germany, Fed. Rep.	-	-	-	1 <sup>1</sup>	n/a	n/a
Ireland	1,283	1,301	1,256	1,772	n/a	n/a
Netherlands	1	-	n/a	-	n/a	n/a
Norway	106	1	2	22 <sup>1,2</sup>	49 <sup>1,2</sup>	11
Spain	-	-	-	n/a	n/a	n/a
UK (Engl. & Wales)	455	275	127	137	203	131
UK (Scotland)	17	19	7	33	422	194
UK (N. Ireland)	-	-	-	-	2	2
Total	3,464	2,873	4,045			

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division VIIg.

n/a = Not available.

**Table 3.8.9.2** Nominal catch (in tonnes) of WHITING in Divisions VIIb,c,h-k, 1981-1991, based on officially reported figures (where available) and Working Group estimates.

Country	1981	1982	1983	1984	1985
Belgium <sup>2</sup>	-	-	-	-	75
France	516	204	356	398	583
Germany, Fed. Rep.	-	-	-	-	-
Ireland	3,550	4,011	2,590	1,872	2,719
Netherlands	21	78	363	169	90
Spain	-	85	91	57	76
UK (Engl. & Wales)	67	49	18	58	165
UK (Scotland)	1	-	-	4	-
Total	4,155	4,427	3,418	2,558	3,708

Country	1986	1987	1988	1989	1990	1991
Belgium <sup>1</sup>	33	29	19	39	67	43
France	614	487	890	n/a	n/a	n/a
Germany, Fed. Rep.	-	-	+	1 <sup>1</sup>	n/a	n/a
Ireland	2,165	2,421	2,693 <sup>1</sup>	2,682	n/a	n/a
Netherlands	7	-	n/a	-	n/a	n/a
Spain	-	-	-	n/a	n/a	n/a
UK (Engl. & Wales)	168	95	121	117	47	60
UK (Scotland)	-	7	1	32	65	79
Total	2,987	3,039	3,724			

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division VIIg.

n/a = Not available.

**Table 3.8.9.3** Nominal catch of PLAICE in Divisions VIIb,c, h-k 1982-1991 as officially reported to ICES.

Country	1982 <sup>1</sup>	1983 <sup>1</sup>	1984 <sup>1</sup>	1985	1986
Belgium <sup>1</sup>	218	162	216	166	335
France	334	404	516	65	98
Ireland	327	403	504	583 <sup>1</sup>	416 <sup>1</sup>
Netherlands		150	1,166	1,179 <sup>1</sup>	9 <sup>1</sup>
Spain	28	13			
UK (Engl. & Wales)	114	81	168	181 <sup>1</sup>	256 <sup>1</sup>
UK (Scotland)			3		1 <sup>1</sup>
Total	1,021	1,213	2,573	2,174	1,115

Country	1987	1988	1989	1990	1991
Belgium <sup>1</sup>	250	245	403	301	252
France	98	144	n/a	n/a	n/a
Ireland	453	526	613	n/a	n/a
UK (Engl. & Wales)	247	435	75	88	224
UK (Scotland)		1	13	92	3
Total	1,048	1,351			

<sup>1</sup>Includes Division VIIg.

**Table 3.8.9.4** Nominal catch of SOLE in Divisions VIIb,c, h-k 1982-1991 as officially reported to ICES.

Country	1982 <sup>1</sup>	1983 <sup>1</sup>	1984 <sup>1</sup>	1985	1986
Belgium <sup>1</sup>	471	411	474	318	442
France	109	185	123	31	46
Ireland	227	216	173	245 <sup>1</sup>	217 <sup>1</sup>
Netherlands		51	194	280 <sup>1</sup>	3 <sup>1</sup>
UK (Engl. & Wales)	109	129	151	200 <sup>1</sup>	261 <sup>1</sup>
Total	916	992	1,115	1,074	969

Country	1987	1988	1989	1990	1991
Belgium <sup>1</sup>	271	254	252	353	358
France	46	55	n/a	n/a	n/a
Ireland	207	216	244	n/a	n/a
UK (Engl. & Wales)	1983	167	177	144	209
Total	717	692	673		

<sup>1</sup>Includes Division VIIg.

**Table 3.9.2** Nominal catch (in tonnes) of COD in Division VIId 1982-1991, as officially reported to ICES.

Year	Belgium	Denmark	France	Netherlands	UK (England & Wales)	UK (Scotland)	Total	Total as used by WG
1982	251	-	2696	1	306	-	3254	3980
1983	368	-	2802	4	358	-	3532	3840
1984	331	-	2492	-	282	-	3105	3520
1985	501	-	2589	-	326	-	3416	3330
1986	650	4	9938	-	830	-	11422	12810
1987	815	-	7541	-	1044	-	9400	14220
1988	486	+	8795	1	867	-	10149	9360
1989	173	+	n/a	1	562	-	n/a	5540
1990	237	-	n/a	- <sup>1</sup>	420	7	n/a	2740
1991	182	-	n/a	- <sup>1</sup>	336 <sup>1</sup>	2 <sup>1</sup>	n/a	1920

<sup>1</sup>Preliminary.**Table 3.9.3** Nominal catch (in tonnes) of WHITING in Division VIId 1982-1991, as officially reported to ICES.

Year	Belgium	France	Netherlands	UK (England & Wales)	UK (Scotland)	Total	Total as used by WG
1982	93	7012	2	170	-	7277	7910
1983	84	5057	1	198	-	5340	6940
1984	79	6914	-	88	-	7081	7370
1985	82	7563	-	186	-	7831	7340
1986	65	4551	-	180	-	4796	5500
1987	136	6730	-	287	-	7153	4690
1988	69	7501	-	251	-	n/a	4430
1989	38	n/a	-	231	1	n/a	4160
1990	83	n/a	-	237	1	n/a	3480
1991	83	n/a	-	289 <sup>1</sup>	- <sup>1</sup>	n/a	5780

<sup>1</sup>Preliminary.



**Table 3.9.4.1** Haddock in Division VIId. Nominal catch (t) as officially reported to ICES.

Year	Belgium	France	UK (England & Wales)	UK (Scotland)	Total
1987	+	5	1	-	6
1988	1	2	-	-	3
1989	1	n/a	-	-	n/a
1990	+	n/a	1	1	n/a
1991	3	n/a	<sup>1</sup>	<sup>1</sup>	n/a

<sup>1</sup>Preliminary.

**Table 3.9.4.2** SAITHE Division VIId. Nominal catch (t) as officially reported to ICES.

Country/ Year	Belgium	Denmark	France	UK (England & Wales)	Total
Saithe Division VIId					
1987	+	-	5	4	9
1988	+	+	1	-	1
1989	1	-	n/a	-	n/a
1990	-	-	n/a	-	n/a
1991	-	-	n/a	-	n/a

**Table 3.9.5** SOLE in Division VIId. Nominal landings (tonnes) as officially reported to ICES, 1974-1991.

Year	Belgium	France	UK (E+W)	Others	Total reported	Unreported <sup>1</sup>	Total as used by WG
1974	159	469	309	3	940	-	940
1975	132	464	244	1	841	52	893
1976	203	599	404	-	1,206	90	1,296
1977	225	737	315	-	1,277	69	1,346
1978	241	782	366	-	1,389	75	1,464
1979	311	1,129	402	-	1,842	83	1,925
1980	302	1,075	159	-	1,536	183	1,719
1981	464	1,513	160	-	2,137	120	2,257
1982	525	1,828	317	4	2,674	145	2,819
1983	502	1,120	419	-	2,041	1,131	3,172
1984	592	1,309	505	-	2,406	880	3,286
1985	568	2,545	520	-	3,633	237	3,870
1986	858	1,528	551	-	2,937	991	3,928
1987	1,100	2,086	655	-	3,841	1,026	4,867
1988	667	2,057	578	-	3,302	644	3,946
1989	646	1,610	689	-	2,945	1,212	4,157
1990	996	n/a	742	-	1,738	2,219	3,957
1991 <sup>2</sup>	904	2,054	776	-	3,734	562	4,296

<sup>1</sup>Estimated by the Working Group.

<sup>2</sup>Provisional.

**Table 3.9.6** English Channel PLAICE. Nominal landings (tonnes) in Division VIId as officially reported to ICES, 1976-1991.

Year	Belgium	Denmark	France	UK (E+W)	Others	Total reported	Un- reported	Total as used by WG
1976	147	1 <sup>1</sup>	1,439	376	-	1,963	-	1,963
1977	149	81 <sup>2</sup>	1,714	302	-	2,246	-	2,246
1978	161	156 <sup>2</sup>	1,810	349	-	2,476	-	2,476
1979	217	28 <sup>2</sup>	2,094	278	-	2,617	-	2,617
1980	435	112 <sup>2</sup>	2,905	304	-	3,756	-458	3,298
1981	815	-	3,431	489	-	4,735	34	4,769
1982	738	-	3,504	541	22	4,805	60	4,865
1983	1,013	-	3,119	548	-	4,680	363	5,043
1984	947	-	2,844	640	-	4,431	581	5,012
1985	1,148	-	3,943	866	-	5,957	54	6,011
1986	1,158	-	3,288	828	488 <sup>2</sup>	5,762	1,056	6,818
1987	1,807	-	4,768	1,292	-	7,867	441	8,308
1988	2,165	-	5,688	1,250	-	9,103	1,297	10,400
1989	2,019	-	3,265 <sup>1</sup>	1,382	-	6,666	2,091	8,757
1990	2,149	2 <sup>2</sup>	n/a	1,404	-	3,555	5,413	8,968
1991 <sup>3</sup>	2,265	-	3,606 <sup>1</sup>	1,455	-	7,326	487	7,813

<sup>1</sup>Estimated by the Working Group.

<sup>2</sup>Includes Division VIIe.

<sup>3</sup>Provisional.

**Table 4.1** Nominal landings (tonnes) of hake as reported to ICES.

**HAKE IIIa**

Country	1987	1988	1989	1990	1991*
Belgium	9	5	3	13	15
Denmark	1,049	576	952	1,584	1,644
Germany, Fed. Rep.	+	-	-	-	-
Netherlands	2	1	-		-
Norway	82	60	56	113	115
Sweden	49	38	50	98	103
Total	1,191	680	1,061		1,877

\*Preliminary.

**HAKE IVa**

Country	1987	1988	1989	1990	1991*
Belgium	+	+	+	+	+
Denmark	261	232	245	336	335
France	371	380	585 <sup>3*</sup>		134 <sup>3</sup>
Germany, Fed. Rep.	21	30	29	9	131 <sup>2</sup>
Netherlands	... <sup>1</sup>	+	8		-
Norway	206	202	269	420	499
Sweden <sup>2</sup>	29	33	24	41	138
UK (England & Wales)	92	67	4	9	4
UK (N. Ireland)	-	3	+	-	-
UK (Scotland)	444	353	188	235	363
Total	1,424	1,300	1,352		1,604

\*Preliminary. <sup>1</sup>Included in IVb. <sup>2</sup>Includes IVb. <sup>3</sup>Includes IIa(EC) and IVb,c.

**HAKE IVb**

Country	1987	1988	1989	1990	1991*
Belgium	25	32	25	78	115
Denmark	602 <sup>3</sup>	790 <sup>4</sup>	860 <sup>5</sup>	934 <sup>6</sup>	1,361 <sup>7</sup>
France	1	1	... <sup>2*</sup>		... <sup>2</sup>
Germany, Fed. Rep.	6	8	5	13	... <sup>2</sup>
Netherlands	99 <sup>1</sup>	149	117		88 <sup>8</sup>
Norway	+	2	2	2	1
Sweden <sup>2</sup>	...	...	...	...	...
UK (England & Wales)	26	18	15	16	20
UK (N. Ireland)	-	-	-	-	+
UK (Scotland)	23	34	31	30	47
Total	782	1,034	1,055		1,632

\*Preliminary. <sup>1</sup>Includes IVa,c. <sup>2</sup>Included in IVa. <sup>3</sup>Includes 4 t reported as Sub-area IV. <sup>4</sup>Includes 12 t reported as Sub-area IV. <sup>5</sup>Includes 4 t reported as Sub-area IV. <sup>6</sup>Includes 11 t reported as Sub-area IV.

<sup>7</sup>Includes 9 t reported as Sub-area IV. <sup>8</sup>Includes 21 t reported as Sub-area IV.

(cont'd.)

Table 4.1 (Cont'd)

## HAKE IVc

Country	1987	1988	1989	1990	1991*
Belgium	1	6	5	1	2
Denmark	+	+	+	1	+
France	-	-	... <sup>2*</sup>		... <sup>2</sup>
Netherlands	... <sup>1</sup>	4	-		1
UK (England & Wales)	-	2	1	-	1
UK (Scotland)	-	-	-	+	-
Total	1	12	6		4

\*Preliminary. <sup>1</sup>Included in IVb. <sup>2</sup>Included in IVa.

## HAKE VIa

Country	1987	1988	1989	1990	1991*
Belgium	5	2	2	-	+
Denmark	1	+	+	+	+
France	1,491	1,909	9,417 <sup>1*</sup>		3,162 <sup>1</sup>
Germany, Fed. Rep.	1	2	2	+	1
Ireland	252	265	730		
Norway	+	5	1	+	+
Spain	1,201	1,340			
UK (England & Wales)	887	1,169	506	279	60
UK (Isle of Man)	-	-	+	-	-
UK (N. Ireland)	53	83	77	115	247
UK (Scotland)	1,239	1,329	1,380	1,399	1,765
Total	5,130	6,104			

\*Preliminary. <sup>1</sup>Includes Vb(EC), VIb and VII.

## HAKE VIb

Country	1987	1988	1989	1990	1991*
France	1	-	... <sup>1</sup>		... <sup>1</sup>
Norway	-	-	-	+	+
Spain	2,000	1,336			
UK (England & Wales)	252	75	8	16	-
UK (N. Ireland)	-	-	+	+	3
UK (Scotland)	4	5	6	12	11
Total	2,257	1,416			

\*Preliminary. <sup>1</sup>Included in VIa.

(cont'd.)

Table 4.1 (Cont'd)

## HAKE VIIa

Country	1987	1988	1989	1990	1991*
Belgium	52	17	19	16	6
France	168	187	... <sup>1</sup> *		... <sup>1</sup>
Ireland	239	237	321		
UK (England & Wales)	164	186	284	139	72
UK (Isle of Man)	2	2	7	8	11
UK (N. Ireland)	476	523	1,024	1,336	1,026
UK (Scotland)	217	202	117	84	67
Total	1,318	1,354	1,772		

\*Preliminary. <sup>1</sup>Included in VIa.

## HAKE VIIb,c

Country	1987	1988	1989	1990	1991*
France	465	478	... <sup>1</sup> *		... <sup>1</sup>
Ireland	298	128	89		
Netherlands	-	-	-		1
Norway	-	-	-	+	+
Spain	3,633	4,033			
UK (England & Wales)	1,093	859	207	157	19
UK (N. Ireland)	8	2	-	-	1
UK (Scotland)	2	8	3	10	31
Total	5,499	5,508			

\*Preliminary. <sup>1</sup>Included in VIa.

## HAKE VIIId

Country	1987	1988	1989	1990	1991*
Belgium	+	26	1	1	2
France	4	4	... <sup>1</sup> *		... <sup>1</sup>
UK (England & Wales)	3	2	3	3	3
Total	7	32	4		5

\*Preliminary. <sup>1</sup>Included in VIa.

## HAKE VIIe

Country	1987	1988	1989	1990	1991*
Belgium	3	3	3	1	+
France	822	1,185	... <sup>1</sup> *		... <sup>1</sup>
UK (England & Wales)	343	329	353	439	505
UK (Scotland)	-	-	1	9	-
Total	1,168	1,517	357		505

\*Preliminary. <sup>1</sup>Included in VIa.

Table 4.1 (Cont'd)

HAKE VIII<sup>f</sup>

Country	1987	1988	1989	1990	1991*
Belgium	26	30	35	28	10
France	463	551	... <sup>1</sup> *		... <sup>1</sup>
UK (England & Wales)	329	505	502	296	274
UK (Scotland)	-	-	16	9	-
Total	818	1,086	553		284

\*Preliminary. <sup>1</sup>Included in VIa.

## HAKE VIIg-k

Country	1987	1988	1989	1990	1991*
Belgium	12	16	29	19	8
Denmark	+	+	-	+	+
France	2,724	3,332	... <sup>1</sup> *		... <sup>1</sup>
Ireland	1,225	1,331	965		
Netherlands	-	-	4		5
Norway	-	-	-	+	-
Spain	4,551	5,229			
UK (England & Wales)	3,646	2,539	1,189	1,499	1,090
UK (Isle of Man)	-	-	-	+	-
UK (N. Ireland)	-	+	+	2	1
UK (Scotland)	5	1	9	17	14
Total	12,163	12,448			

\*Preliminary. <sup>1</sup>Included in VIa.

## HAKE VIII

Country	1987	1988	1989	1990	1991*
Belgium	3	2	15	8	12
Denmark	+	-	-	-	-
France	11,626	13,853	13,678 <sup>1</sup> *		15,607 <sup>2</sup>
Ireland	-	-	2		
Netherlands	1	-	-		-
Portugal	11	23	21	20	23
Spain	14,030	13,630			
UK (England & Wales)	1	2	-	-	-
Total	25,672	27,510			

\*Preliminary. <sup>1</sup>VIIIa,b,d,e 13,663 t; VIIIc, IX, X, COPACE(EC) 15 t.<sup>2</sup>VIIIa,b,d,e 15,591 t t; VIIIc, IX, X, COPACE(EC) 16 t.

(cont'd.)

Table 4.1 (Cont'd)

HAKE IX

Country	1987	1988	1989	1990	1991*
Portugal	6,892	5,469	3,111	3,074	3,564
Spain	8,080	6,060			
Total	14,972	11,529			

\*Preliminary.

Table 4.1.2 HAKE - Southern stock. Revised landings estimates ('000 t) for the Southern HAKE stock (Divisions VIIIc and IXa) by country and gear as determined by the Working group, 1972-1991.

Year	Spain					Portugal				France		Southern stock total
	Gill-net	Small gill-net	Long-line	Total artis-anal	Trawl	Total	Artis-anal	Trawl	Total	Total		
1972	-	-	-	7.1	10.2	17.3	4.7	4.1	8.8	-	26.1	
1973	-	-	-	8.5	12.3	20.8	6.5	7.3	13.8	0.2	34.8	
1974	2.6	1.0	2.2	5.8	8.3	14.1	5.1	3.5	8.6	0.1	22.8	
1975	3.5	1.3	3.0	7.8	11.2	19.0	6.1	4.3	10.4	0.1	29.5	
1976	3.1	1.2	2.6	6.9	10.0	16.9	6.0	3.1	9.1	0.1	26.1	
1977	1.5	0.6	1.3	3.4	5.8	9.2	4.5	1.6	6.1	0.2	15.5	
1978	1.4	0.1	2.1	3.6	4.9	8.5	3.4	1.4	4.8	0.1	13.4	
1979	1.7	0.2	2.1	4.0	7.2	11.2	3.9	1.9	5.8	-	17.0	
1980	2.2	0.2	5.0	7.3	5.3	12.6	4.5	2.3	6.8	-	19.4	
1981	1.5	0.3	4.6	6.4	4.1	10.5	4.1	1.9	6.0	-	16.5	
1982	1.3	0.4	5.3	7.0	4.4	11.4	5.0	2.5	7.5	-	18.9	
1983	1.5	0.9	7.2	9.6	7.0	16.6	5.2	2.9	8.1	-	24.6	
1984	1.6	0.8	8.2	10.6	4.9	15.5	4.3	1.2	5.5	-	21.0	
1985	1.8	0.8	4.4	7.0	5.3	12.3	3.8	2.0	5.8	-	18.1	
1986	2.1	0.8	3.5	6.4	4.9	11.2	3.2	1.8	5.0	0.0	16.2	
1987	2.0	0.5	4.4	6.9	3.5	10.4	3.5	1.3	4.8	0.0	15.2	
1988	2.0	0.7	3.0	5.7	3.7	9.4	4.3	1.7	6.0	0.0	15.4	
1989	1.9	0.6	1.9	4.4	3.9	8.3	2.7	1.8	4.6	0.0	12.9	
1990	1.7	0.6	2.1	4.4	4.1	8.5	2.3	1.1	3.4	0.0	12.0	
1991	1.4	0.4	2.2	4.0	3.6	7.6	2.7	1.2	4.0	0.0	11.6	

Table 4.2 MEGRIM (*L. whiffiagonis*) in areas VII and VIIla,b. Nominal landings (t) provided by the Working Group.

	1984	1985	1986	1987	1988	1989	1990	1991
France			3708	4975	5525	4464	4221	3387
Spain			10242	8772	9247	9482	8224	7780
U.K.			2048	1600	1956	1009	1285	1737
Ireland			1563	1561	995	2548	1381	1936
Total catches	18828	19597	19003	18613	19448	21586	16131	17979
Tot landings	16659	17865	16682	16908	17723	16047	13063	14757
Tot discards	2169	1732	2321	1705	1725	5539	3068	3222



Table 4.3.1 ANGLERFISH - Divisions VII and VIIa,b. Quantities of anglerfish (Lophius piscatorius) in tonnes landed by the main fishing fleets 1984-1991.

YEAR	DIVISION VII										DIVISION VIIab			TOTAL VII +						
	IRELAND Trawl	IRELAND Trawl	BELGIUM UK	UK (Unit 3)	UK (Unit 4)	UK (Unit 5)	UK Beam Trawl (Unit 6)	FRANCE Non Neph. Trawl (Unit 3)	FRANCE Non Neph. Trawl (Unit 4)	FRANCE Nephrops Trawl (Unit 5)	FRANCE Nephrops Trawl (Unit 8)	SPAIN Non Neph. Trawl (Unit 4)	SPAIN Non Neph. Trawl (Unit 7)		TOTAL	FRANCE Artisan Cotier Nephrops Tri(Un.9)(Unit 10)	FRANCE Semi- Indust. (Un.14)	SPAIN Non Neph. Trawl (Unit 14)		
1984								8522	1210	1825				11557	1268	554	1545	3367	14924	
1985								7948	1307	1844					18163	1154	505	1631	4160	22323
1986								6031	708	1732					16549	1408	500	1168	735	20360
1987	369	344	326	429	1058	372	741		5626	478	1321				14818	1461	585	1572	648	19084
1988	333	345	81	560	778	262	1286		5482	332	1256				13774	1235	640	1272	811	17732
1989	84	227	144	643	684	305	1530		4936	677	1173		287		15001	926	554	958	609	18048
1990	123	1102				456	1793	300	4803	642	1319				15154	688	403	1329	799	18353
1991	596	835	216	416	337	387	1521	600	3870	269	1025				13425	353	255	869	502	15404
	203	809		428	687	211	1090	1300												

Table 4.3.2 ANGLERFISH - Divisions VII and VIIa,b. Quantities of anglerfish (Lophius budegassa) in tonnes landed by the main fishing fleets as estimated (1984-1991).

YEAR	DIVISION VII										DIVISION VIIab					TOTAL VII +	
	IRELAND Trawl	IRELAND Trawl	BELGIUM UK	UK (Unit 3)	UK (Unit 4)	UK (Unit 5)	UK Beam Trawl (Unit 6)	FRANCE Non Neph. Trawl (Unit 4)	FRANCE Non Neph. Trawl (Unit 5)	FRANCE Non Neph. Trawl (Unit 8)	SPAIN Non Neph. Trawl (Unit 4)	SPAIN Non Neph. Trawl (Unit 7)	TOTAL Artisan Cotier Nephrops Tri(Un.9)(Unit 10)	FRANCE Semi- Indust. (Un.14)	SPAIN Non Neph. Trawl (Unit 14)		TOTAL
1984								1350	137	484			1971	956	90	741	3758
1985								1792	154	456			4969	1024	89	673	7059
1986								1760	87	458			7952	784	90	633	9874
1987	431	68	277	23	798	41	632	1205	98	648			5882	675	119	616	7940
1988	333	98	37	30	401	74	578	171	579	2777		37	7557	608	132	661	9624
1989	409	122	77	34	404	161	814	235	83	879	1948		7075	611	204	940	9407
1990	47	520		25	118	235	965	2255	47	899	1655		6508	706	153	950	8869
1991	231	323	104	22	161	28	729	1833	37	690	2088		6340	575	196	935	8819

**Table 5.1** Annual landings (t) of SARDINE in Divisions VIIIc and IXa by country.

Country	1975	1976	1977	1978	1979	1980
Portugal	95,877	79,649	79,819	83,553	91,294	106,302
Spain	62,496	62,041	45,931	56,437	62,147	85,380
Total	158,373	141,690	125,750	139,990	153,441	191,682

Country	1981	1982	1983	1984	1985	1986
Portugal	113,253	100,859	85,922	95,110	111,709	103,451
Spain	100,880	103,645	95,217	107,576	92,398	77,155
Total	214,133	204,504	181,139	202,686	204,107	180,606

Country	1987	1988	1989	1990	1991
Portugal	90,214	93,591	91,091	92,404	92,638 <sup>1</sup>
Spain	78,611	64,949	46,035	46,753	35,118
Total	168,825	158,540	137,126	139,157	127,756

<sup>1</sup>Discards included.

Table 5.2 ANNUAL CATCHES OF THE BAY OF BISCAY ANCHOVY (Subarea VIII)  
As estimated by the working group. (Tonnes)

YEAR/COUNTRY & DIVISION	FRANCE VIIIab	SPAIN VIIIbc	INTERNATIONAL SUBAREA VIII
1960	1085	57000	58085
1961	1494	74000	75494
1962	1123	58000	59123
1963	652	48000	48652
1964	1973	75000	76973
1965	2615	81000	83615
1966	839	47519	48358
1967	1812	39363	41175
1968	1190	38429	39619
1969	2991	33092	36083
1970	3665	19820	23485
1971	4825	23787	28612
1972	6150	26917	33067
1973	4395	23614	28009
1974	3835	27282	31117
1975	2913	23389	26302
1976	1095	36166	37261
1977	3807	44384	48191
1978	3683	41536	45219
1979	1349	25000	26349
1980	1564	20538	22102
1981	1021	9794	10815
1982	381	4610	4991
1983	1911	12242	14153
1984	1711	33468	35179
1985	3005	8481	11486
1986	2311	5612	7923
1987	5061 (1)	9863	14924
1988	6743	8266	15009
1989	2200	8174	10374
1990	10598 (2)	23258	33856
1991	9708	9573	19281
1992	4000 (3)	20943	24943 (*)
Average (1960-91)	3053	31162	34215

\* Preliminary data for the first semester.

(1) Accurate data since 1987, before catches were underestimated.

(2) Fishery was closed in November.

(3) The French fishery was closed under EC legislation around the middle of April.

**Table 5.3** Portuguese and Spanish annual landings (t) of ANCHOVY in Division IXa (from Pestana, 1989 and Working Group members).

Year	Portugal	Spain	Total
1943	9,975	-	-
1944	6,651	-	-
1945	992	-	-
1946	6,520	-	-
1947	3,392	-	-
1948	4,938	-	-
1949	2,684	-	-
1950	3,377	-	-
1951	3,594	-	-
1952	4,415	-	-
1953	1,033	-	-
1954	3,919	-	-
1955	4,523	-	-
1956	7,898	-	-
1957	12,610	-	-
1958	3,030	-	-
1959	3,788	-	-
1960	9,503	-	-
1961	2,492	-	-
1962	4,446	-	-
1963	5,714	-	-
1964	4,181	-	-
1965	4,460	-	-
1966	4,460	-	-
1967	3,818	-	-
1968	970	-	-
1969	1,243	-	-
1970	1,172	-	-
1971	326	-	-
1972	207	-	-
1973	126	-	-
1974	238	-	-
1975	372	-	-
1976	88	-	-
1977	3,261	-	-
1978	1,011	-	-
1979	655	-	-
1980	980	-	-
1981	978	-	-
1982	656	-	-
1983	673	-	-
1984	392	-	-
1985	2,122	-	-
1986	2,153	-	-
1987	1,622	-	-
1988	442	4,263	4,705
1989	823	5,336	6,159
1990	541	5,911	6,452
1991	210	5,711	5,921

- = No data.

**Table 5.4.1** Total landings (in tonnes) of *L. boscii* in Divisions VIIIc and IXa.

Year	Spain		Portugal		Total
	Div. VIIIc	Div. IXa	Total	IXa	
1986	799	197	996	95	1,124
1987	995	586	1,581	62	1,688
1988	917	1,099	2,016	136	2,223
1989	805	1,548	2,353	188	2,629
1990	927	798	1,725	176	1,945
1991	841	634	1,475	208	1,683

**Table 5.4.2** Total landings (in tonnes) of *L. whiffiagonis* in Divisions VIIIc and IXa.

Year	Spain		Portugal		Total
	Div. VIIIc	Div. IXa	Total	IXa	
1986	508	98	606	53	659
1987	404	46	450	47	497
1988	657	59	716	101	817
1989	533	45	579	136	715
1990	841	25	866	111	977
1991	494	16	510	103	613

Table 5.5.1

ANGLERFISH (*I. piscatorius*). Divisions VIIIc and IXa.  
Tonnes landed by fleet for 1984-1991.

YEAR	DIVISION VIIIc			DIVISION IXa				TOTAL VIIIc+IXa
	SPAIN Trawl	SPAIN Gillnet	TOTAL	SPAIN Trawl	PORTUGAL Trawl	PORTUGAL Artisanal	TOTAL	
1984	3086	1690	4776	578	186	492	1256	6032
1985	1210	2372	3582	540	212	702	1454	5036
1986	2499	2624	5123	670	167	910	1747	6870
1987	1714	2670	4384	320	194	864	1378	5762
1988	2525	2253	4778	570	157	817	1544	6322
1989	1643	2147	3790	347	259	600	1206	4996
1990	1439	985	2424	435	326	606	1367	3791
1991	1490	778	2268	319	224	829	1372	3640

Table 5.5.2

ANGLERFISH (*L. budegassa*). Divisions VIIIc and IXa.  
Tonnes landed by fleet for 1984-1991.

YEAR	DIVISION VIIIc			DIVISION IXa				TOTAL VIIIc+IXa
	SPAIN Trawl	SPAIN Gillnet	TOTAL	SPAIN Trawl	PORTUGAL Trawl	PORTUGAL Artisanal	TOTAL	
1984	514	176	690	558	223	458	1239	1929
1985	366	123	489	437	254	653	1344	1833
1986	553	585	1138	379	200	847	1426	2564
1987	1094	772	1866	813	232	804	1849	3715
1988	1058	1010	2068	684	188	760	1632	3700
1989	648	351	999	764	272	542	1578	2577
1990	491	142	633	689	387	625	1701	2334
1991	503	76	579	559	309	716	1584	2163

Table 5.6.1 Nominal landings (tonnes) of SOLE as reported to ICES.

## SOLE VIII

Country	1987	1988	1989	1990	1991*
Belgium	124	135	311	301	389
France	4,010	4,309	5,471 <sup>1</sup>		4,315 <sup>1</sup>
Netherlands	145	-	-		-
Portugal	3	7	8	5	3
Spain	4,383	4,451			
Total	4,383	4,451			

\*Preliminary. <sup>1</sup>VIIIa,b

**Table 5.6.2** Sole in Divisions VIIIa,b. International landings and catches (landings + discards) as used by the Working Group (in tonnes).

Years	Official landings	Unreported landings	Used landings	Used catches	Discards
1979	2,443	176	2,619	2,866	247
1980	2,689	297	2,986	3,255	269
1981	2,694	242	2,936	3,352	416
1982	1,746	2,067	3,813	4,321	508
1983	2,669	959	3,628	4,073	445
1984	3,183	855	4,038	4,402	364
1985	3,925	326	4,251	4,556	305
1986	4,567	238	4,805	5,031	226
1987	4,383	703	5,086	5,676	590
1988	4,451	931	5,382	6,029	647
1989	5,782	63	5,845	6,524	679
1990	N/A	N/A	5,916	6,471	555
1991	4,704	865	5,569	6,047	478

**Table 6.1.1** Landings options (tonnes) for 1992. For details see individual stock summaries. Management Area codes in Figures 6.2.1-6.2.3.

Management area	Present TAC area	Functional units included	Catch options (t)
Va	A	1	Managed by national TAC
Vb (non EC)	B	2	Managed by national TAC
IIIa	E	3 + 4	4,300
IVa: rect. 44-48 E6-E7 + 44E8	F	9 + 10	2,400
IVa: remainder	G	7	2,700
IVb,c E of 1°E	H	5	870
IVb,c W of 1°E	I	6 + 8	4,200
VIa	C Vb (EC) + VI	11-13	11,300
Vb (EC) + VIb	D Vb (EC) + VI	None	Zero TAC
VIIa: excluding rect. 33 E2-E5	J VII	14 + 15	9,400
VIIId,e	K VII	None	Zero TAC
VIIb,c,j,k	L VII	16 - 19	4,000
VIIIf,g,h and VIIa 33E2-E5	M VII	20 - 22	3,800
VIIIa,b	N VIIIa,b	23 + 24	6,800
VIIIc	O VIIIc	25 + 31	510
VIIId,e	P VIIId,e	None	Zero TAC
IXa	Q IX + X	26 - 30	1,300
IXb + X	R IX + X	None	Zero TAC



**Table 6.2.1.1** Catches (t) of MACKEREL in the Norwegian Sea (Division IIa) and off the Faroes (Division Vb), 1982-1991. (Data submitted by Working Group members.)

Country	1982	1983	1984	1985	1986
Denmark	1,008	10,427	11,787	7,610	1,653
Faroe Islands	180	-	137	-	-
France	8	-	-	16	-
Germany, Fed. Rep.	-	5	-	-	99
German Dem. Rep.	-	-	-	-	16
Ireland	-	-	-	-	-
Norway	34,540	38,453	82,005	61,065	85,400
Poland	231	-	-	-	-
UK (Engl. & Wales)	-	-	-	-	-
UK (Scotland)	-	-	-	-	2,131
USSR	1,641	65	4,292	9,405	11,813
Discards	-	-	-	-	-
<b>Total</b>	<b>37,608</b>	<b>48,950</b>	<b>98,222</b>	<b>78,096</b>	<b>101,112</b>

Country	1987 <sup>1</sup>	1988 <sup>1</sup>	1989	1990 <sup>2</sup>	1991 <sup>2</sup>
Denmark	3,133	4,265	6,433	6,800	1,098
Faroe Islands	-	22	1,247	3,100	5,793
France	-	-	11	-	23
Germany, Fed. Rep.	-	380	-	-	-
German Dem. Rep.	292	-	2,409	-	-
Ireland	-	-	-	-	-
Norway	25,000	86,400	68,300	77,200	76,760
Poland	-	-	-	-	-
UK (Engl. & Wales)	-	-	-	+	-
UK (Scotland)	157	1,413	-	400	514
USSR	18,604	27,924	12,088	30,000	13,631 <sup>3</sup>
Discards	-	-	-	2,300	-
<b>Total</b>	<b>47,186</b>	<b>120,404</b>	<b>90,488</b>	<b>118,700</b>	<b>97,819</b>

<sup>1</sup>Includes catches probably taken in the northern part of Division IVa.

<sup>2</sup>Preliminary.

<sup>3</sup>Russia.

**Table 6.2.1.2** Catch (t) of MACKEREL in the North Sea, Skagerrak, and Kattegat (Sub-area IV and Division IIIa), 1982-1991. (Data submitted by Working Group members.)

Country	1982	1983	1984	1985	1986
Belgium	102	93	68	-	49
Denmark	2,034	11,285	10,088	12,424	23,368
Faroe Islands	720	-	-	1,356	-
France	3,041	2,248	-	322	1,200
Germany, Fed. Rep.	28	10	112	217	1,853
Ireland	-	-	-	-	-
Netherlands	390	866	340	726	1,949
Norway	27,966	24,464	27,311	30,835	50,600
Sweden	692	1,903	1,440	760	1,300
UK (Engl. & Wales)	16	16	2	143	18
UK (Scotland)	44	4	13	7	541
UK (N.Ireland)	-	-	-	-	-
USSR	-	-	-	-	-
Unallocated, discards, and misreported	450	96	202	3,656	7,431
<b>Total</b>	<b>35,483</b>	<b>40,985</b>	<b>39,576</b>	<b>50,466</b>	<b>88,309</b>

Country	1987 <sup>1</sup>	1988	1989	1990	1991 <sup>2</sup>
Belgium	14	20	37	-	125
Denmark	28,217	32,588	26,831	29,000	38,834
Faroe Islands	-	-	2,685	5,900	5,338
France	2,146	1,806	2,200	1,600	2,362
Germany, Fed. Rep.	474	177	6,312	3,500	4,173
Ireland	-	-	8,880	12,800	13,000
Netherlands	2,761	2,564	7,343	13,700	4,591
Norway	108,250	59,750	81,400	74,500	102,350
Sweden	3,162	1,003	6,601	6,400	4,227
UK (Engl. & Wales)	94	160	5,618	1,300	2,671
UK (Scotland)	19,763	616	33,042	28,100	33,991
UK (N.Ireland)	-	100	-	1,400	255
USSR	-	-	-	-	-
Unallocated, discards and misreported	10,789	29,766	4,777	4,300	153,958 <sup>3</sup>
<b>Total</b>	<b>175,670</b>	<b>128,550</b>	<b>185,726</b>	<b>182,500</b>	<b>365,884</b>

<sup>1</sup>May includes catches taken in Division IIa.

<sup>2</sup>Preliminary.

<sup>3</sup>Including approximately 130,000 t believed caught in these sub-areas but reported as having been taken in Division VIa + approximately 7,000 t of discards.

**Table 6.2.1.3** Catch (t) of MACKEREL in the Western area (Sub-areas VI and VII and Divisions VIIa,b,d,e).  
(Data submitted by Working Group members.)

Country	1982	1983	1984	1985	1986
Belgium	-	+	+	-	+
Denmark	15,000	15,000	200	400	300
Faroe Islands	11,100	14,900	9,200	9,000	1,400
France	12,300	11,000	12,500	7,400	11,200
Germany, Fed. Rep.	11,200	23,000	11,200	11,800	7,700
Ireland	109,700	110,000	84,100	91,400	74,500
Netherlands	67,200	73,600	99,000	37,000	58,900
Norway	19,000	19,900	34,700	24,300	21,000
Poland	-	-	-	-	-
Spain	-	-	100	+	-
UK (Engl. & Wales)	82,900	62,000	30,000	9,600	9,100
UK (N.Ireland)	9,600	800	10,600	12,200	9,700
UK (Scotland)	147,400	120,100	157,700	184,100	137,500
USSR	-	+	200	+	-
Unallocated	97,300	105,500	18,000	75,100	51,000
Discard	24,900	11,300	12,100	4,500	-
Grand Total	607,700	567,100	479,600	467,700	380,500

Country	1987	1988 <sup>1</sup>	1989 <sup>2</sup>	1990 <sup>2</sup>	1991 <sup>2</sup>
Belgium	-	-	-	-	-
Denmark	100	-	1,000?	-	1,573
Faroe Islands	7,100	2,600	1,100	1,000	4,095
France	11,100	8,900	12,700	17,400	10,364
Germany, Fed. Rep.	13,300	15,900	16,200	18,100	17,138
Ireland	89,500	85,800	61,100	61,500	64,827
Netherlands	31,700	26,100	24,000	24,500	29,156
Norway	21,600	17,300	700	-	-
Poland	-	-	-	-	-
Spain	-	1,500	1,400	400	4,020
UK (Engl. & Wales)	25,200	24,100	14,700	19,200	25,500
UK (N.Ireland)	10,700	8,900	11,000	12,800	2,995
UK (Scotland)	164,800	175,400	123,400	130,700	134,093
USSR	-	+	-	-	-
Unallocated	25,800	4,700	16,700	6,000	-133,802
Discard	-	5,800	4,900	11,300	23,550
Grand Total	401,700	377,000	288,900	302,900	183,509

<sup>1</sup>Includes catches taken in Division IVa, but misreported to Division VIa.

<sup>2</sup>Preliminary.

Ila + Vb	97,819
IV + IIIa	365,881
VI, VII, VIIa	183,509
Total	647,209

Table 6.2.1.4

Catches (t) of MACKEREL by division and sub-area in 1991.  
(Data submitted by Working Group members.)

Division/ Sub-area	Quarter				Total
	1	2	3	4	
Ila + Vb	600	700	75,100	21,400	97,800
IVa	111,400	100	81,800	164,800	358,100
IVb	0	600	3,500	100	4,200
IVc	100	300	1,000	300	1,700
IIIa	+	300	1,600	0	1,900
VI	102,700	1,300	1,000	15,200	120,200
VII	29,600	13,900	3,400	9,900	56,800
VIIIa,b,d,e	2,400	3,500	400	200	6,500
Sub-total	246,800	20,700	167,800	211,900	647,200
VIIIc	3,700	11,000	1,800	400	16,900
IXa	1,100	1,600	900	300	3,900
Grand total	251,600	33,300	170,500	212,600	668,000

**Table 6.2.1.5** Actual catches (t) of MACKEREL by area. Discards not estimated prior to 1978.  
(Data submitted by Working Group members.)

Year	Sub-area VI			Sub-area VII and Divisions VIIIa, b, d, e			Sub-area IV and Division IIIa			Divs. IIa, Vb <sup>1</sup>		Total		
	Landings	Discards	Catch	Landings	Discards	Catch	Landings	Discards <sup>2</sup>	Catch	Landings	Discards	Landings	Discards	Catch
1969	4,800	-	4,800	66,300	-	66,300	739,182	-	739,182	+		810,282	-	810,282
1970	3,900	-	3,900	100,300	-	100,300	322,451	-	322,451	163		426,814	-	426,814
1971	10,200	-	10,200	122,600	-	122,600	243,673	-	243,673	358		376,831	-	376,831
1972	10,000	-	10,000	157,800	-	157,800	188,599	-	188,599	88		356,487	-	356,487
1973	52,200	-	52,200	167,300	-	167,300	326,519	-	326,519	21,600		567,619	-	567,619
1974	64,100	-	64,100	234,100	-	234,100	298,391	-	298,391	6,800		603,391	-	603,391
1975	64,800	-	64,800	416,500	-	416,500	263,062	-	263,062	34,700		779,062	-	779,062
1976	67,800	-	67,800	439,400	-	439,400	303,842	-	303,842	10,500		821,542	-	821,542
1977	74,800	-	74,800	259,100	-	259,100	258,131	-	258,131	1,400		593,431	-	593,431
1978	151,700	15,100	166,900	355,500	35,500	391,000	148,817	-	148,817	4,200		660,217	50,700	710,917
1979	203,300	20,300	223,600	398,000	39,800	437,800	152,323	500	152,823	7,000		760,623	60,600	821,223
1980	218,700	6,000	224,700	386,100	15,600	401,700	87,391	-	87,391	8,300		700,491	21,600	722,091
1981	335,100	2,500	337,600	274,300	39,800	314,100	64,172	3,216	67,388	18,700		692,272	45,516	737,788
1982	340,400	4,100	344,500	257,800	20,800	278,600	35,033	450	35,483	37,600		670,833	25,350	696,183
1983	315,100	22,300	337,400	245,400	9,000	254,400	40,889	96	40,985	49,000		650,389	31,396	681,785
1984	306,100	1,600	307,700	176,100	10,500	186,600	39,374	202	39,576	93,900		615,474	12,302	627,776
1985	308,140	2,735	390,875	75,043	1,800	76,843	46,790	3,656	50,446	78,000		587,973	8,191	596,164
1986	104,100	+	104,100	128,499	+	128,499	236,309	7,431	243,740	101,000		569,908	7,431	577,339
1987	183,700	+	183,700	100,300	+	100,300	290,829	10,789	301,618	47,000		621,829	10,789	632,618
1988	115,600	3,100	118,700	75,600	2,700	78,300	308,550	29,766	338,316	116,200		615,950	35,566	651,516
1989	121,300	2,600	123,900	72,900	2,300	75,200	279,410	2,190	281,600	86,900		560,510	7,090	567,600
1990	114,800	5,800	120,600	56,300	5,500	61,800	300,800	4,300	305,100	116,800		588,700	15,600	604,300
1991	109,500	10,700	120,200	50,500	12,800	63,300	358,700	7,200	365,900	97,800		616,500	30,700	647,200

<sup>1</sup>For 1976-1985 only Division IIa.

<sup>2</sup>Discards estimated only for one fleet.

NB: Landings from 1969-1978 were taken from the 1978 Working Group report (Tables 2.1, 2.2 and 2.5).

**Table 6.2.1.6** Landings (tonnes) of MACKEREL in Divisions VIIIc and IXa, 1977-1991. (Data submitted by Working Group members.)

**Division VIIIc**

Country	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Spain	19,852	18,543	15,013	11,316	12,834	15,621	10,390	13,852	11,810	16,533	15,982	16,844	13,446	16,086	16,940
Total	19,852	18,543	15,013	11,316	12,834	15,621	10,390	13,852	11,810	16,533	15,982	16,844	13,446	16,086	16,940

**Division IXa**

Country	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Portugal	1,743	1,555	1,071	1,929	3,108	3,018	2,239	2,250	4,178	6,419	5,650	4,150	3,016	3,509	2,789
Spain	2,935	6,221	6,280	2,719	2,111	2,437	2,224	4,206	2,123	1,837	491	3,540	1,763	1,406	1,051
Poland	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
USSR	2,879	189	111	-	-	-	-	-	-	-	-	-	-	-	-
Total	7,565	7,965	7,462	4,648	5,219	5,455	4,463	6,456	6,301	8,256	6,141	7,690	4,779	4,915	3,840

**Table 6.3.1.1** Landings (t) of HORSE MACKEREL by Sub-area.  
(Data as submitted by Working Group members.)

Sub-area	1979	1980	1981	1982	1983	1984
II	2	-	+	-	412	23
IV + IIIa	1,412	2,151	7,245	2,788	4,420	25,987
VI	7,791	8,724	11,134	6,283	24,881	31,716
VII	43,525	45,697	34,749	33,478	40,526	42,952
VIII	47,155	37,495	40,073	22,683	28,223	25,629
IX	37,619	36,903	35,873	39,726	48,733	23,178
Total	137,504	130,970	129,074	104,958	147,195	149,485

Sub-area	1985	1986	1987	1988	1989	1990
II	79	214	3,311	6,818	4,809	11,414
IV + IIIa	24,238	20,746	20,895	62,892	112,047	145,062
VI	33,025	20,455	35,157	45,842	34,870	20,904
VII	39,034	77,628	100,734	90,253	138,890	192,196
VIII	27,740	36,061	37,703	34,177	42,991	47,802
IX	20,237	31,159	34,243	37,888	38,259	24,023
Total	144,353	186,263	232,043	277,870	371,866	441,401

Sub-area	1991 <sup>1</sup>
II	4,487
V + IIIa	77,994
VI	34,455
VII	201,326
VIII	50,466
IX	21,778
Total	390,506

<sup>1</sup>Preliminary.

**Table 6.3.1.2** Landings (t) of HORSE MACKEREL in Sub-area II.  
(Data as submitted by Working Group members.)

Country	1979	1980	1981	1982	1983	1984
Denmark	-	-	-	-	-	-
France	+	-	-	-	-	1
Germany, Fed.Rep.	2	-	+	-	-	-
Norway	-	-	-	-	412	22
USSR	-	-	-	-	-	-
<b>Total</b>	<b>2</b>	<b>-</b>	<b>+</b>	<b>-</b>	<b>412</b>	<b>23</b>

Country	1985	1986	1987	1988	1989	1990
Faroe Islands	-	-	-	-	-	964
Denmark	-	-	39	-	-	-
France	1	<sup>2</sup>	<sup>2</sup>	<sup>2</sup>	-	-
Germany, Fed.Rep.	-	-	-	64	12	+
Norway	78	214	3,272	6,285	4,770	9,135
USSR	-	-	-	469	27	1,298
UK (England + Wales)	-	-	-	-	-	17
<b>Total</b>	<b>79</b>	<b>214</b>	<b>3,311</b>	<b>6,818</b>	<b>4,809</b>	<b>11,414</b>

Country	1991 <sup>1</sup>
Faroe Islands	1,115
Denmark	-
France	-
Germany	-
Norway	3,200
Russia	172
UK (England + Wales)	-
<b>Total</b>	<b>4,487</b>

<sup>1</sup>Preliminary.

<sup>2</sup>Included in Sub-area IV.



**Table 6.3.1.3** Landings (t) of HORSE MACKEREL in Sub-area IV by country.  
(Data submitted by Working Group members.)

Country	1979	1980	1981	1982	1983	1984
Belgium	9	8	34	7	55	20
Denmark	496	199	3,576	1,612	1,590	23,730
Faroe Islands	-	260	-	-	-	-
France	221	292	421	567	366	827
Germany, Fed.Rep.	376	+	139	30	52	+
Ireland	-	1,161	412	-	-	-
Netherlands	88	101	355	559	2,029 <sup>4</sup>	824 <sup>4</sup>
Norway	199	119	2,292	7	322	-
Poland	-	-	-	-	2	94
Sweden	+	-	-	-	-	-
UK (Engl. + Wales)	23	11	15	6	4	-
UK (Scotland)	+	-	-	-	-	3
USSR	-	-	-	-	-	489
						-
Total	1,412	2,151	7,245	2,788	4,420	25,987

Country	1985	1986	1987	1988	1989	1990 <sup>1</sup>	1991 <sup>1</sup>
Belgium	13	13	9	10	10	13	-
Denmark	22,495	18,652 <sup>2</sup>	7,290 <sup>2</sup>	20,323 <sup>2</sup>	23,329 <sup>2</sup>	20,605 <sup>2</sup>	6,982 <sup>2</sup>
Faroe Islands	-	-	-	-	-	942	340
France	298	231 <sup>3</sup>	189 <sup>3</sup>	784 <sup>3</sup>	248	220	174
Germany, Fed.Rep.	+	-	3	153	506	2,469 <sup>6</sup>	5,995
Ireland	-	-	-	-	-	687	2,657
Netherlands	160 <sup>4</sup>	600 <sup>4</sup>	850 <sup>4</sup>	1,060 <sup>4</sup>	14,172	1,970	3,852
Norway <sup>2</sup>	203	776	11,728 <sup>5</sup>	34,425 <sup>5</sup>	84,161	117,903 <sup>2</sup>	50,000 <sup>2</sup>
Poland	-	-	-	-	-	-	-
Sweden	-	2 <sup>2</sup>	-	-	-	102	953 <sup>2</sup>
UK (Engl. + Wales)	71	3	339	373	10	10	132
UK (N. Ireland)	-	-	-	-	-	-	350
UK (Scotland)	998	531	487	5,749	2,093	458	7,309
USSR	-	-	-	-	-	-	-
Unallocated + discards	-	-	-	-	-12,482 <sup>5</sup>	-317 <sup>5</sup>	-750 <sup>5</sup>
Total	24,238	20,746	20,895	62,892	112,047	145,062	77,994

<sup>1</sup>Preliminary.

<sup>2</sup>Includes Division IIIa.

<sup>3</sup>Includes Division IIa.

<sup>4</sup>Estimated from biological sampling.

<sup>5</sup>Assumed to be misreported.

<sup>6</sup>Includes 13 t from the German Democratic Republic.

**Table 6.3.1.4** Landings (t) of HORSE MACKEREL in Sub-area VI by country.  
(Data submitted by Working Group members.)

Country	1979	1980	1981	1982	1983	1984
Denmark	443	734	341	2,785	7	-
Faroe Islands	-	-	-	1,248	-	-
France	151	45	454	4	10	14
Germany, Fed. Rep.	155	5,550	10,212	2,113	4,146	130
Ireland	-	-	-	-	15,086 <sup>2</sup>	13,858
Netherlands	6,910	2,385 <sup>2</sup>	100 <sup>2</sup>	50	94	17,500 <sup>2</sup>
Norway	-	-	5	-	-	-
Spain	20	-	-	-	-	-
UK (Engl. + Wales)	73	9	5	+	38	+
UK (Scotland)	39	1	17	83	-	214
USSR	-	-	-	-	-	-
<b>Total</b>	<b>7,791</b>	<b>8,724</b>	<b>11,134</b>	<b>6,283</b>	<b>24,881</b>	<b>31,716</b>

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	-	-	769	1,655	973	615	-
Faroe Islands	4,014	1,992 <sup>2</sup>	4,450 <sup>4</sup>	4,000 <sup>4</sup>	3,059	628	255
France	13	12	20	10	2	17	4
Germany, Fed. Rep.	191	354	174	615	1,162	2,474	24,766
Ireland	27,102	28,125	29,743	27,872	19,493	15,911 <sup>74</sup>	2,500
Netherlands	18,450 <sup>2</sup>	3,450 <sup>2</sup>	5,750 <sup>2</sup>	3,340 <sup>2</sup>	1,907 <sup>2</sup>	660 <sup>2</sup>	3,369 <sup>2</sup>
Norway	-	83	75	41	-	-	-
Spain	-	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	<sup>3</sup>	1
UK (Engl. + Wales)	996	198	404	475	44	145	1,229
UK (N.Ireland)	-	-	-	-	-	-	1,970
UK (Scotland)	1,427	138	1,027	7,834	1,737	267	1,640
USSR	-	-	-	-	-	44	-
Unallocated + discards	-19,168	-13,897	-7,255	-	6,493	143	-1,278
<b>Total</b>	<b>33,025</b>	<b>20,455</b>	<b>35,157</b>	<b>45,842</b>	<b>34,870</b>	<b>20,904</b>	<b>34,455</b>

<sup>1</sup>Preliminary.

<sup>2</sup>Estimated from biological sampling.

<sup>3</sup>Included in Sub-area VII.

<sup>4</sup>Includes Divisions IIIa, IVa,b and VIb.

**Table 6.3.1.5** Landings (t) of HORSE MACKEREL in Sub-area VII by country. Data submitted by the Working Group members.)

Country	1979	1980	1981	1982	1983	1984
Belgium	3	-	1	1	-	-
Denmark	4,287	5,045	3,099	877	993	732
France	4,407	1,983	2,800	2,314	1,834	2,387
Germany, Fed.Rep.	5,333	2,289	1,079	12	1,977	228
Ireland	-	-	16	-	-	65
Netherlands	25,174	23,002	25,000 <sup>2</sup>	27,500 <sup>2</sup>	34,350 <sup>2</sup>	38,700 <sup>2</sup>
Norway	959	394	-	-	-	-
Spain	676	50	234	104	142	560
UK (Engl. + Wales)	2,686	12,933	2,520	2,670	1,230	279
UK (Scotland)	-	1	-	-	-	1
USSR	-	-	-	-	-	-
<b>Total</b>	<b>43,525</b>	<b>45,697</b>	<b>34,749</b>	<b>33,478</b>	<b>40,526</b>	<b>42,952</b>

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Faroe Islands	-	-	-	-	-	28	-
Belgium	+	+	2	-	-	+	-
Denmark	1,477 <sup>3</sup>	30,408 <sup>3</sup>	27,368	33,202	34,474	30,594	28,888
France	1,881	3,801	2,197	1,523	4,576	2,538	1,230
Germany, Fed.Rep.	-	5	374	4,705	7,743	8,109	12,919
Ireland	100	703	15	481	12,645	17,887	19,074
Netherlands	33,550 <sup>2</sup>	40,750 <sup>2</sup>	69,400 <sup>2</sup>	43,560 <sup>2</sup>	43,582 <sup>2</sup>	111,900 <sup>2</sup>	104,107 <sup>2</sup>
Norway	-	-	-	-	-	-	-
Spain	275	137	148	150	14	16	113
UK (Engl. + Wales)	1,630	1,824	1,228	3,759	4,488	13,371	6,436
UK (N.Ireland)	-	-	-	-	-	-	2,026
UK (Scotland)	1	+	2	2,873	+	139	1,992
USSR	120	-	-	-	-	-	-
Unallocated + discards	-	-	-	-	28,368	7,614	24,541
<b>Total</b>	<b>39,034</b>	<b>77,628</b>	<b>100,734</b>	<b>90,253</b>	<b>138,890</b>	<b>192,196</b>	<b>201,326</b>

<sup>1</sup>Provisional.

<sup>2</sup>Estimated from biological sampling.

<sup>3</sup>Includes Sub-area VI.

**Table 6.3.1.6** Landings (t) of HORSE MACKEREL in Sub-area VIII by country.  
(Data submitted by Working Group members.)

Country	1979	1980	1981	1982	1983	1984
Denmark	127	-	-	-	-	-
France	4,240	3,361	3,711	3,073	2,643	2,489
Netherlands	-	-	-	-	-	<sup>2</sup>
Spain	42,766	34,134	36,362	19,610	25,580	23,119
UK (Engl. + Wales)	22	-	+	1	-	1
USSR	-	-	-	-	-	20
Total	47,155	37,495	40,073	22,683	28,223	25,629

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Danmark	-	446	3,283	2,793	6,729	5,726	1,349
France	4,305	3,534	3,983	4,502	4,719	5,082	6,164
Germany	-	-	-	-	-	-	80
Netherlands	<sup>2</sup>	<sup>2</sup>	<sup>2</sup>	-	-	6,000	12,437 <sup>3</sup>
Spain	23,292	31,033	30,098	26,629	31,475	29,488	27,803
UK (Engl. + Wales)	143	392	339	253	68	6	70
USSR	-	656	-	-	-	-	-
Unallocated + discards	-	-	-	-	-	1,500	2,563
Total	27,740	36,061	37,703	34,177	42,991	47,802	50,466

<sup>1</sup>Preliminary.

<sup>2</sup>Included in Sub-area VII.

<sup>3</sup>Estimated from biological sampling.

**Table 6.3.1.7** Landings (t) of HORSE MACKEREL in Sub-area IX by country. (Data submitted by Working Group members.)

Country	1979	1980	1981	1982	1983	1984
Portugal	24,489	25,224	23,753	30,886	30,951	17,307
Spain	12,880	11,679	12,120	8,840	17,782	5,871
USSR	250	-	-	-	-	-
Total	37,619	36,903	35,873	39,726	48,733 <sup>3</sup>	23,178

Country	1985	1986	1987	1988	1989	1990	1991 <sup>1</sup>
Portugal	9,420	17,682	21,444	25,629	25,231	19,958	17,497
Spain	10,817	13,477	12,799	12,259	13,028	4,065	4,281
USSR	-	-	-	-	-	-	-
Total	20,237	31,159	34,243	37,888	38,259	24,023	21,778

<sup>1</sup>Preliminary.

**Table 6.3.1.8** Landings and discards of HORSE MACKEREL (t) by year and division, for the North Sea, Western and Southern horse mackerel. (Data submitted by Working Group members.)

Year	North Sea horse mackerel				Western horse mackerel							Southern horse mackerel		
	IIIa	IVb,c	VIIId	Total	IIa	IVa	VIa	VIIa-c,e-k	VIIIa,b,d,e	Discards	Total	VIIc	IXa	Total
1982	-	2,788 <sup>3</sup>	1,247	4,035	-	-	6,283	32,231	3,073	-	41,587	19,610	39,726	59,336
1983	-	4,420 <sup>3</sup>	3,600	8,020	412	-	24,881	36,926	2,643	-	64,862	25,580	48,733	74,313
1984	-	25,893 <sup>3</sup>	3,585	29,478	23	94	31,716	38,782	2,510	500	73,625	23,119	23,178	46,297
1985	1,138	22,897	2,715	26,750	79	203	33,025	35,296	4,448	7,500	80,551	23,292	20,237	43,529
1986	396	19,496	4,756	24,648	214	776	20,343	72,761	3,071	8,500	105,665	31,033	31,159	62,192
1987	436	9,477	1,721	11,634	3,311	11,185	35,197	99,942	7,605	-	157,240	30,098	34,243	64,341
1988	2,261	18,290	3,120	23,671	6,818	42,174	45,842	81,978	7,548	3,740	188,100	26,629	37,888	64,517
1989	913	25,830	6,522	33,265	4,809	85,304 <sup>2</sup>	34,870	131,218	11,516	1,150	268,867	31,475	38,259	69,734
1990	14,872 <sup>1</sup>	17,437	1,325	18,762	11,414	112,753 <sup>2</sup>	20,794	182,580	21,120	9,930	373,463	25,182	24,023	49,205
1991	2,725 <sup>1</sup>	11,400	600	12,000	4,487	63,869 <sup>3</sup>	34,415	196,926	25,693	5,440	333,555	23,733	21,778	45,511

<sup>1</sup>Norwegian and Danish catches are included in the Western horse mackerel.

<sup>2</sup>Norwegian catches in Division IVb included in the Western horse mackerel.

<sup>3</sup>Divisions IIIa and IVb,c combined.

**Table 6.4.1.1** Landings (tonnes) of BLUE WHITING from the main fisheries, 1982-1991, as estimated by the Working Group.

Area	1982	1983	1984	1985	1986
Norwegian Sea fishery (Sub-areas I + II and Divisions Va, XIVa + XIVb)	110,685	52,963	65,932	90,742	160,061
Fishery in the spawning area (Divisions Vb, VIa, VIb and VIIb + VIIc)	316,566	361,537	421,865 <sup>2</sup>	464,265 <sup>2</sup>	534,263 <sup>2</sup>
Icelandic industrial fishery (Division Va)		7,000		-	-
Industrial mixed fishery (Division IVa-c, Vb, IIIa)	117,578	117,737	122,806	97,769	99,580
Subtotal northern fishery	544,829	539,237	610,603	652,776	793,904
Southern fishery (Sub-areas VIII + IX, Divisions VIId,e + VIIg-k)	31,590	30,835	31,173 <sup>3</sup>	42,820 <sup>3</sup>	33,082 <sup>3</sup>
Total	576,419	570,072	641,776	695,596	826,986

Area	1987	1988	1989	1990	1991 <sup>2</sup>
Norwegian Sea fishery (Sub-areas I + II and Divisions Va, XIVa + XIVb)	123,042	55,829	37,638	2,106	78,703
Fishery in the spawning area (Divisions Vb, VIa, VIb and VIIb + VIIc)	445,863 <sup>2</sup>	421,636	473,165	463,495	220,689
Icelandic industrial fishery (Division Va)	-	-	4,977	-	-
Industrial mixed fishery (Division IVa-c, Vb, IIIa)	62,689	45,110	75,958	63,192	57,079
Subtotal northern fishery	631,615	522,575	591,738	528,793	356,471
Southern fishery (Sub-areas VIII + IX, Divisions VIId,e + VIIg-k)	32,819 <sup>3</sup>	30,838	33,695	32,817	32,003
Total	664,434	553,413	625,433	561,610	388,474

<sup>1</sup>Preliminary.

<sup>2</sup>Including directed fishery also in Divisions VIIg-k, IVa and Sub-area XII.

<sup>3</sup>Excluding directed fishery also in Divisions VIIg-k.

**Table 6.4.1.2** Landings (tonnes) of BLUE WHITING from the directed fishery in the Norwegian Sea (Sub-areas I and II, Divisions Va, XIVa and XIVb) fisheries, 1982-1991, as estimated by the Working Group.

Country	1982	1983	1984	1985	1986
Faroes	-	11,316	-	-	-
France	2,067	2,890	-	-	-
German Dem.Rep.	3,042	5,553	8,193	1,689	3,541
Germany, Fed.Rep.	890	2	35	75	106
Greenland	-	-	-	-	10
Iceland	-	-	105	-	-
Norway	-	5,061	689	-	-
Poland	443	-	-	-	-
UK (Engl. & Wales)	-	-	-	-	-
USSR	103,770	28,141	56,817	88,978	156,404
<b>Total</b>	<b>110,685</b>	<b>52,963</b>	<b>65,932</b>	<b>90,742</b>	<b>160,061</b>

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Faroes	9,290	-	1,047	-	-
France	-	-	-	-	-
German Dem.Rep.	1,010	3	1,341	-	-
Germany, Fed.Rep.	-	-	-	-	-
Greenland	-	-	-	-	-
Iceland	-	-	-	-	-
Norway	-	-	-	566	100
Poland	56	10	-	-	-
UK (Engl. & Wales)	-	-	-	-	-
USSR/Russia <sup>2</sup>	112,686	55,816	35,250	1,540	78,603
<b>Total</b>	<b>123,042</b>	<b>55,829</b>	<b>37,638</b>	<b>2,106</b>	<b>78,703</b>

<sup>1</sup>Preliminary.

<sup>2</sup>In 1991.



**Table 6.4.1.3** Landings (tonnes) of BLUE WHITING from directed fisheries in the spawning area (Divisions Vb, Vla,b, VIIb,c and since 1984 Divisions VIIg-k and Sub-area XII), 1982-1991, as estimated by the Working Group.

Country	1982	1983	1984	1985	1986
Denmark	23,164	28,680	26,445	21,104	11,364
Faroes	38,958	56,168	62,264	72,316	80,564
France	1,212	3,600	3,882	-	-
German Dem.Rep.	7,771	3,284	1,171	6,839	2,750
Germany, Fed.Rep.	701	825	994	626	-
Iceland	1,689	1,176	-	-	-
Ireland	-	-	-	668	16,440
Netherlands	200	150	1,000	1,801	8,888
Norway	169,700	185,646	211,773	234,137	283,162 <sup>2</sup>
Poland	-	-	-	-	-
Spain	-	318	-	-	-
UK (Engl. & Wales)	-	-	33	2	-
UK (Scotland)	-	-	-	-	10
USSR	73,171	81,690	114,303	126,772	3,472
					127,613
<b>Total</b>	<b>316,566</b>	<b>361,537</b>	<b>421,865</b>	<b>464,265</b>	<b>534,263</b>

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	2,655	797	25	-	-
Faroes	70,625	79,339	70,711	43,405	10,208 <sup>2</sup>
France	-	-	2,190	-	-
German Dem.Rep.	3,584	4,663	3,225	230	-
Germany, Fed.Rep.	266	600	848	1,469	349
Iceland	-	-	-	-	-
Ireland	3,300	245	-	-	-
Netherlands	5,627	800	2,078 <sup>7</sup>	7,280	17,359
Norway	191,012	208,416	258,386	281,036 <sup>2</sup>	114,866 <sup>2</sup>
Poland	-	-	-	-	-
Spain	-	-	-	-	-
Sweden	-	-	-	-	-
UK (Engl. & Wales)	5	3	1,557	13	-
UK (Scotland)	3,310	5,068	6,463	5,993	3,541
USSR/Russia <sup>3</sup>	165,497	121,705	127,682	124,069	74,366
<b>Total</b>	<b>445,884</b>	<b>421,636</b>	<b>473,165</b>	<b>463,495</b>	<b>220,689</b>

<sup>1</sup>Preliminary.

<sup>2</sup>Including directed fishery also in Division IVa.

<sup>3</sup>In 1991.

**Table 6.4.1.4** Landings (tonnes) of BLUE WHITING from the mixed industrial fisheries and caught as by-catch in ordinary fisheries in Divisions IIIa, IVa-c, Vb and IIa, 1982-1991, as estimated by the Working Group.

Country	1982	1983	1984	1985	1986
Denmark	34,936	38,290	49,032	35,843	57,315
Faroes	27,269	12,757	9,740	3,606	5,678
France	1,417	249	-	-	-
German Dem.Rep. <sup>2</sup>	-	-	-	-	-
Germany,Fed.Rep. <sup>2</sup>	93	-	556	52	-
Ireland	-	-	-	-	-
Netherlands	-	-	122	130	1,114
Norway	47,856	62,591	58,038	54,522	26,941
Poland <sup>2</sup>	550	-	-	-	-
Sweden <sup>4</sup>	1,241	3,850	5,401	3,616	8,532
UK (Engl. & Wales) <sup>2</sup>	-	-	-	-	-
UK (Scotland)	-	-	-	-	-
<b>Total</b>	<b>117,578</b>	<b>117,737</b>	<b>122,806</b>	<b>97,769</b>	<b>99,580</b>

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Denmark	28,541	18,114	26,605	27,052	15,538
Faroes	7,051	492	3,325	5,281	356
France	-	-	-	-	-
German Dem.Rep. <sup>2</sup>	53	-	-	-	-
Germany,Fed.Rep. <sup>2</sup>	62	280	3	-	-
Ireland	-	-	-	-	-
Netherlands	-	-	-	20	-
Norway	24,969	24,898	42,956	29,336 <sup>3</sup>	23,205
Poland <sup>2</sup>	-	-	-	-	-
Sweden <sup>4</sup>	2,013	1,226	3,062	1,503	17,980
UK (Engl. & Wales) <sup>2</sup>	-	-	7	-	-
UK (Scotland)	-	100	-	-	-
<b>Total</b>	<b>62,689</b>	<b>45,110</b>	<b>75,958</b>	<b>63,192</b>	<b>57,079</b>

<sup>1</sup>Preliminary.

<sup>2</sup>Including directed fishery also in Division IVa.

<sup>3</sup>Including mixed industrial fishery in the Norwegian Sea.

<sup>4</sup>Reported landings assumed to be from human consumption fisheries.

**Table 6.4.1.5** Spawning stock biomass (SSB) and total stock biomass (TSB) in ('000 t) assuming various levels of a constant TAC for the years 1993-1995.

A: Recruitment for 1993-1995: Average of 1977-1988 recruitments.

Year	SSB				
	300	400	500	600	700
1992	3,820	3,820	3,820	3,820	3,820
1993	3,857	3,857	3,857	3,857	3,857
1994	3,981	3,888	3,794	3,701	3,608
1995	3,950	3,768	3,587	3,406	3,226
1996	3,970	3,706	3,441	3,177	2,913
Year	TSB				
	300	400	500	600	700
1992	5,439	5,439	5,439	5,439	5,439
1993	5,390	5,390	5,390	5,390	5,390
1994	5,170	5,066	4,963	4,260	4,757
1995	5,131	4,936	4,740	4,545	4,349
1996	5,085	4,809	4,532	4,255	3,977

B: Recruitment for 1993-1995: Average of 1977-1988 except 1982-1983 recruitments.

Year	SSB				
	300	400	500	600	700
1992	3,820	3,820	3,820	3,820	3,820
1993	3,857	3,857	3,857	3,857	3,857
1994	3,972	3,879	3,785	3,692	3,599
1995	3,905	3,724	3,543	3,362	3,181
1996	3,848	3,583	3,318	3,054	2,790
Year	TSB				
	300	400	500	600	700
1992	5,439	5,439	5,439	5,439	5,439
1993	5,350	5,350	5,350	5,350	5,350
1994	5,086	4,983	4,880	4,777	4,673
1995	4,952	4,758	4,563	4,368	4,172
1996	4,810	4,535	4,259	3,982	3,705

**Table 6.4.2** Landings (tonnes) of BLUE WHITING from the Southern areas (Sub-areas VIII and IX and Divisions VIIg-k and VIId,e; from 1984, the Divisions VIIg-k are not included) 1982-1991 as estimated by the Working Group.

Country	1982	1983	1984	1985	1986
Germany, Fed. Rep	-	50	-	-	-
Netherlands	200	-	-	-	-
Norway	-	-	-	-	-
Portugal	3,890	4,748	5,252	6,989	8,116
Spain	27,500	26,037	25,921	35,828	24,965
UK (England & Wales)	-	-	-	3	1
France	-	-	-	-	-
<b>Total</b>	<b>31,590</b>	<b>30,835</b>	<b>31,173</b>	<b>42,820</b>	<b>33,082</b>

Country	1987	1988	1989	1990	1991 <sup>1</sup>
Germany, Fed. Rep.	-	-	-	-	-
Netherlands	-	-	-	450	10
Norway	4	-	-	-	-
Portugal	9,148	5,979	3,557	2,864	2,813
Spain	23,644	24,847	30,108	29,490	29,180
UK (England & Wales)	23	12	29	13	-
France	-	-	1	-	-
<b>Total</b>	<b>32,819</b>	<b>30,838</b>	<b>33,695</b>	<b>32,817</b>	<b>32,003</b>

<sup>1</sup>Preliminary.

**Table 6.4.3.1** The percentage distribution of acoustic biomass estimates of BLUE WHITING from various surveys in the spawning season divided on areas (%) within and beyond areas of national economic zones of NEAFC member countries.

Year	International	Faroes	Norway	EEC	Surveys
1981	0.8	20.7	6.0	72.5	Norwegian and Scottish
1982	-	8.4	-	91.6	Norwegian
1983	-	4.5	-	95.5	Norwegian
1983	-	12.7	0.2	87.1	USSR
1984	1.9	10.4	-	87.7	USSR
1985	-	7.0	6.6	86.4	Norwegian
1986	-	9.5	25.4	65.1	Norwegian
1987	-	2.9	-	97.1	USSR
1988	-	2.6	-	97.4	Norwegian
1988	-	-	-	100.0	USSR
1989	-	1.5	-	98.5	Norwegian
1990	3.2	2.4	9.7	84.7	Norwegian and USSR
1991	5.5	2.6	10.1	81.8	Norwegian and USSR
1992	0.4	3.8	13.2	82.6	Norwegian and Russian

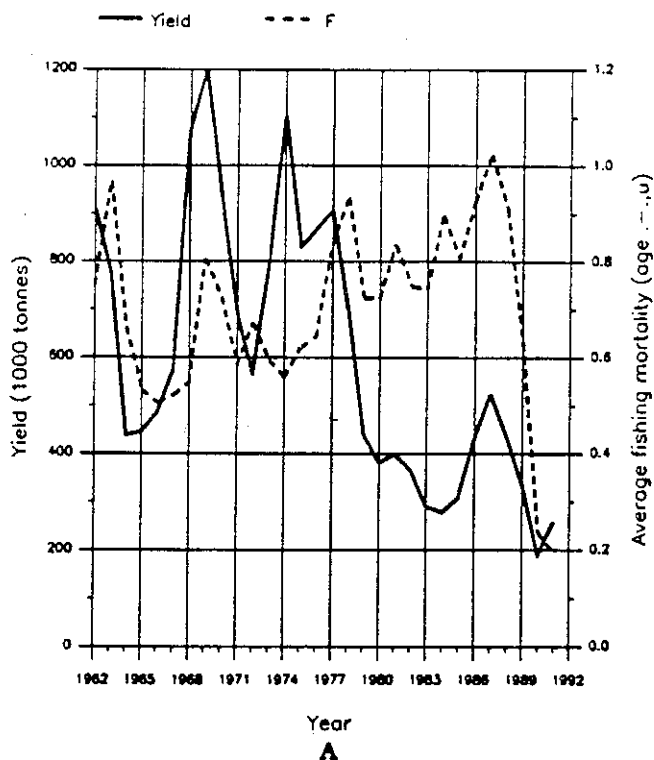
**Table 6.4.3.2** Total catches (tonnes) of BLUE WHITING divided into areas within and beyond national fisheries jurisdiction of NEAFC contracting parties. Percentage in ( ).

Year	International	Svalbard	Jan Mayen	Norway	Iceland	Greenland	Faroes	EEC	Total (t)	Total from off. data (t)	%
1978	136,504 (25.52)	-	-	67,391 (12.60)	26,444 (4.94)	6,580 (1.23)	195,361 (36.53)	102,523 (19.17)	534,803	574,812	3.0
1979	614,734 (56.18)	-	-	75,545 (6.90)	15,117 (1.38)	204 (0.02)	224,201 (20.49)	164,388 (15.02)	1,094,189	1,091,422	100.3
1980	567,693 (55.23)	-	-	152,095 (14.80)	4,562 (0.44)	8,757 (0.85)	164,342 (15.99)	130,417 (12.69)	1,027,866	1,092,620	94.1
1981	168,681 (19.76)	-	123,000 (14.41)	215,004 (25.18)	7,751 (1.09)	-	174,801 (23.50)	164,475 (46.58)	853,712	870,808	98.0
1982	22,993 (4.32)	-	-	130,435 (24.51)	5,797 (1.09)	-	125,072 (23.50)	247,884 (46.58)	532,181	544,919	97.7
1983	15,203 (2.93)	-	-	109,675 (21.15)	7,000 (1.35)	-	91,804 (17.70)	294,981 (56.87)	518,663	539,235	96.2
1984	18,407 (3.19)	-	-	150,603 (26.13)	105 (0.02)	-	124,905 (21.67)	282,418 (48.99)	576,438	586,504	98.3
1985	38,978 (6.07)	-	-	114,785 (17.88)	-	-	196,003 (30.52)	292,345 (45.53)	642,111	644,899	99.6
1986	20,665 (2.74)	-	-	187,768 (24.87)	-	116 (0.02)	171,074 (22.66)	375,257 (49.71)	754,880	757,370	99.7
1987	103,535 (17.76)	-	-	109,201 (18.74)	-	-	135,980 (23.31)	234,249 (40.19)	582,830	631,610	92.3
1988	65,172 (13.2)	-	-	38,449 (7.8)	-	-	157,368 (31.8)	234,344 (47.3)	495,333	522,575	94.8
1989	137,093 (23.0)	-	-	68,817 (11.5)	4,977 (0.8)	-	101,177 (17.0)	284,338 (47.7)	596,402	596,402	100.0
1990	88,509 (16.7)	-	-	39,160 (7.4)	-	-	115,308 (21.8)	285,893 (54.1)	528,803	528,803	100.0
1991	51,950 (14.8)	-	-	72,309 (20.7)	-	-	60,253 (17.2)	165,519 (47.3)	350,031	356,471	98.0

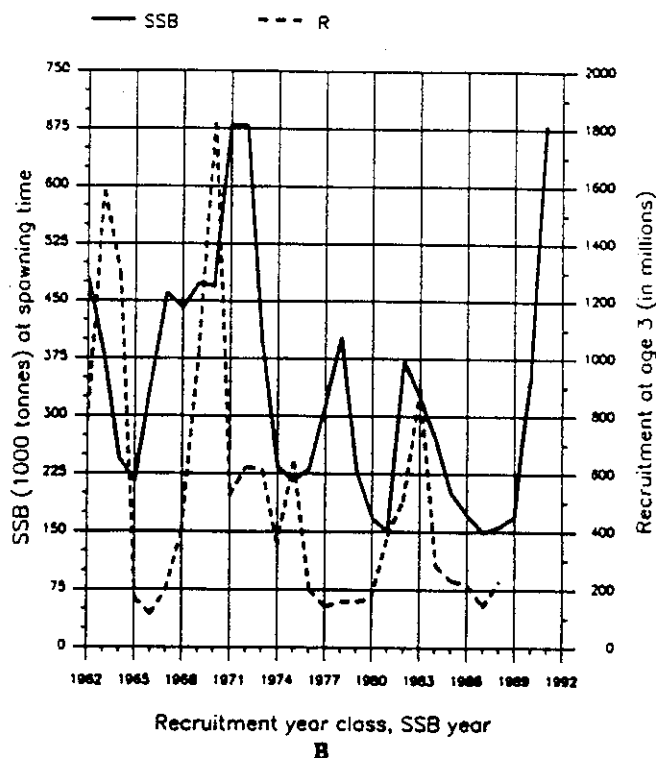
Figure 2.1.2

**FISH STOCK SUMMARY**  
**STOCK: Cod in the North – East Arctic (Fishing Areas I and II)**  
**3 – 9 – 1992**

Trends in yield and fishing mortality (F)

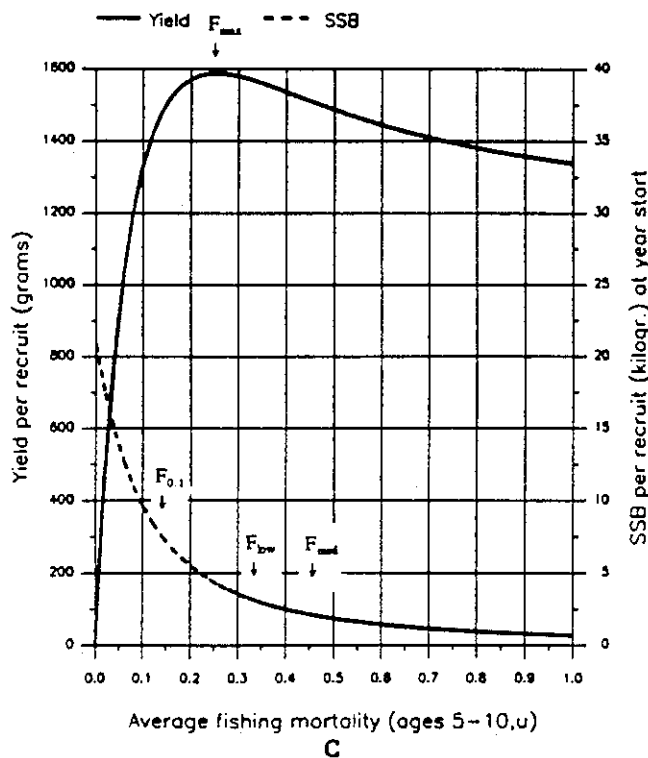


Trends in spawning stock biomass (SSB) and recruitment (R)

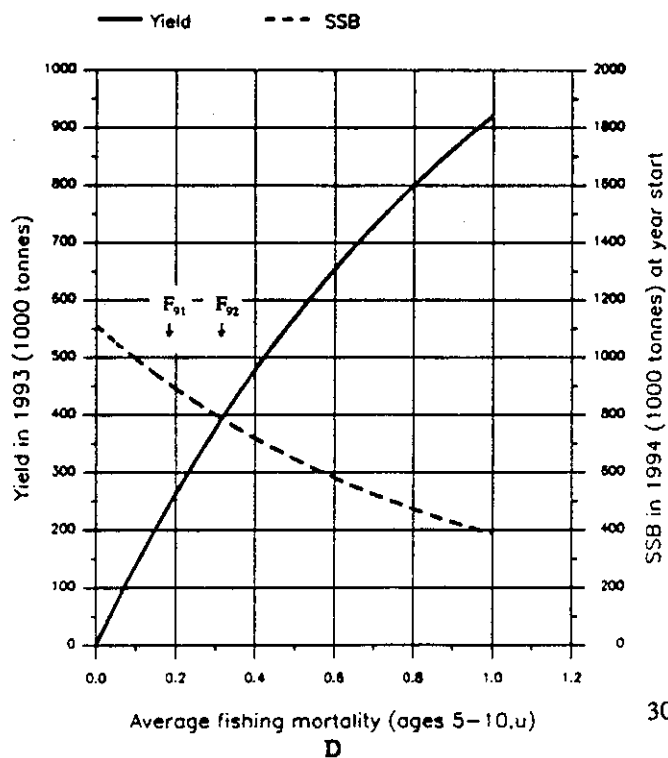


**FISH STOCK SUMMARY**  
**STOCK: Cod in the North – East Arctic (Fishing Areas I and II)**  
**10 – 9 – 1992**

Long term yield and spawning stock biomass

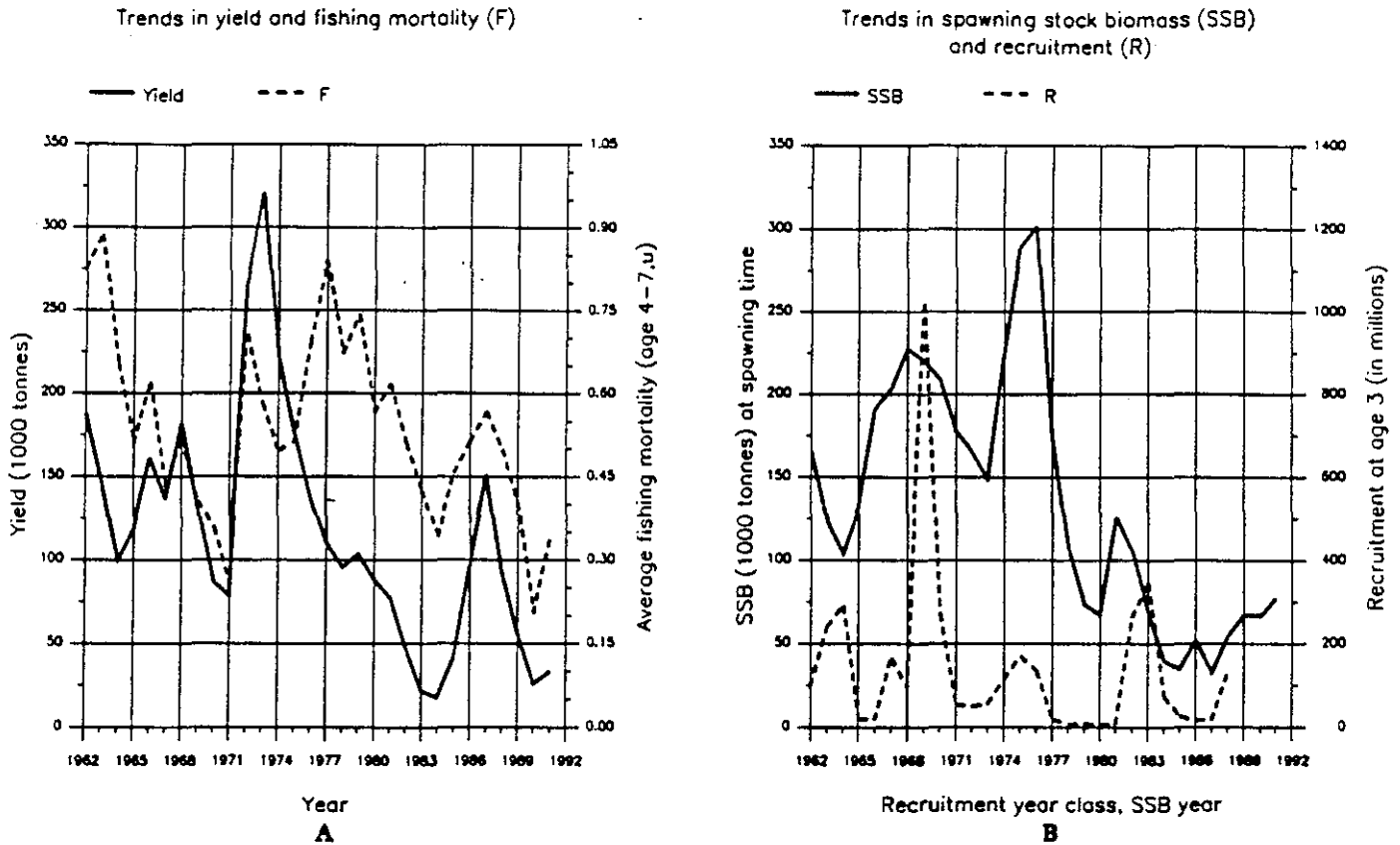


Short-term yield and spawning stock biomass



# FISH STOCK SUMMARY

Figure 2.2 STOCK: Haddock in the North-East Arctic (Fishing Areas I and II)  
31-8-1992



# FISH STOCK SUMMARY

STOCK: Haddock in the North-East Arctic (Fishing Areas I and II)  
3-9-1992

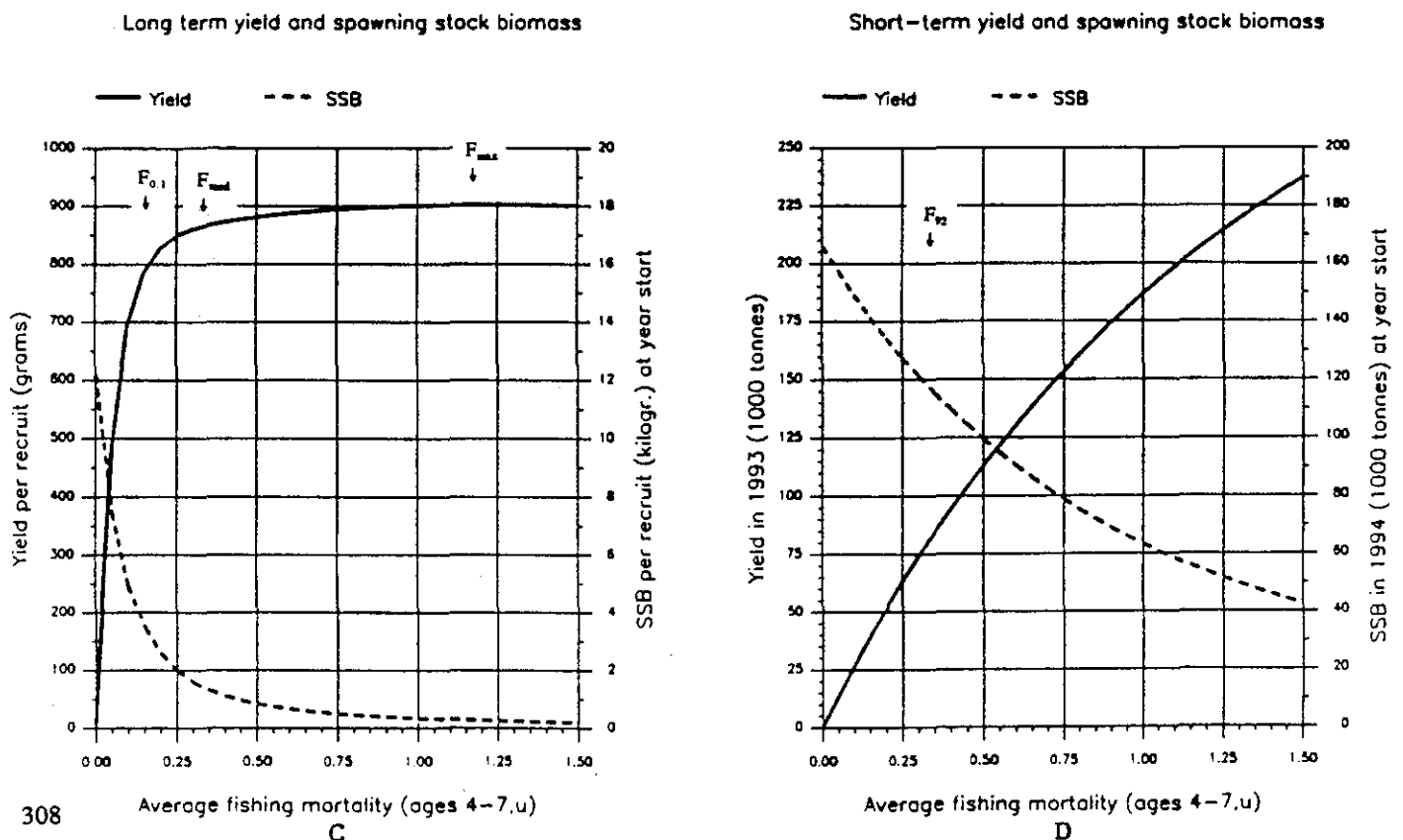
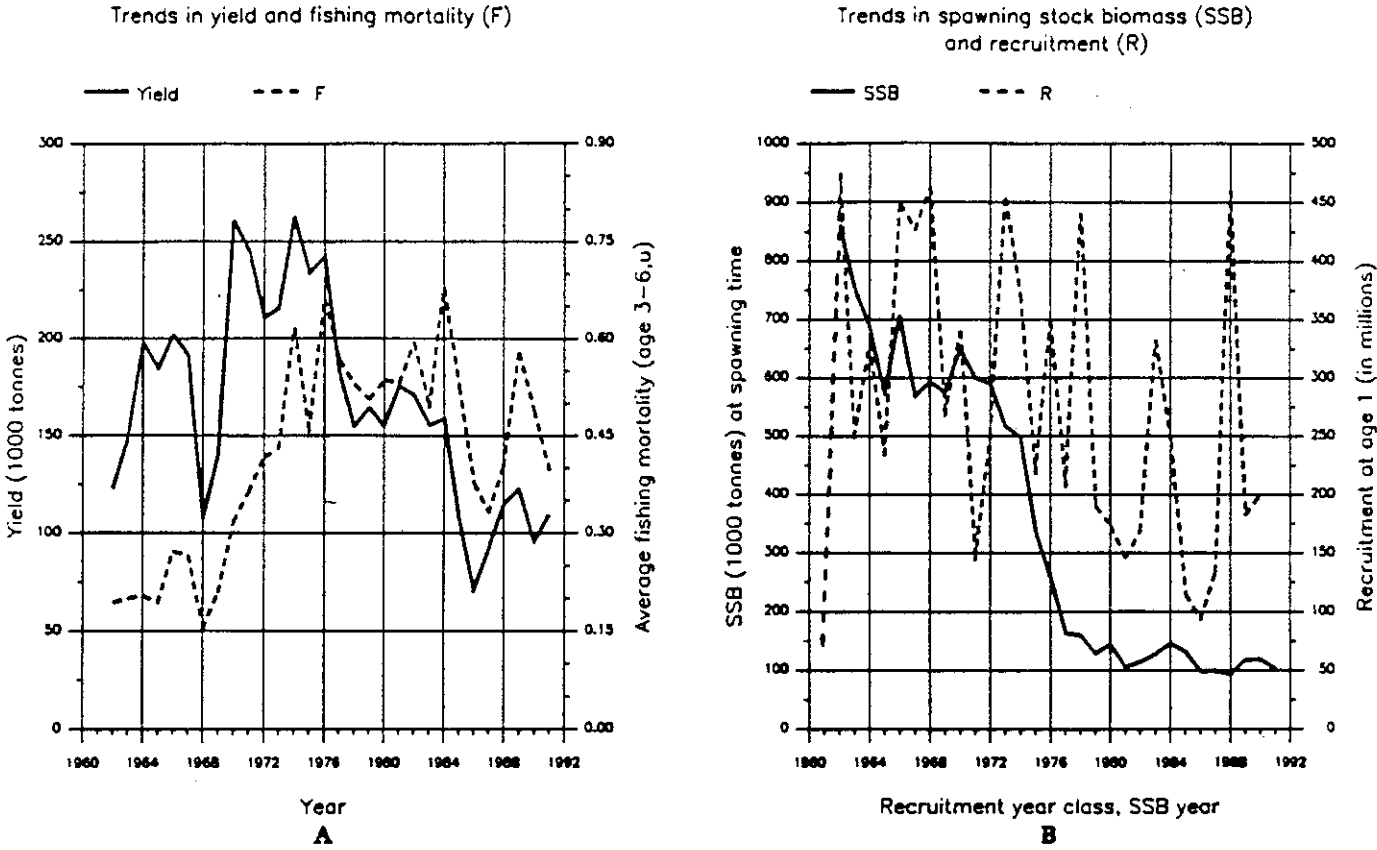




Figure 2.3

FISH STOCK SUMMARY  
STOCK: Saithe in the North-East Arctic (Fishing Areas I and II)  
1-9-1992



FISH STOCK SUMMARY  
STOCK: Saithe in the North-East Arctic (Fishing Areas I and II)  
28-8-1992

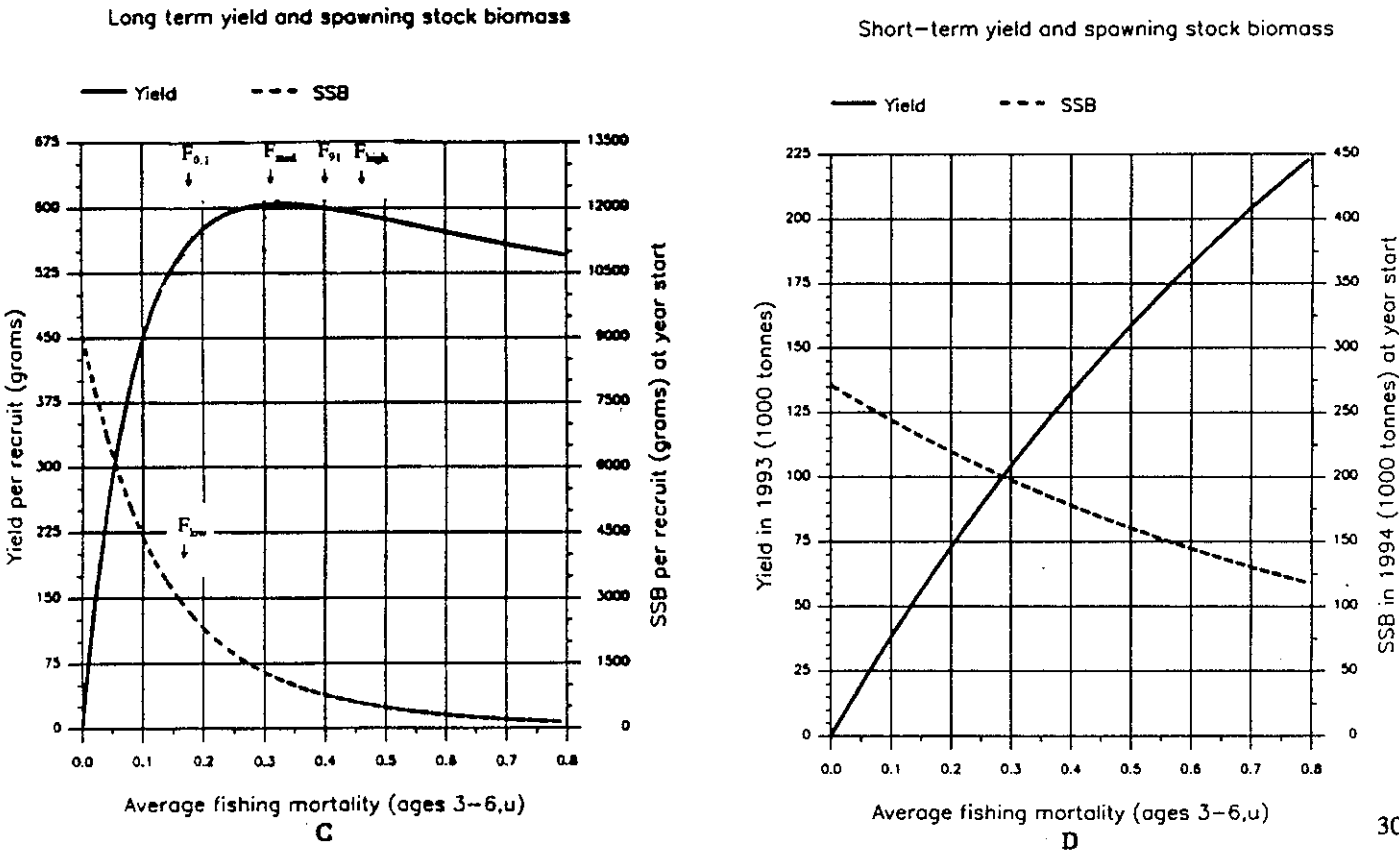
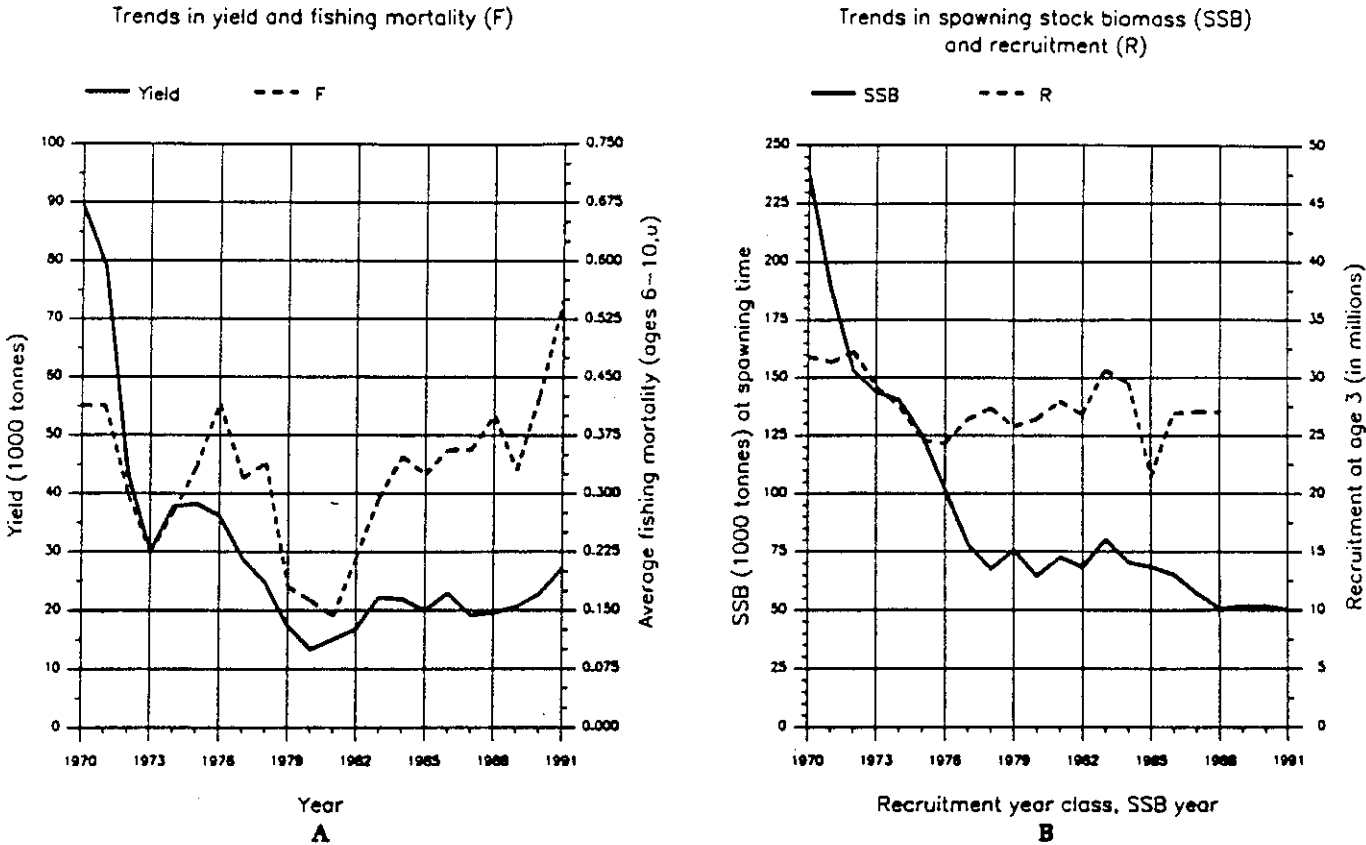


Figure 2.5

FISH STOCK SUMMARY  
STOCK: Greenland Halibut in the North – East Arctic (Fishing Areas I and II)  
1 – 9 – 1992



FISH STOCK SUMMARY  
STOCK: Greenland Halibut in the North – East Arctic (Fishing Areas I and II)  
2 – 9 – 1992

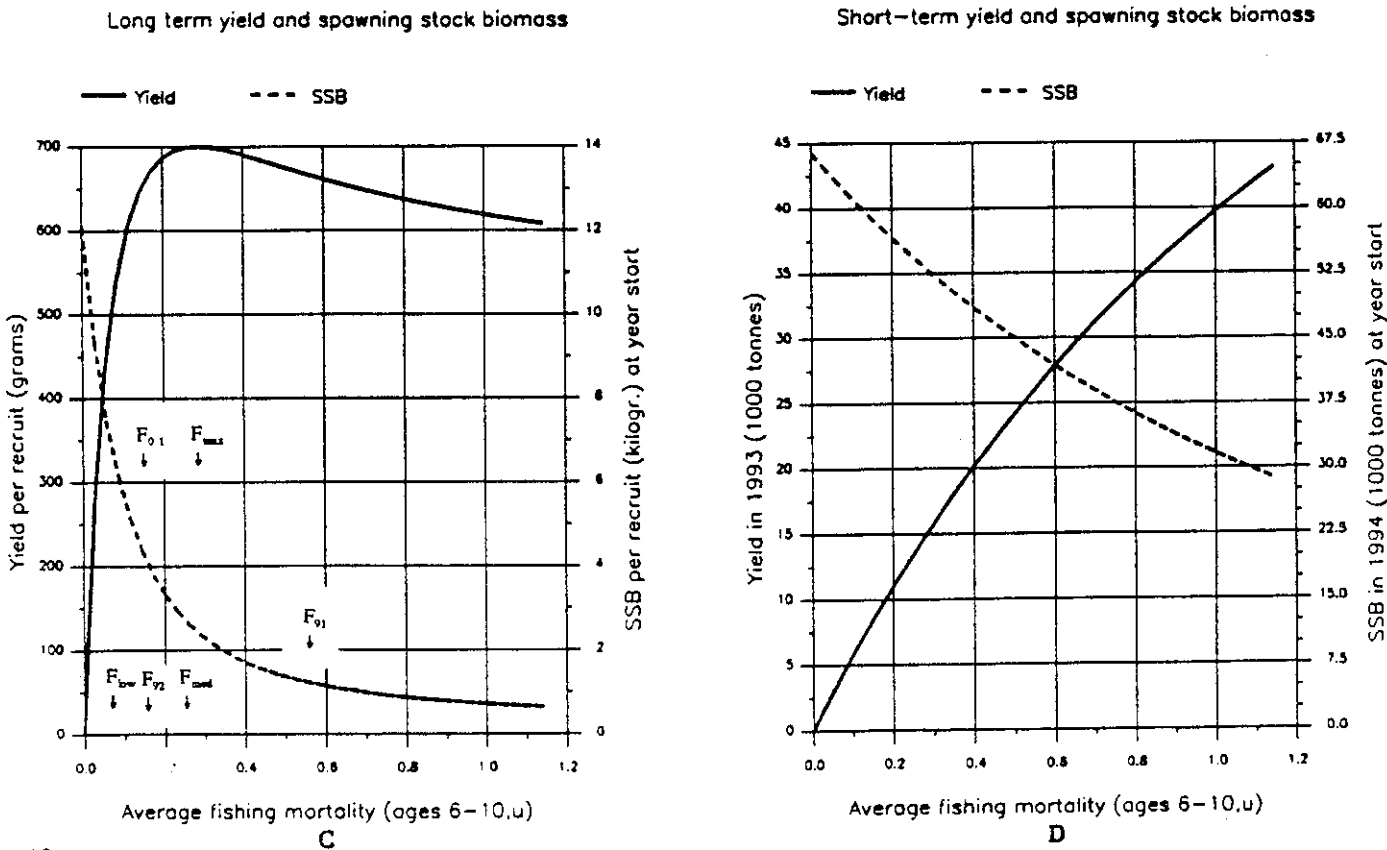
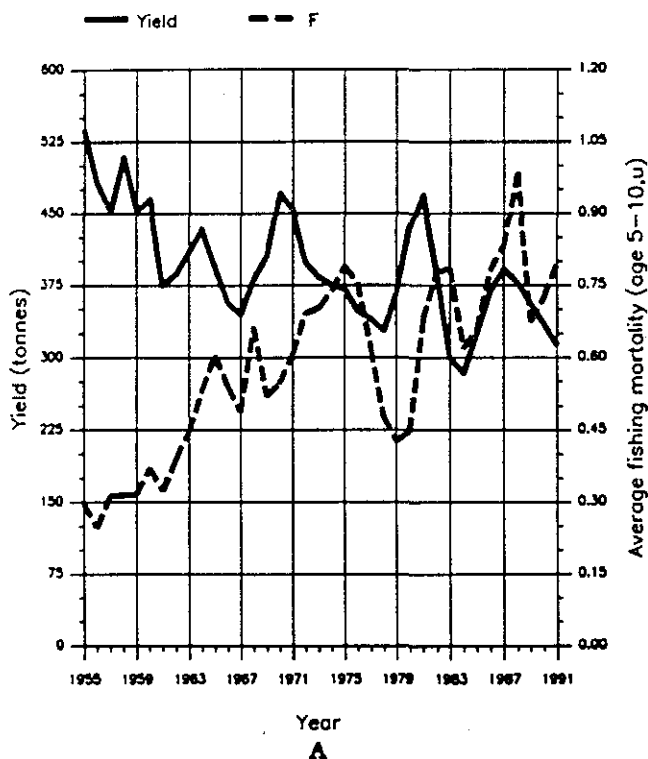


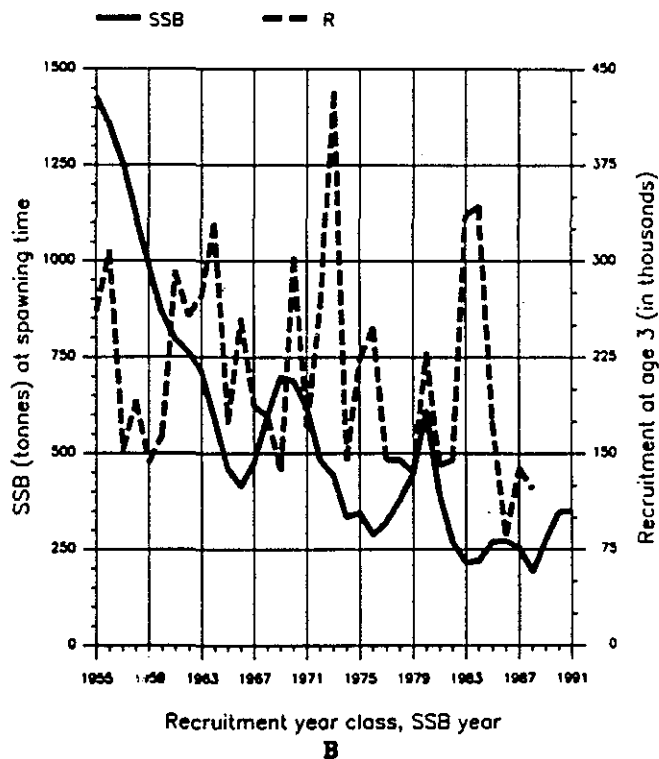
Figure 2.6.2

**FISH STOCK SUMMARY**  
**STOCK: Cod in the Iceland Grounds (Fishing Area Va)**  
**11-5-1992**

Trends in yield and fishing mortality (F)

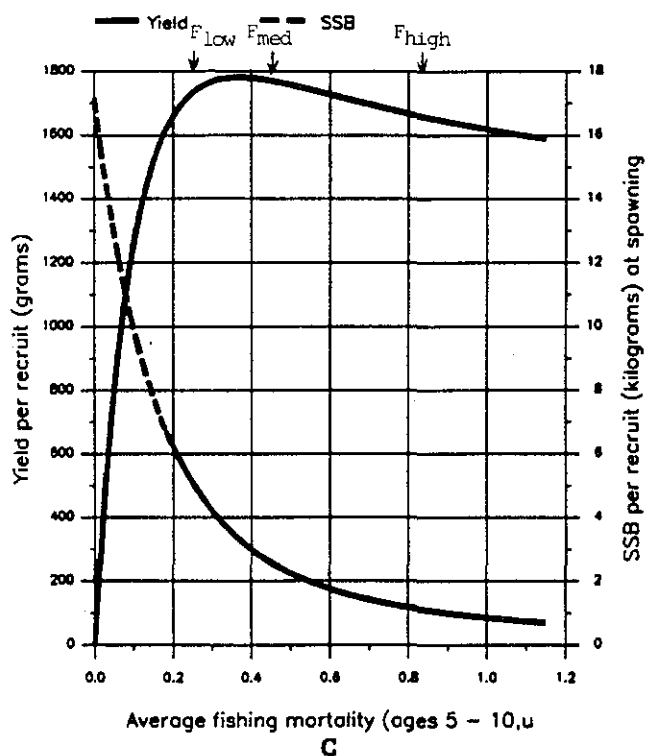


Trends in spawning stock biomass (SSB) and recruitment (R)



**FISH STOCK SUMMARY**  
**STOCK: Cod in the Iceland Grounds (Fishing Area Va)**  
**11-5-1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

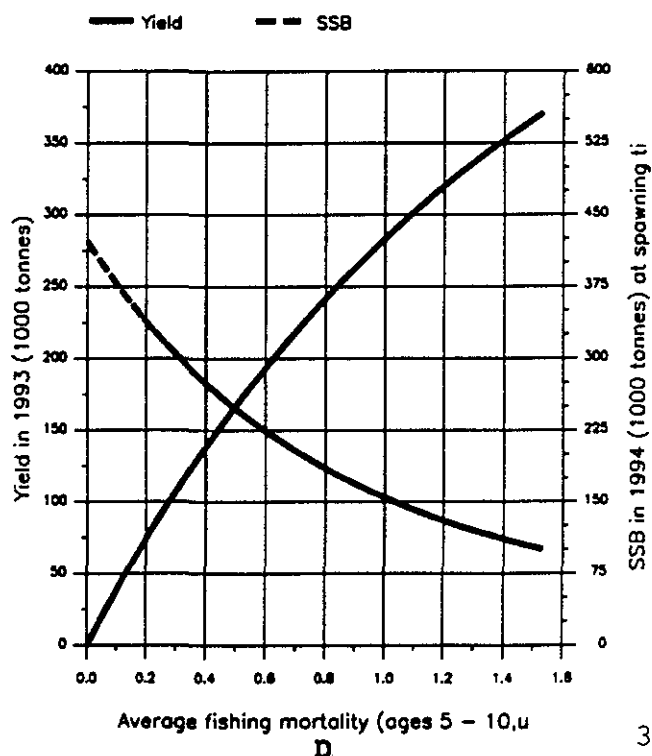
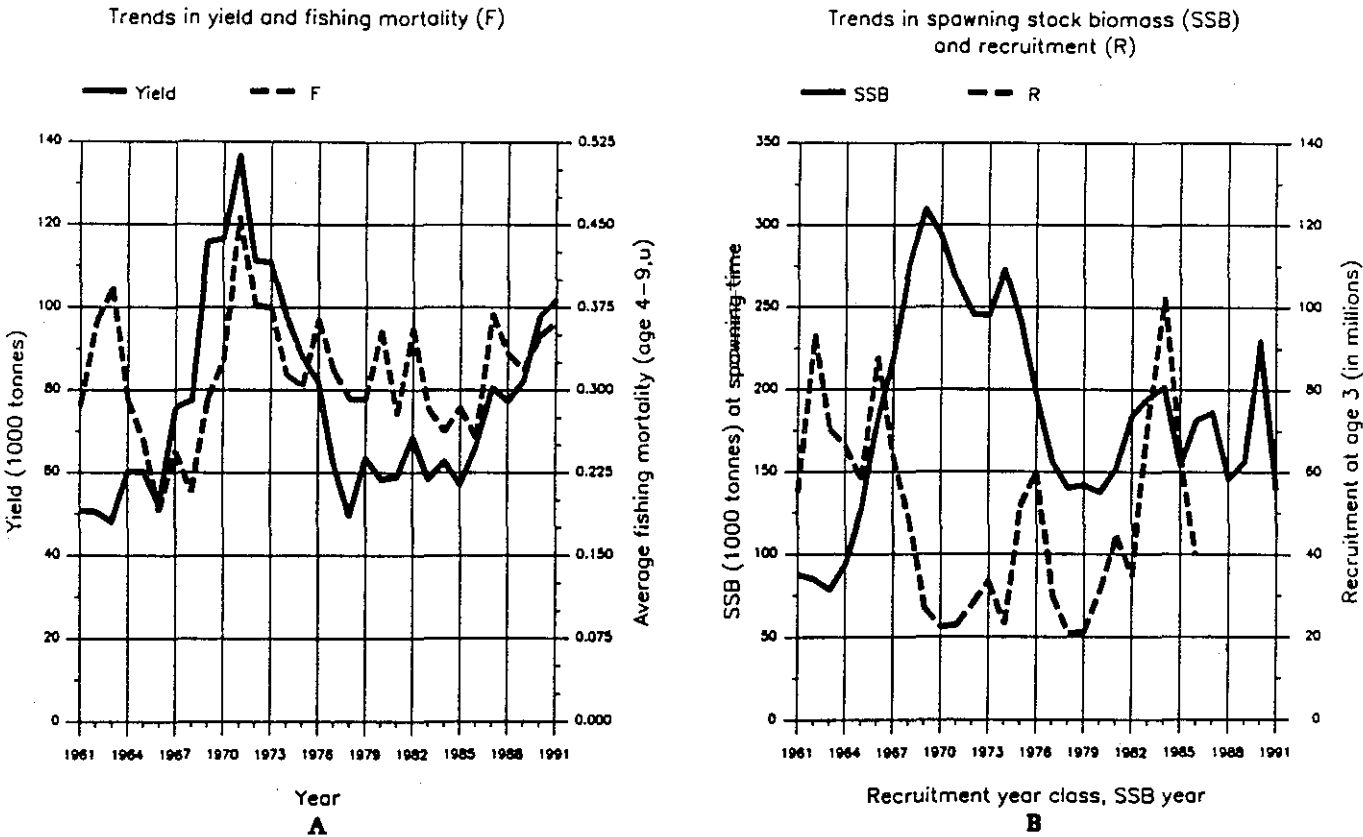


Figure 2.6.3

FISH STOCK SUMMARY  
STOCK: Saithe in the Iceland Grounds (Fishing Area Va)  
7-5-1992



FISH STOCK SUMMARY  
STOCK: Saithe in the Iceland Grounds (Fishing Area Va)  
7-5-1992

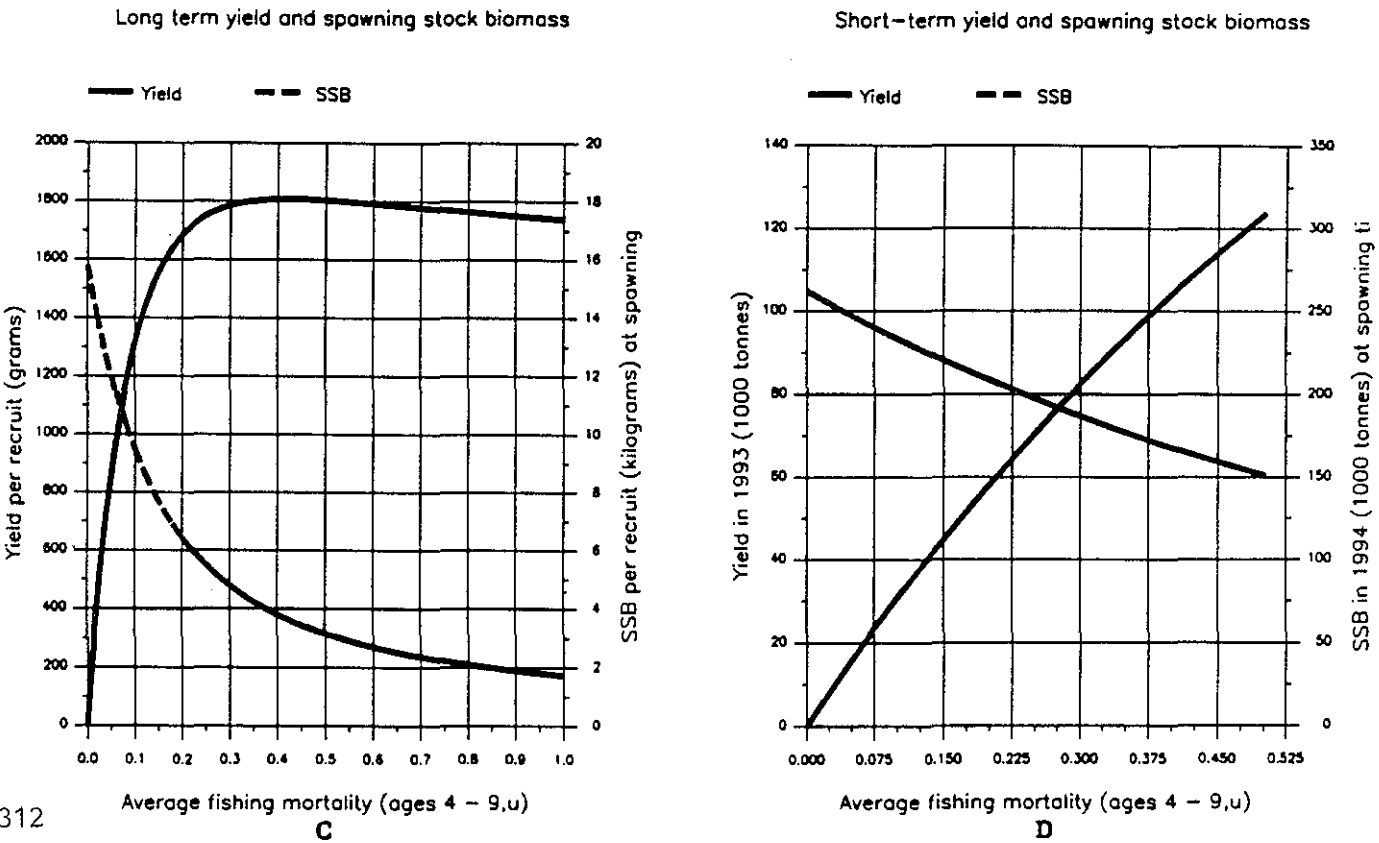
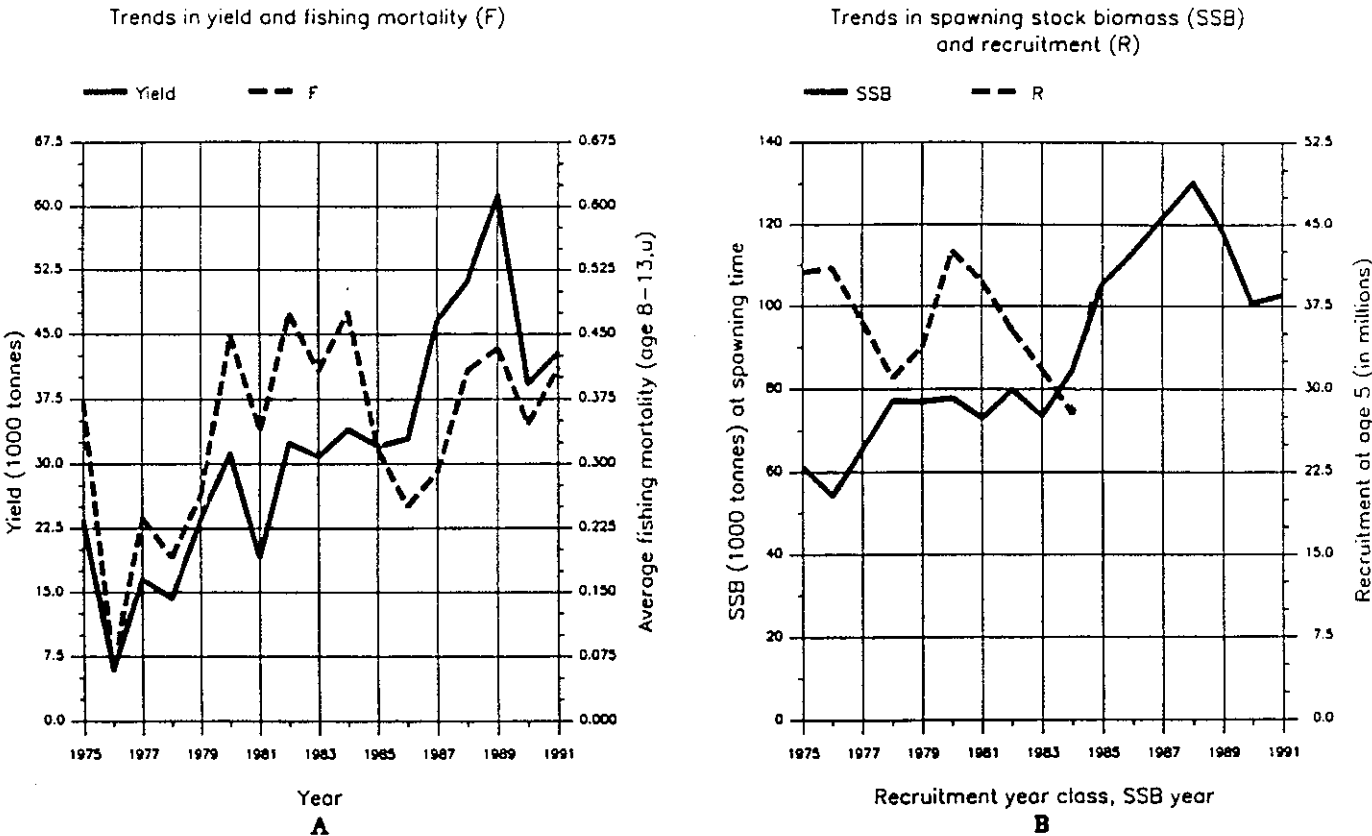
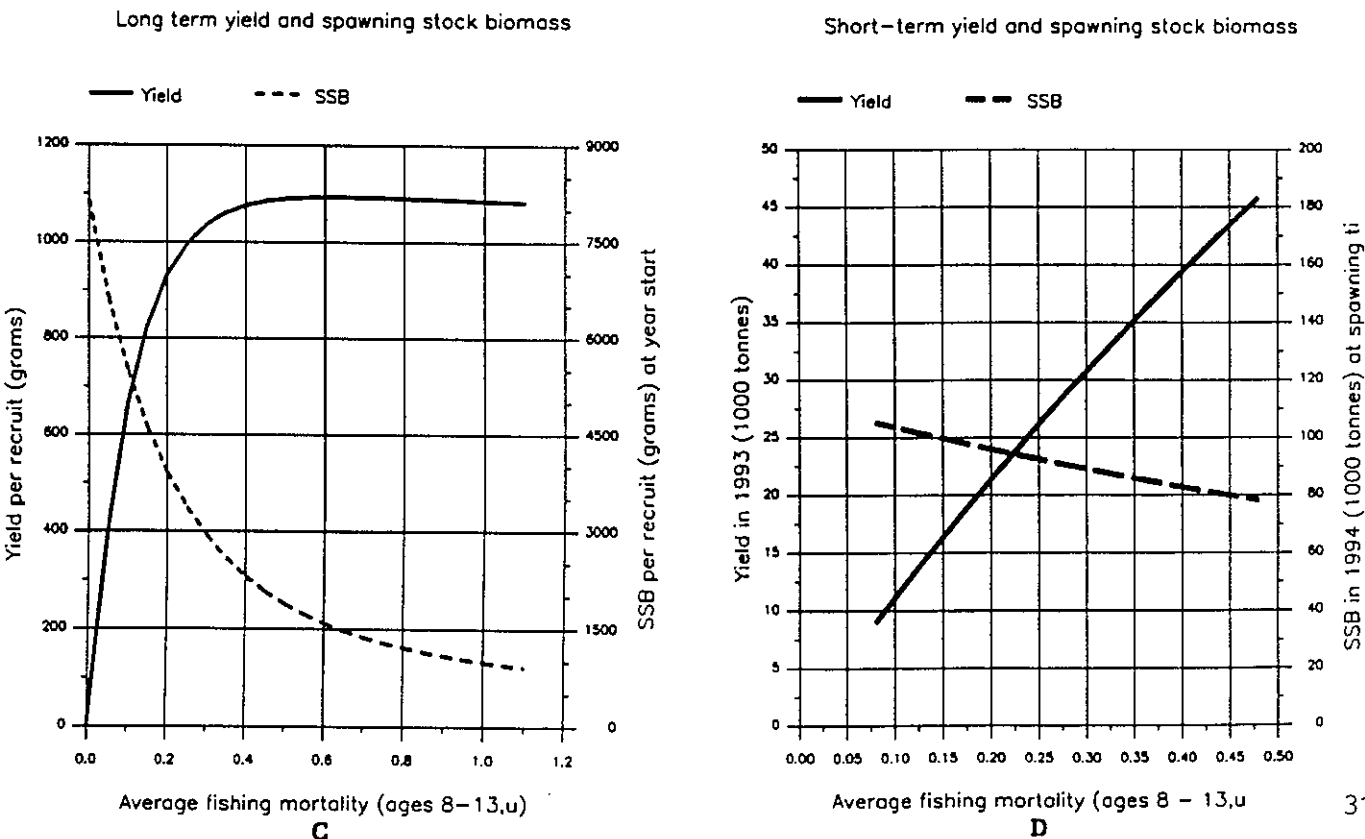


Figure 2.6.4

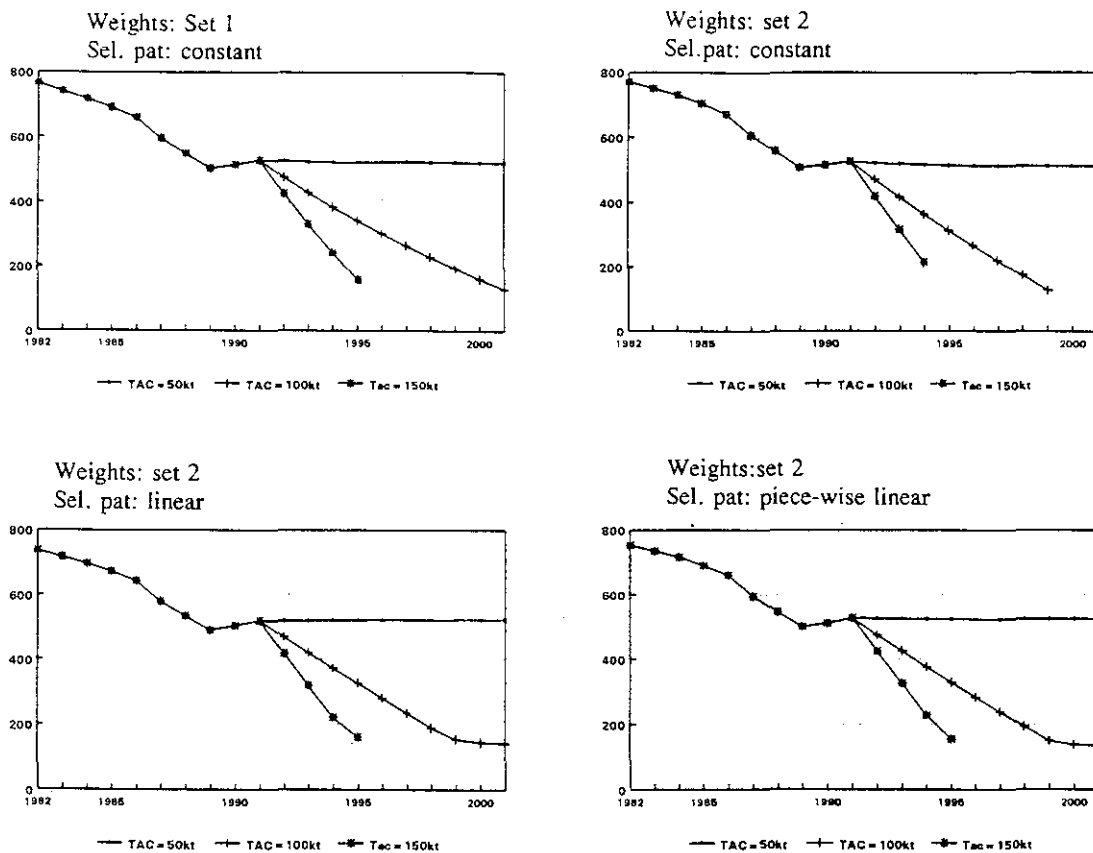
FISH STOCK SUMMARY  
STOCK: Greenland halibut in the Iceland and Faroes Grounds and East Greenland  
11-5-1992



FISH STOCK SUMMARY  
STOCK: Greenland halibut in the Iceland and Faroes Grounds and East Greenland  
11-5-1992



**Figure 2.7.2.1** Projections of stock biomass of *S. mentella* "oceanic type" based on a 1991 biomass of 526,000 t, with  $M = 0.1$  and 13 age groups.



**Figure 2.7.2.2** Projection of stock biomass of *S. mentella* "oceanic type" based on a 1991 biomass of 263,000 and 1,052,000 t,  $M = 0.1$ , weight set 2 and piece wise linear selection pattern.

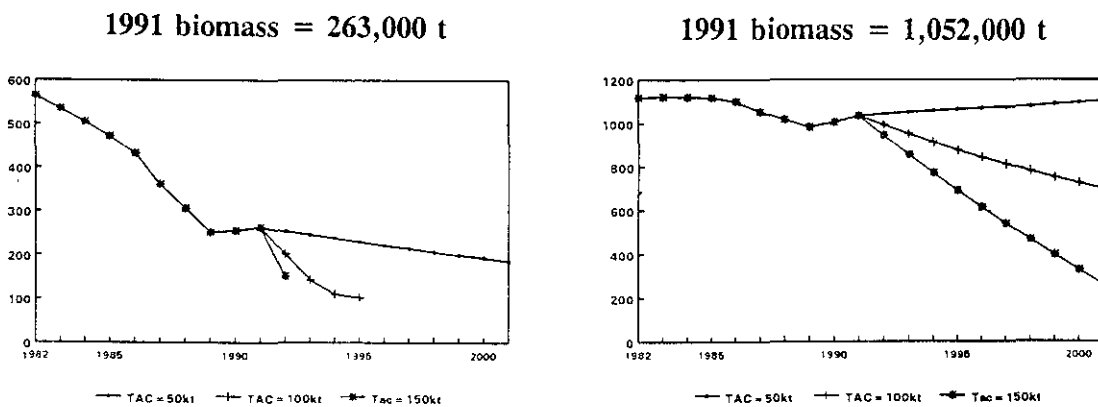
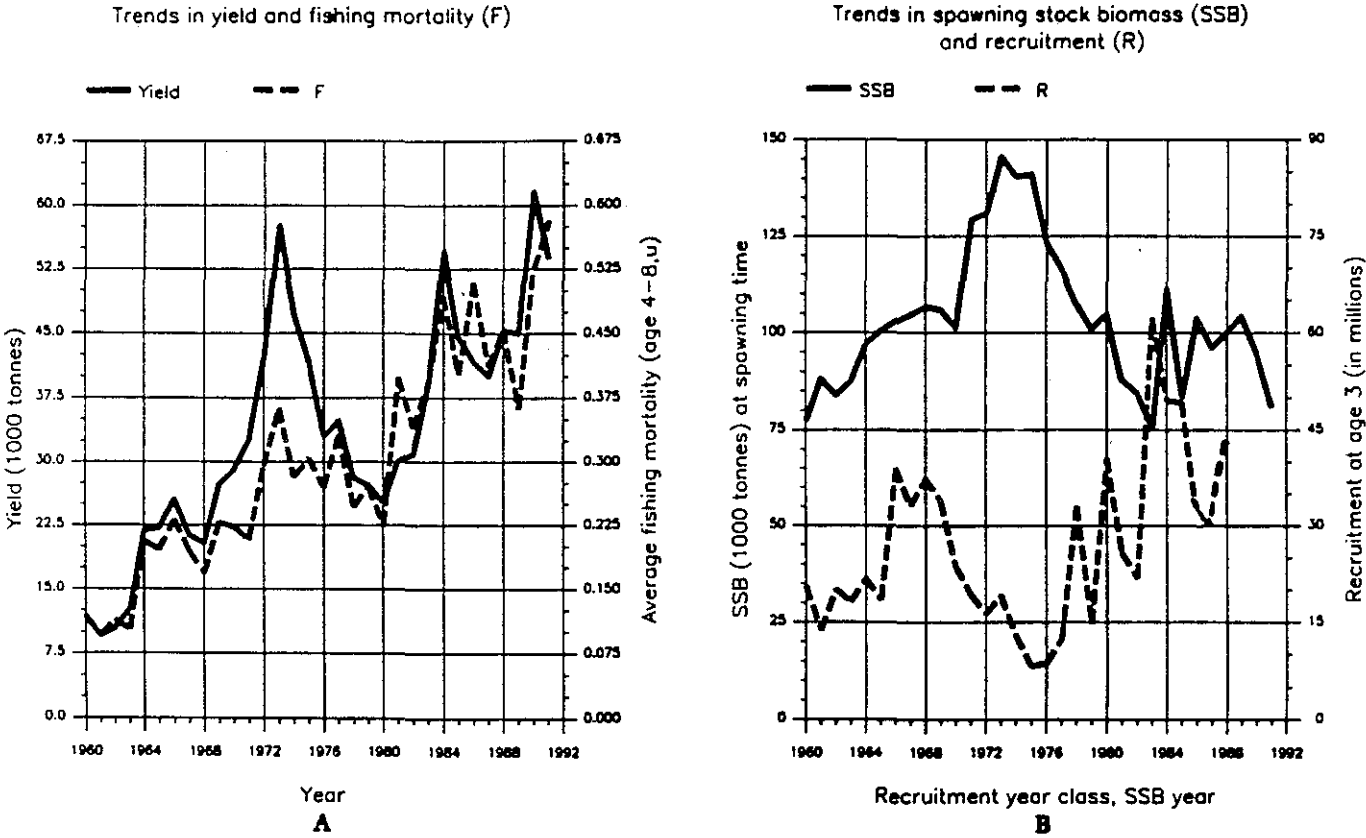


Figure 2.8.1

FISH STOCK SUMMARY  
STOCK: Saithe in the Faroes Grounds (Fishing Area Vb)  
10-5-1992



FISH STOCK SUMMARY  
STOCK: Saithe in the Faroes Grounds (Fishing Area Vb)  
11-5-1992

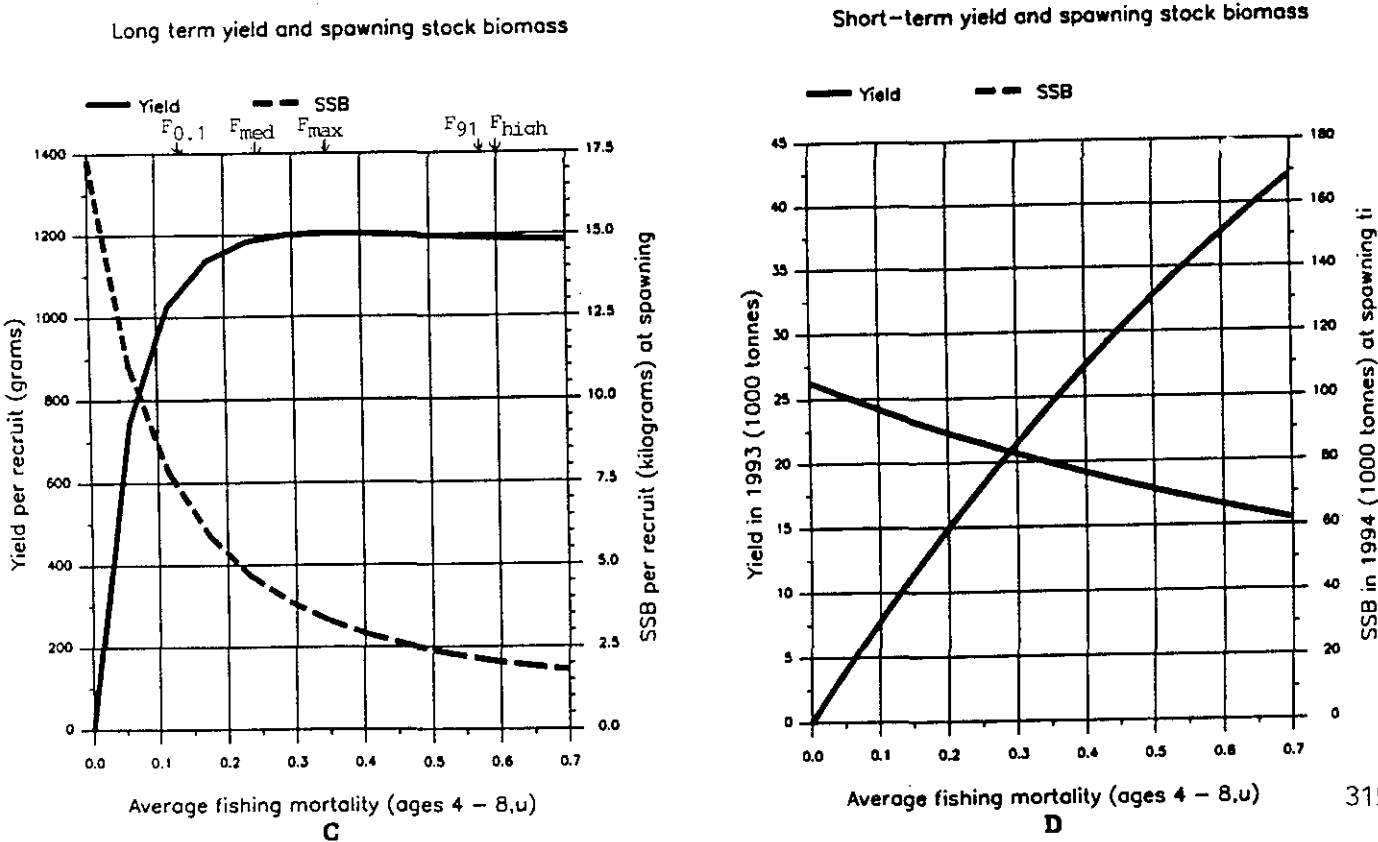
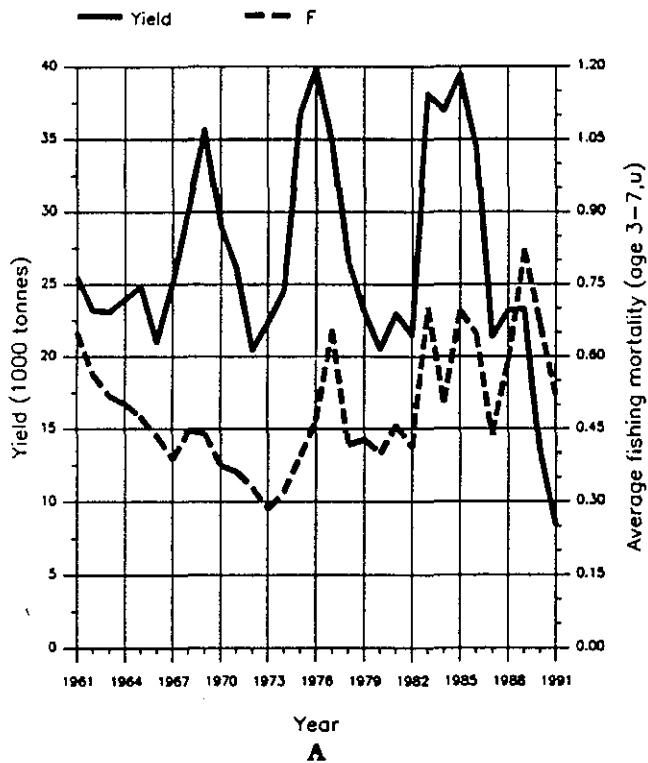


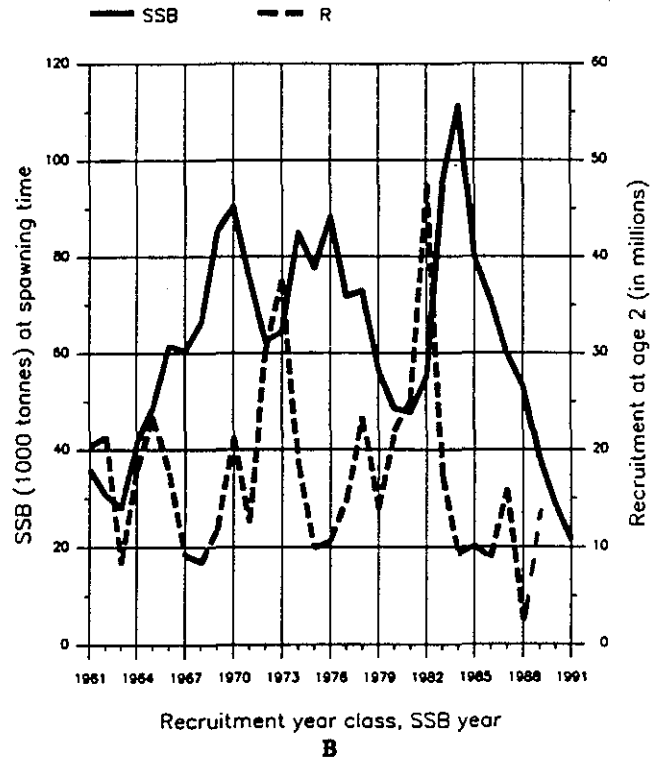
Figure 2.8.2

**FISH STOCK SUMMARY**  
**STOCK: Cod in the Faroe Plateau (Fishing Area Vb1)**  
**10-5-1992**

Trends in yield and fishing mortality (F)

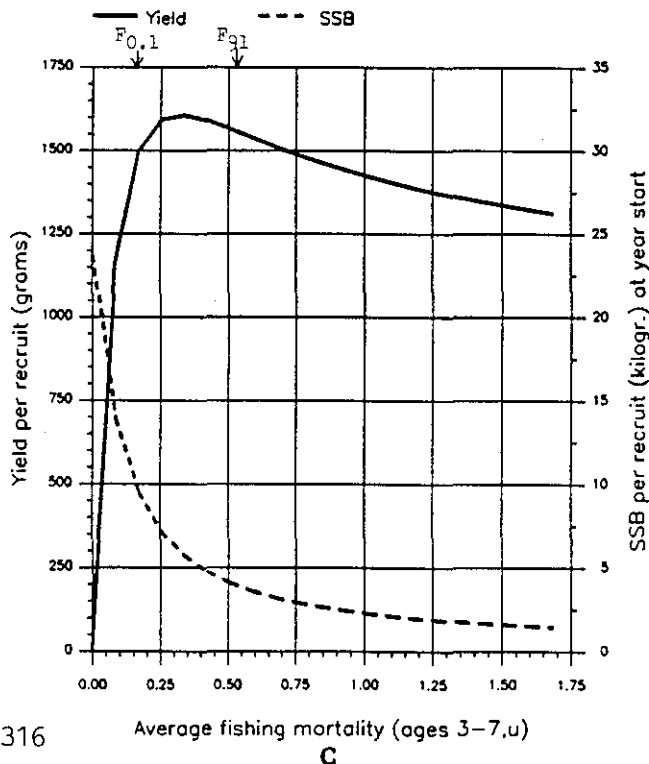


Trends in spawning stock biomass (SSB) and recruitment (R)



**FISH STOCK SUMMARY**  
**STOCK: Cod in the Faroe Plateau (Fishing Area Vb1)**  
**25-5-1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

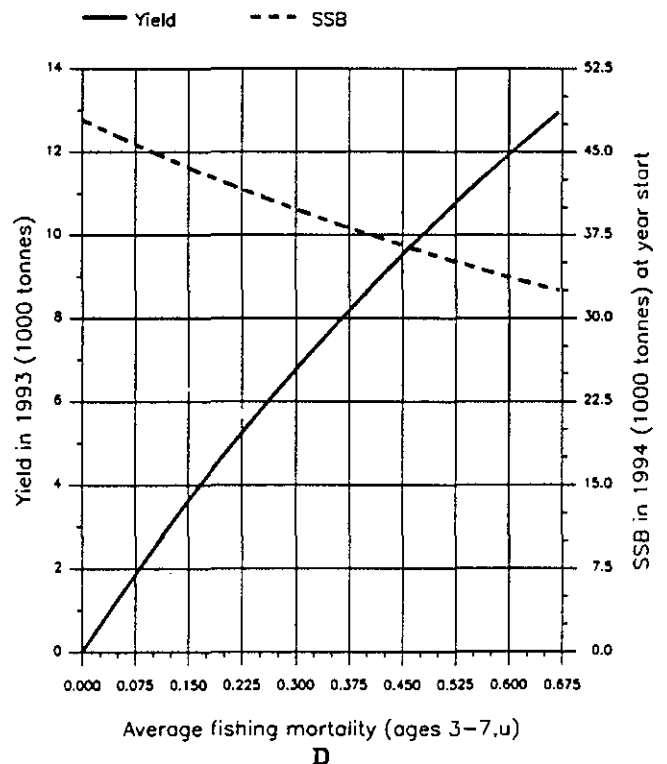
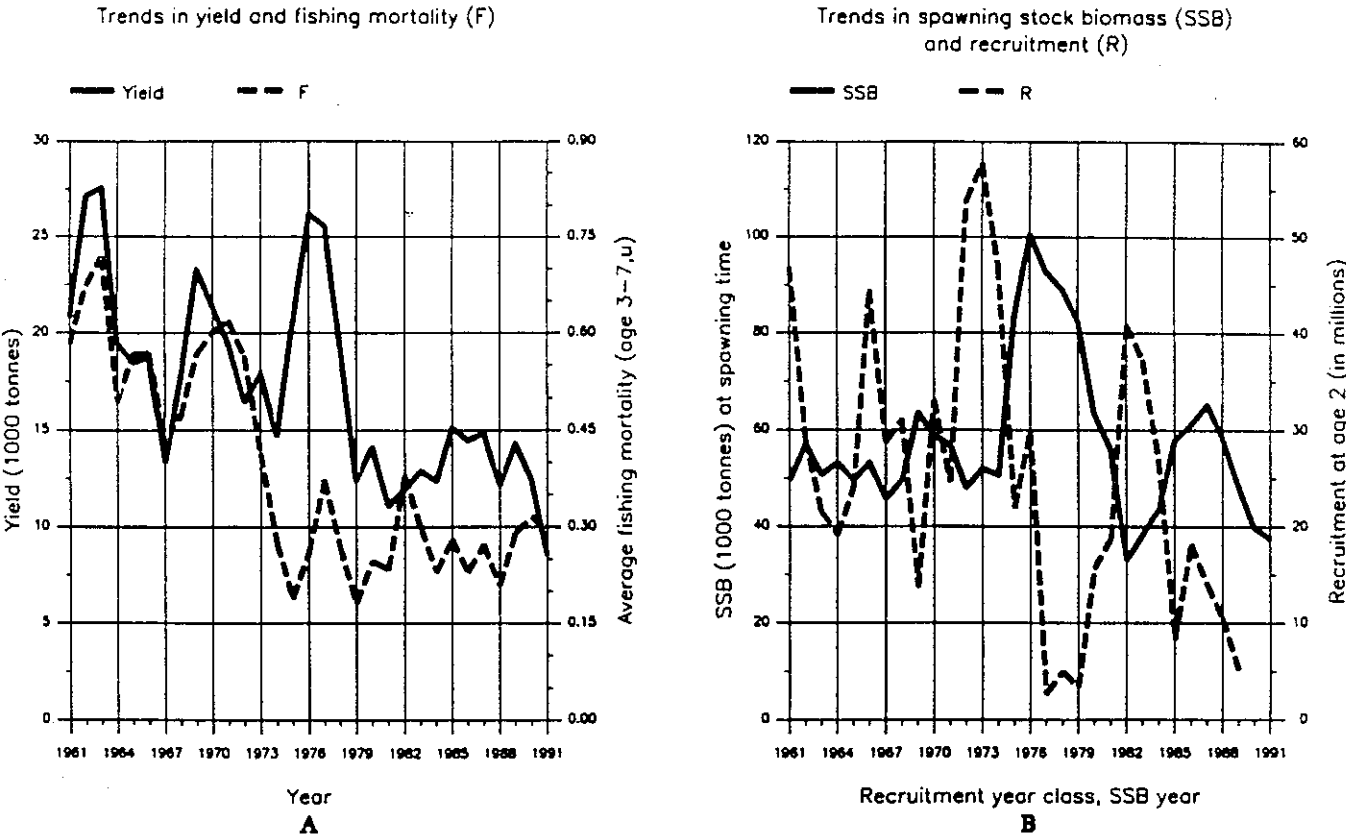




Figure 2.8.4

FISH STOCK SUMMARY  
STOCK: Haddock in the Faroe Grounds (Fishing Area Vb)  
9-5-1992



FISH STOCK SUMMARY  
STOCK: Haddock in the Faroe Grounds (Fishing Area Vb)  
11-5-1992

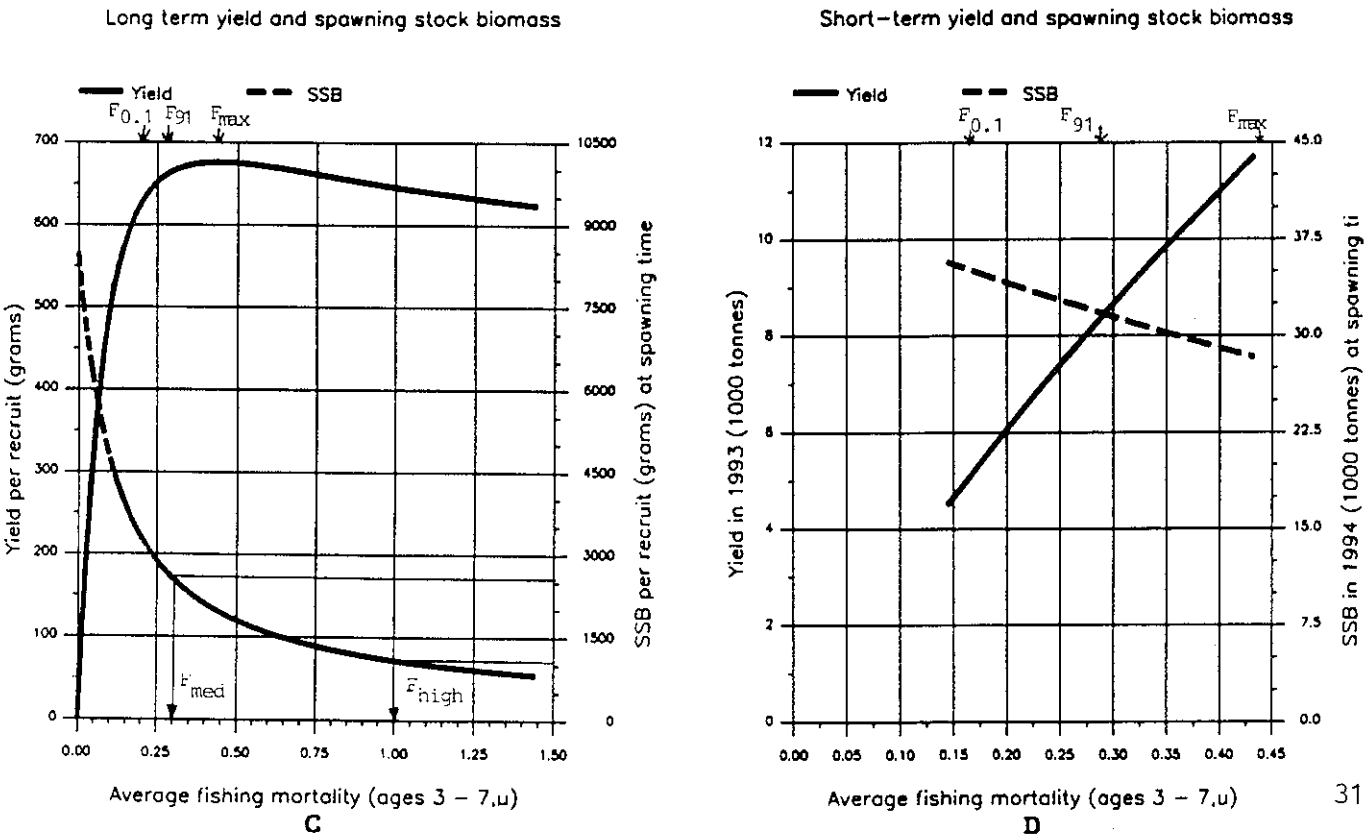


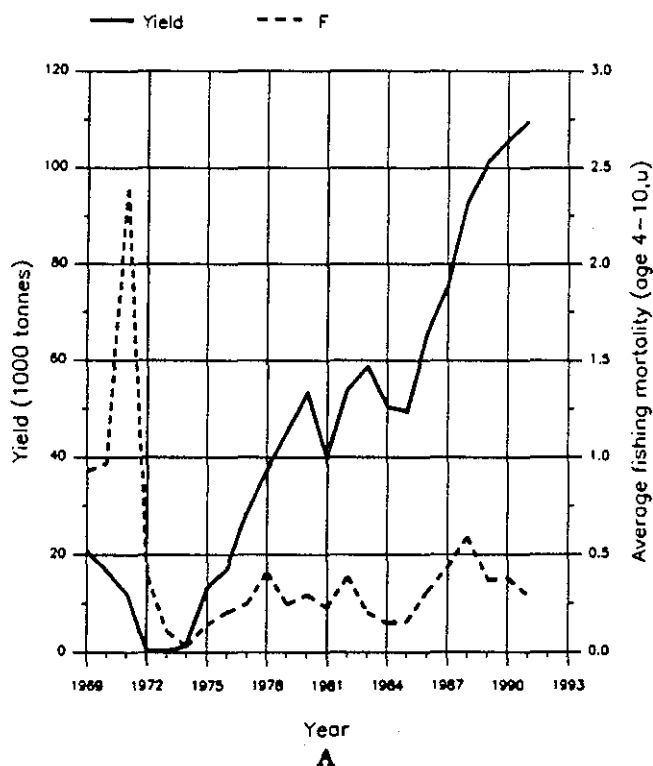
Figure 2.9.1.1

# FISH STOCK SUMMARY

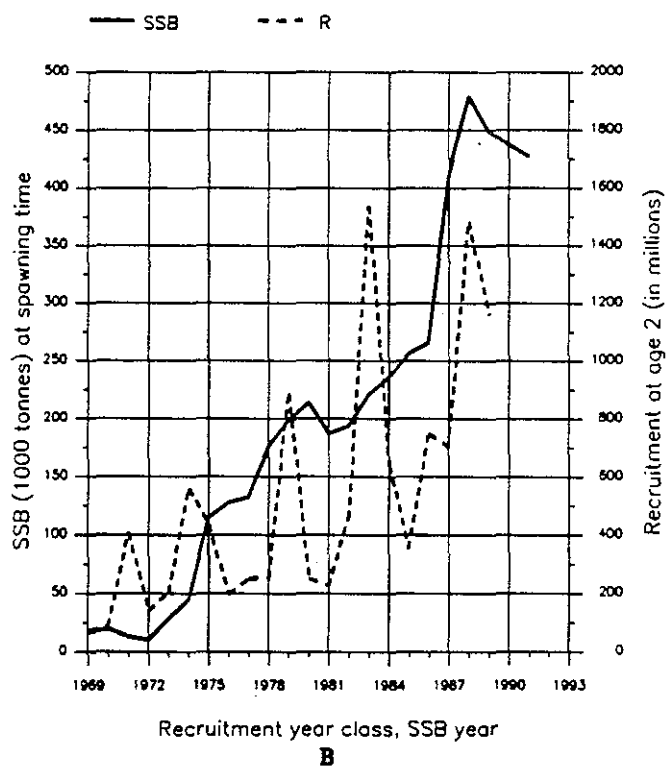
STOCK: Herring, Summer Spawning at Iceland (Fishing Area Va)

21-10-1992

Trends in yield and fishing mortality (F)



Trends in spawning stock biomass (SSB) and recruitment (R)

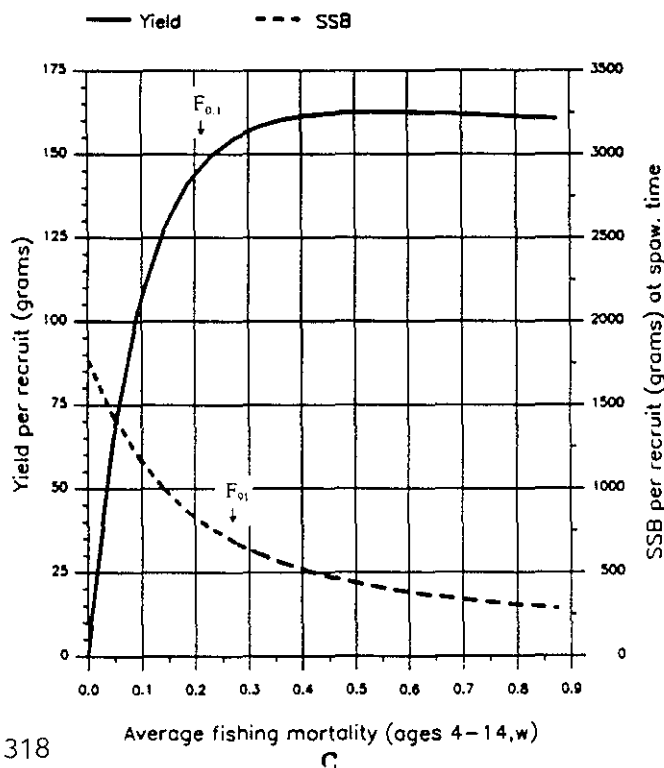


# FISH STOCK SUMMARY

STOCK: Herring, Summer Spawning at Iceland (Fishing Area Va)

21-10-1992

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

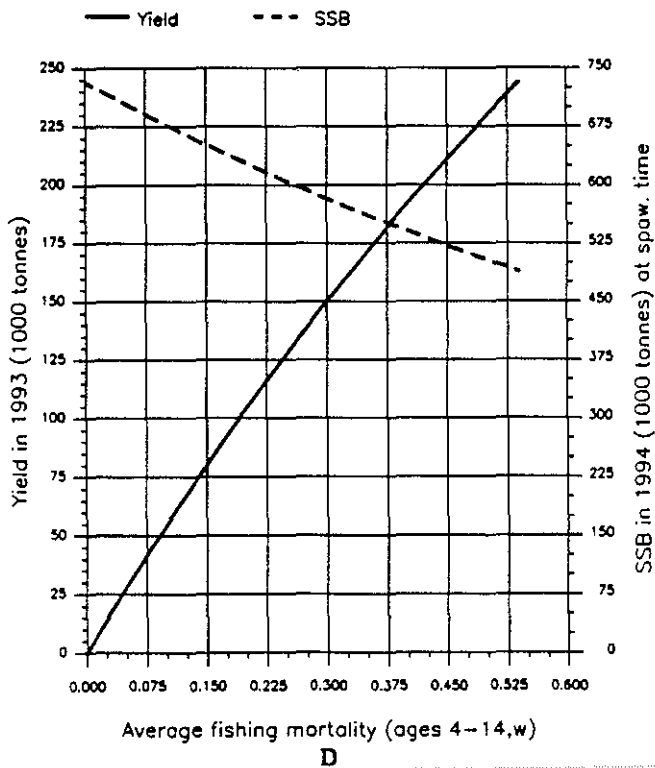


Figure 2.9.1.2

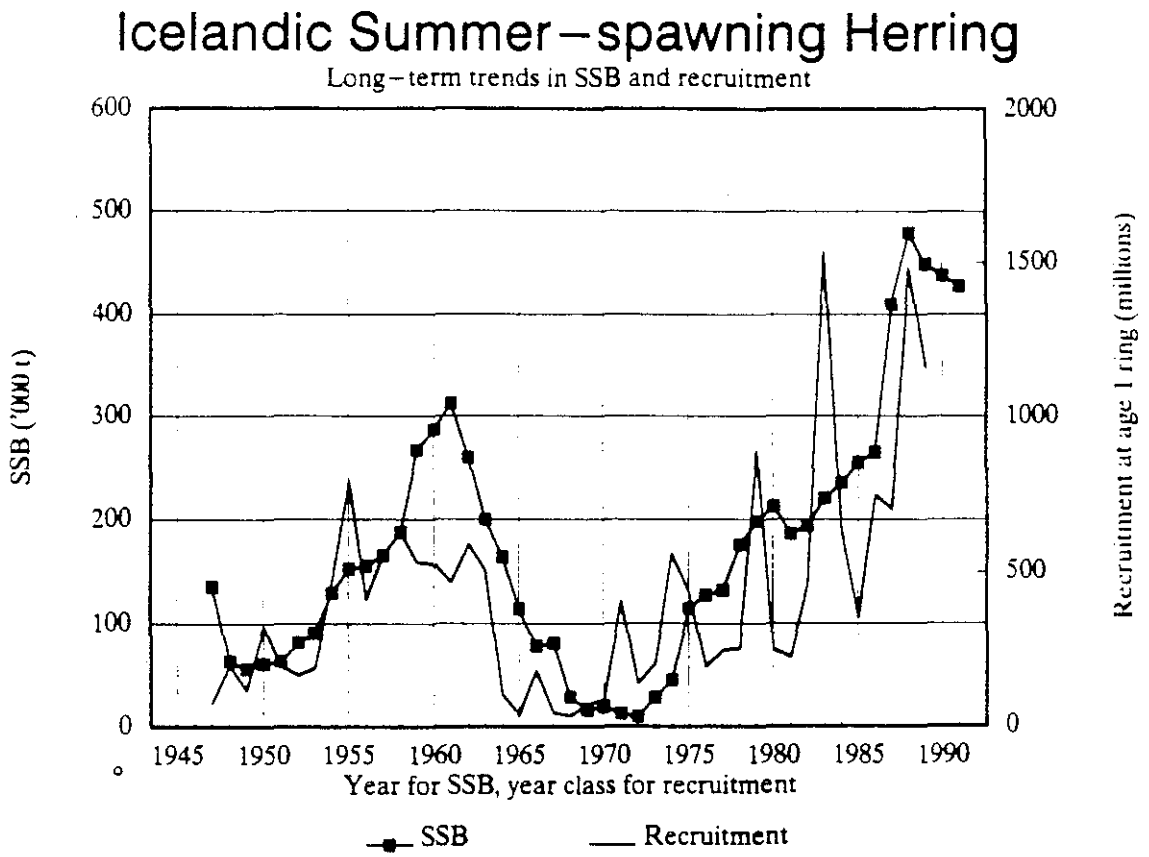
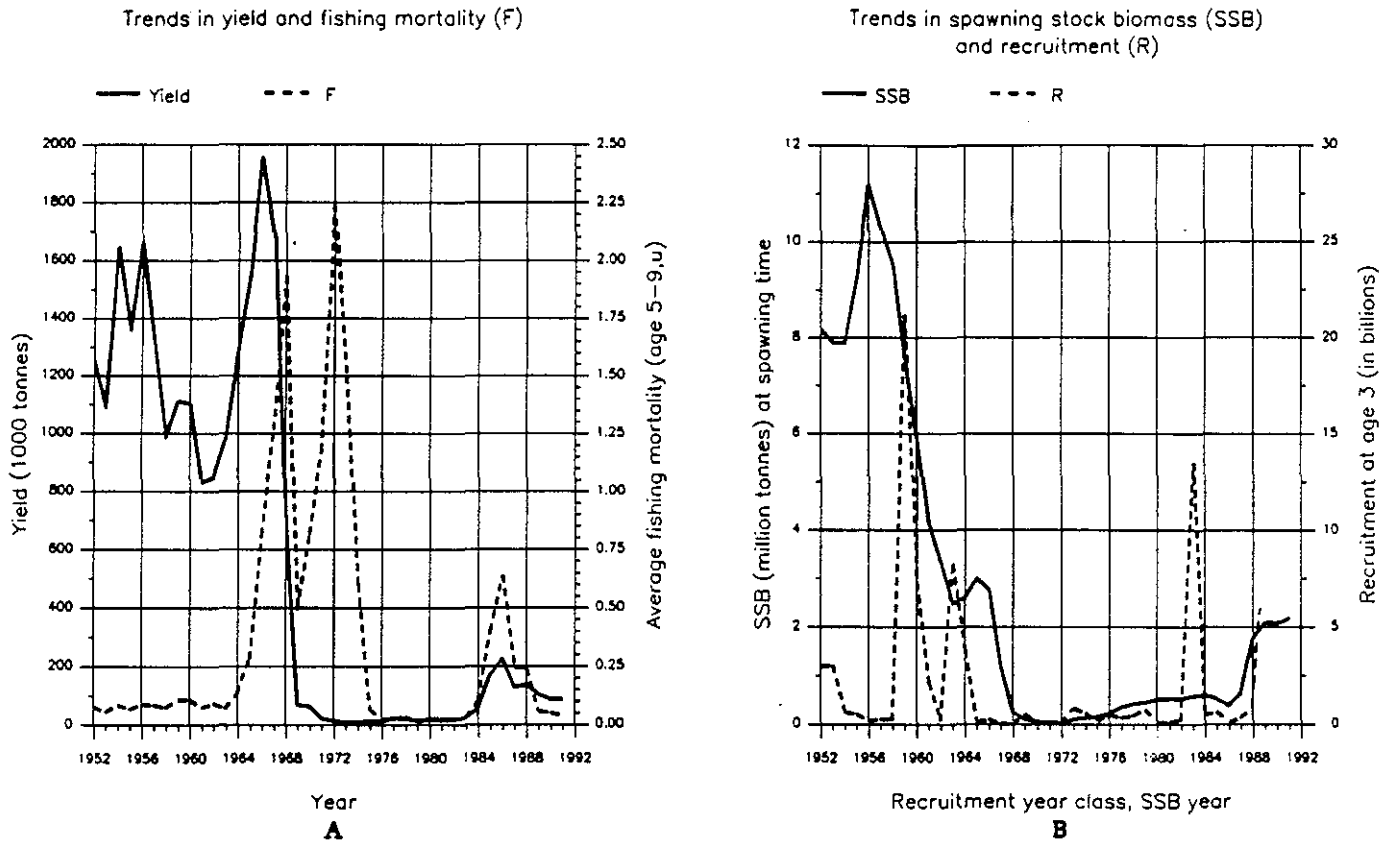
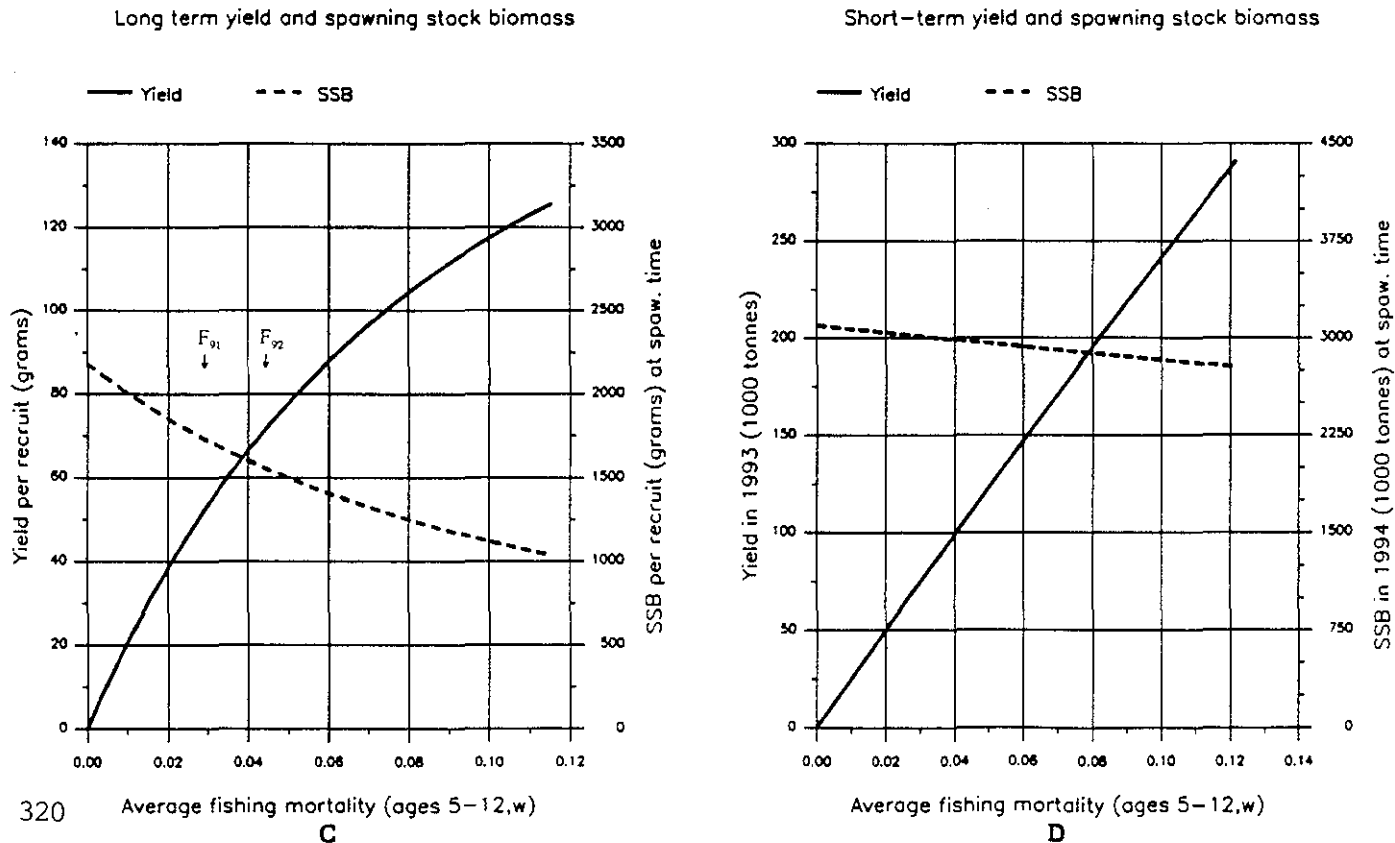


Figure 2.9.2.1

FISH STOCK SUMMARY  
STOCK: Herring, Norwegian Spring Spawners  
22-10-1992



FISH STOCK SUMMARY  
STOCK: Herring, Norwegian Spring Spawners  
3-11-1992



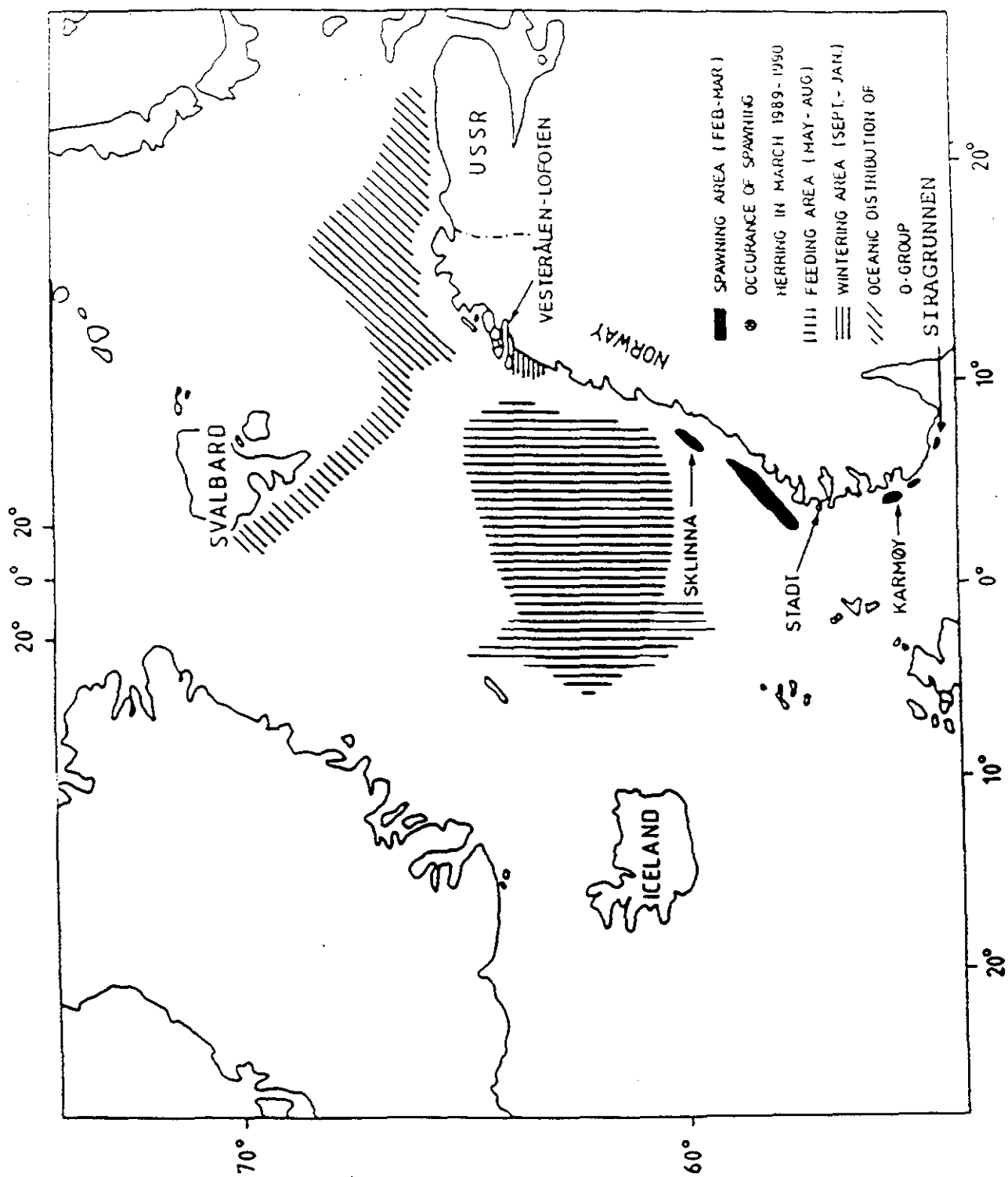


Figure 2.9.2.2 General distribution pattern of Norwegian spring-spawning herring in 1991 and 1992.

**FISH STOCK SUMMARY**  
**STOCK: Herring in the North Sea Area (IIIa, IV and VIId)**  
**20--11--1992**

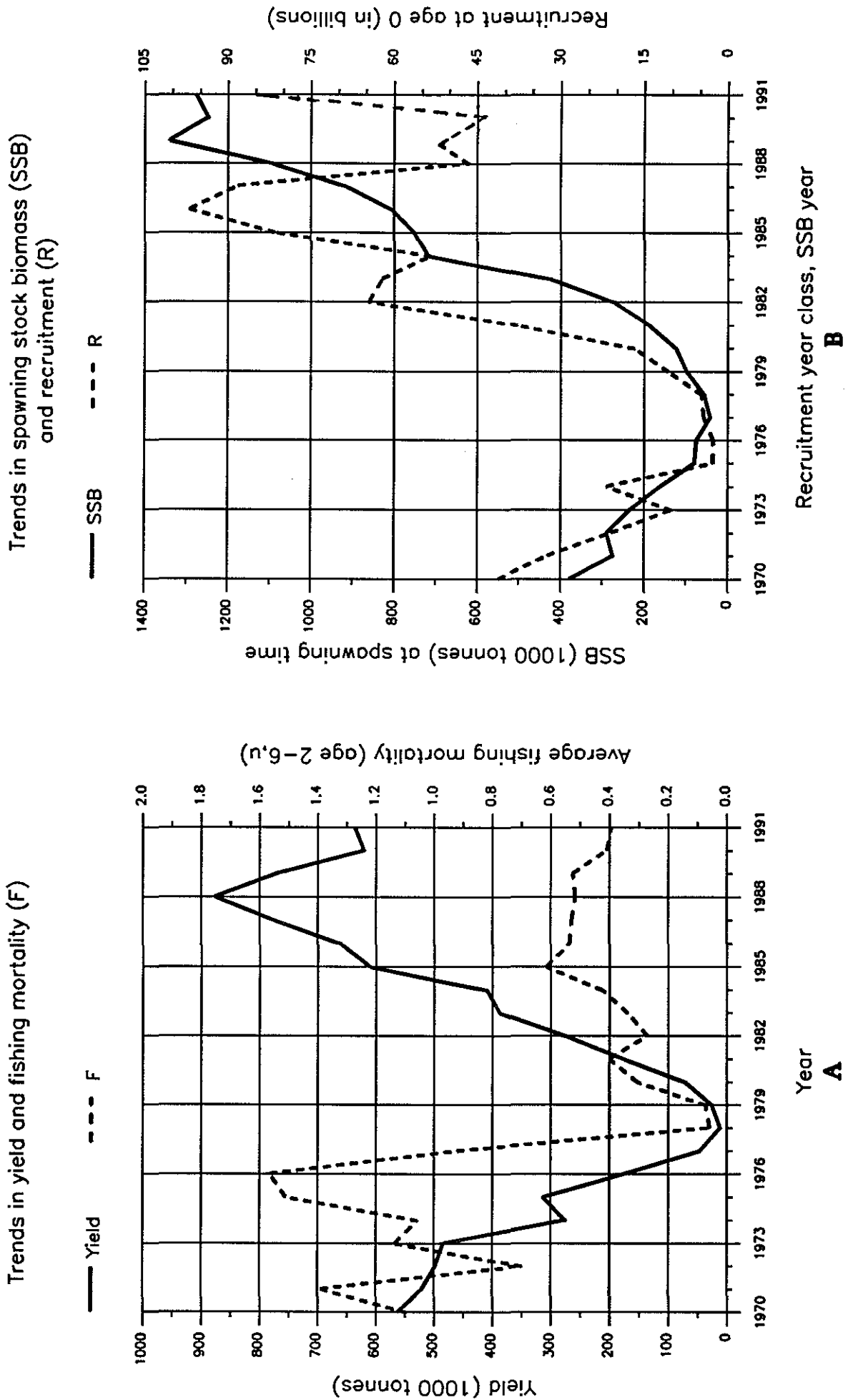
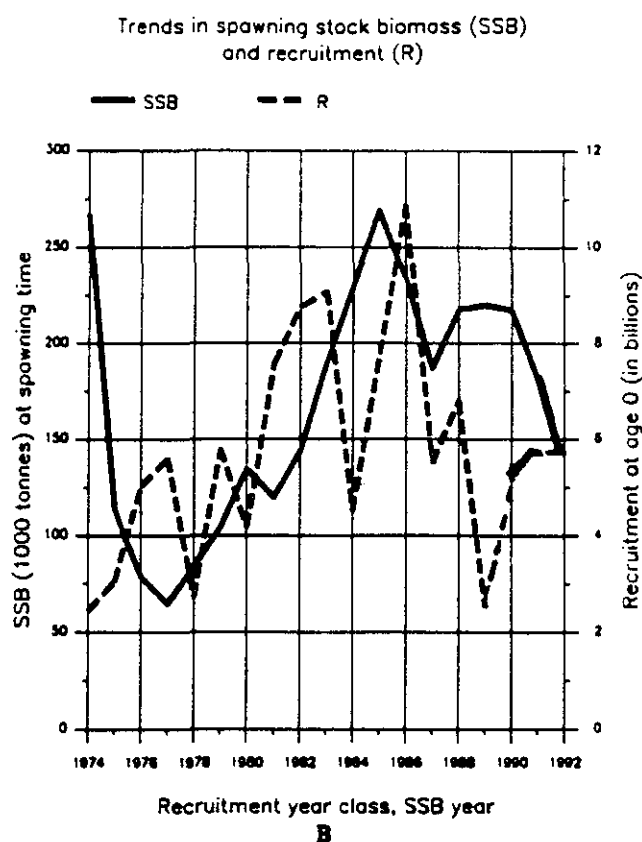
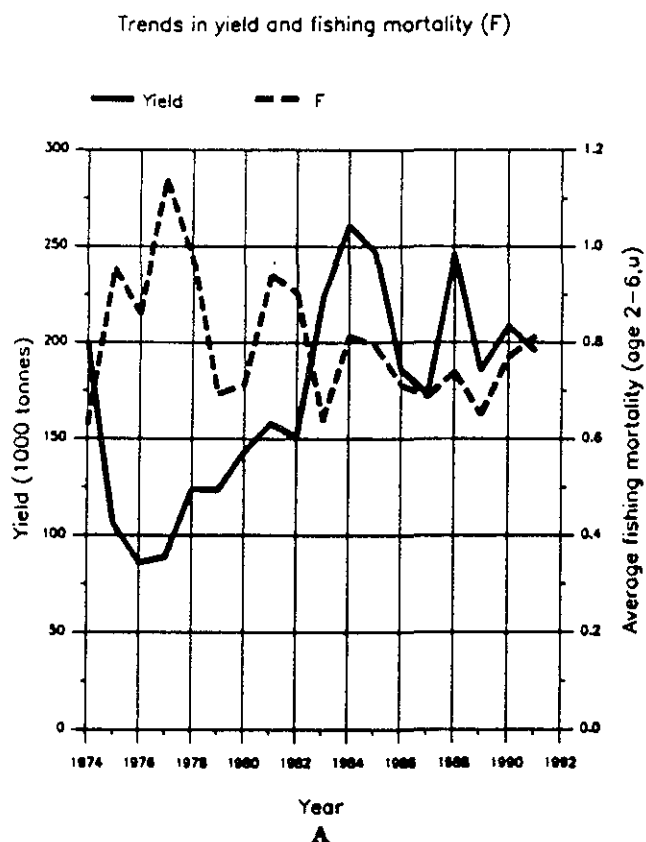


Figure 3.1.6

# **FISH STOCK SUMMARY** **STOCK: Herring in the Western Baltic and Kattegat** **29-4-1992**



# **FISH STOCK SUMMARY** **STOCK: Herring in the Western Baltic and Kattegat** **3-5-1992**

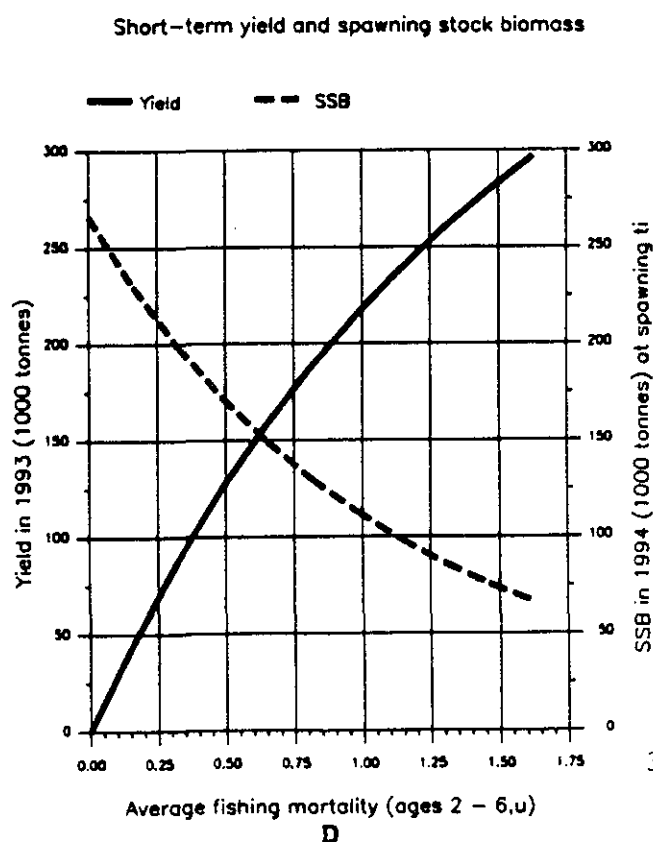
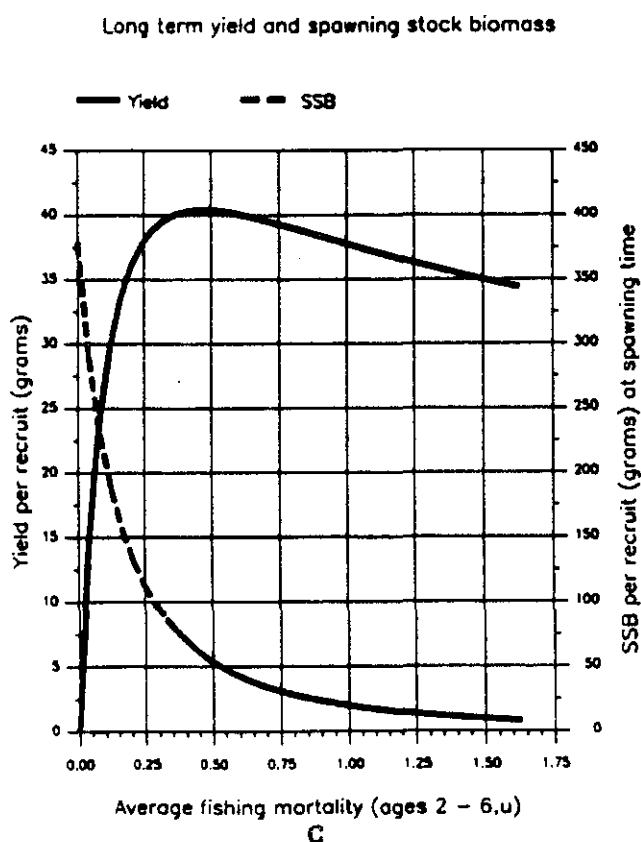


Figure 3.1.7 Recommended seasonal closures of herring spawning grounds in the Celtic Sea and Division VIIj herring stock.

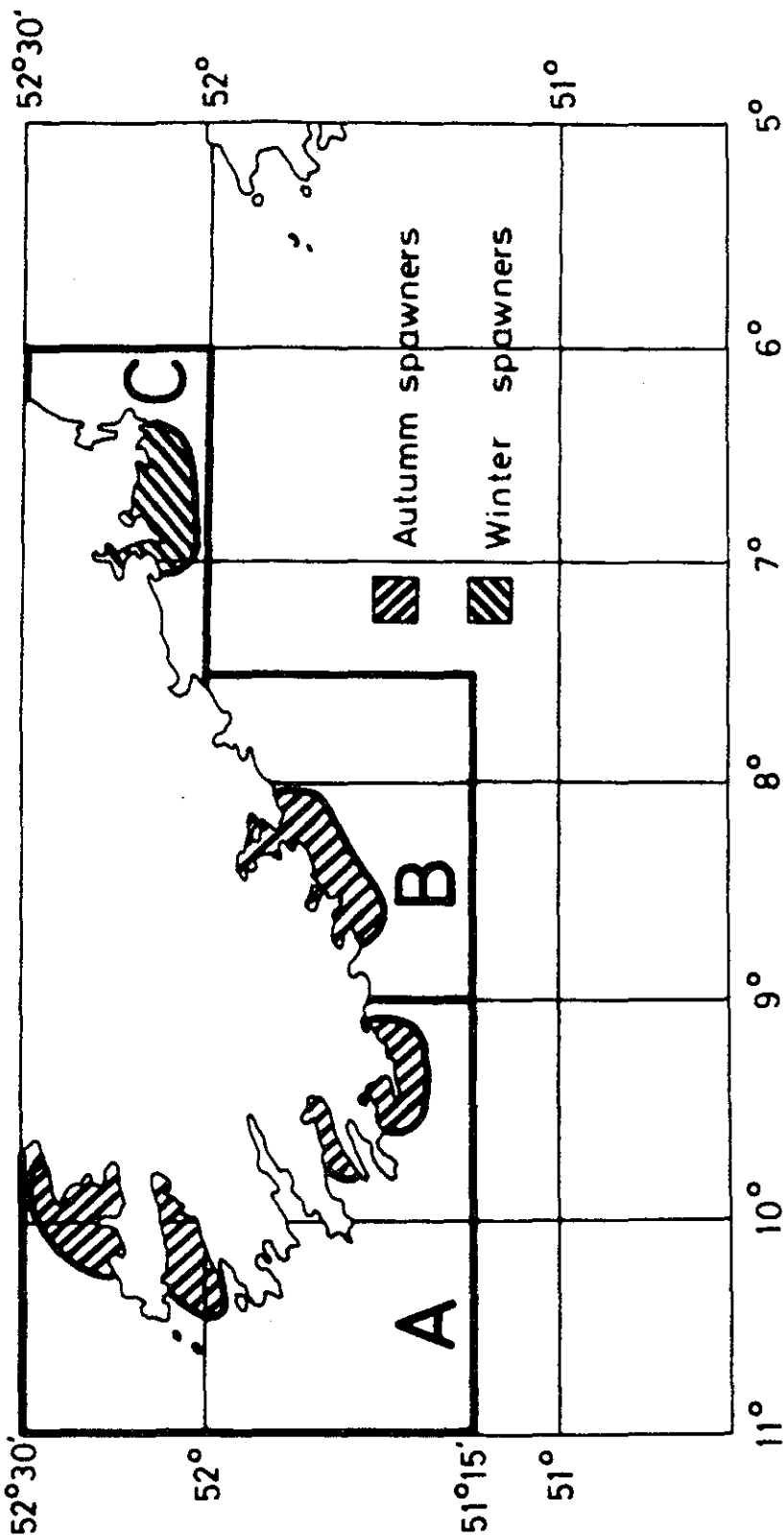




Figure 3.2.1 Danish SANDEEL areas and assessment areas by the Working Group.

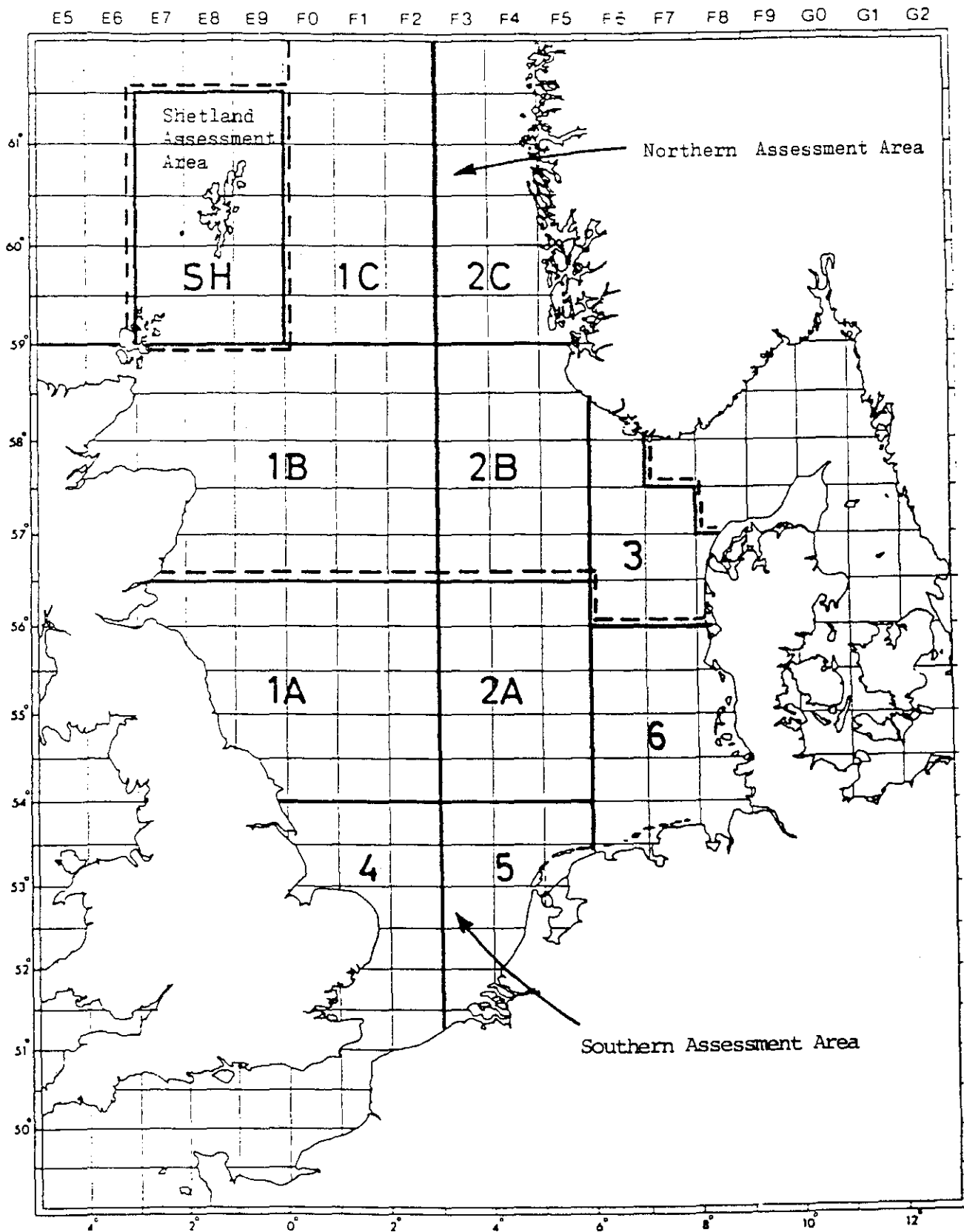
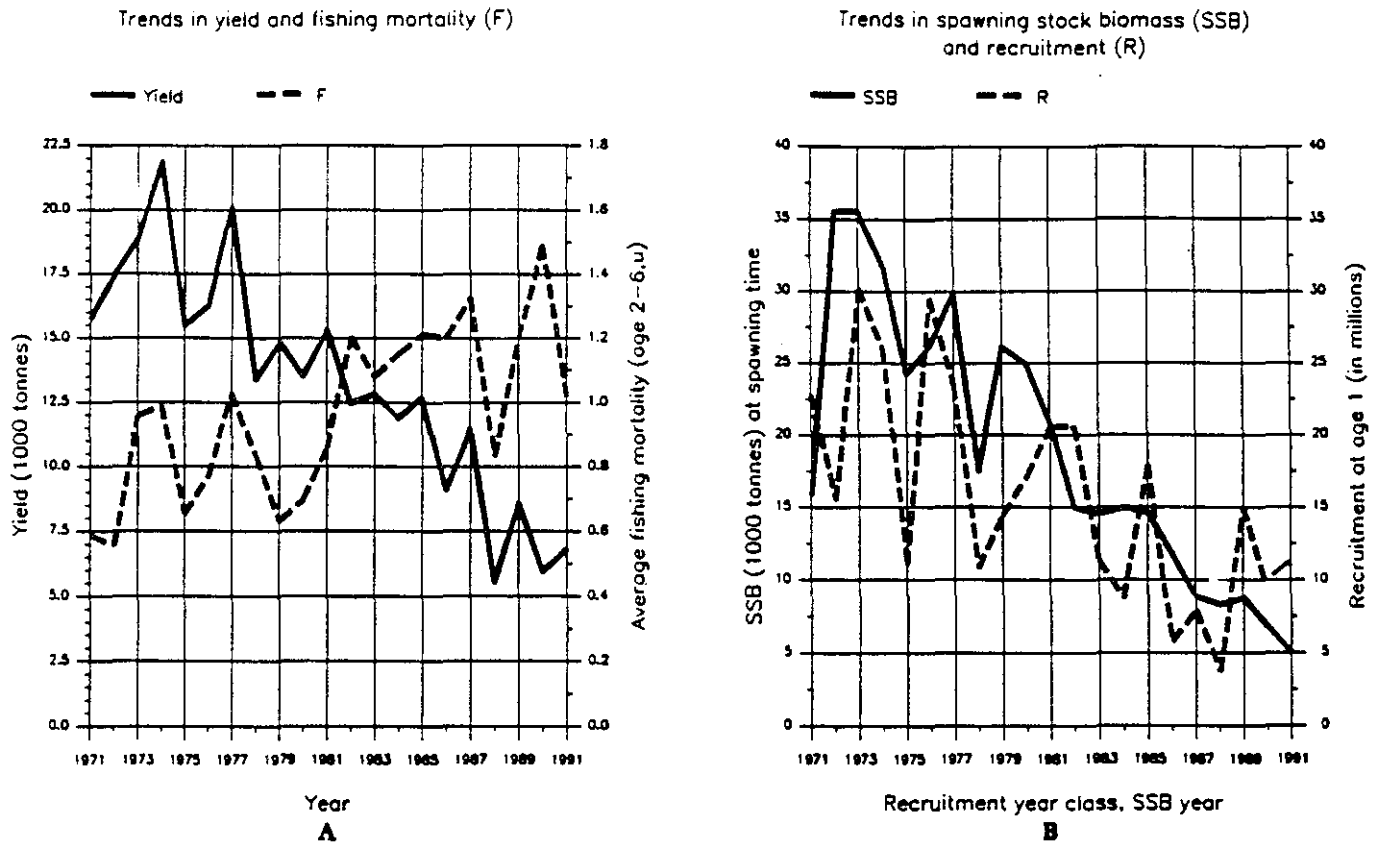


Figure 3.3.2

**FISH STOCK SUMMARY**  
**STOCK: Cod in the Kattegat (part of Fishing Area IIIa)**  
**6-5-1992**



**FISH STOCK SUMMARY**  
**STOCK: Cod in the Kattegat (part of Fishing Area IIIa)**  
**6-5-1992**

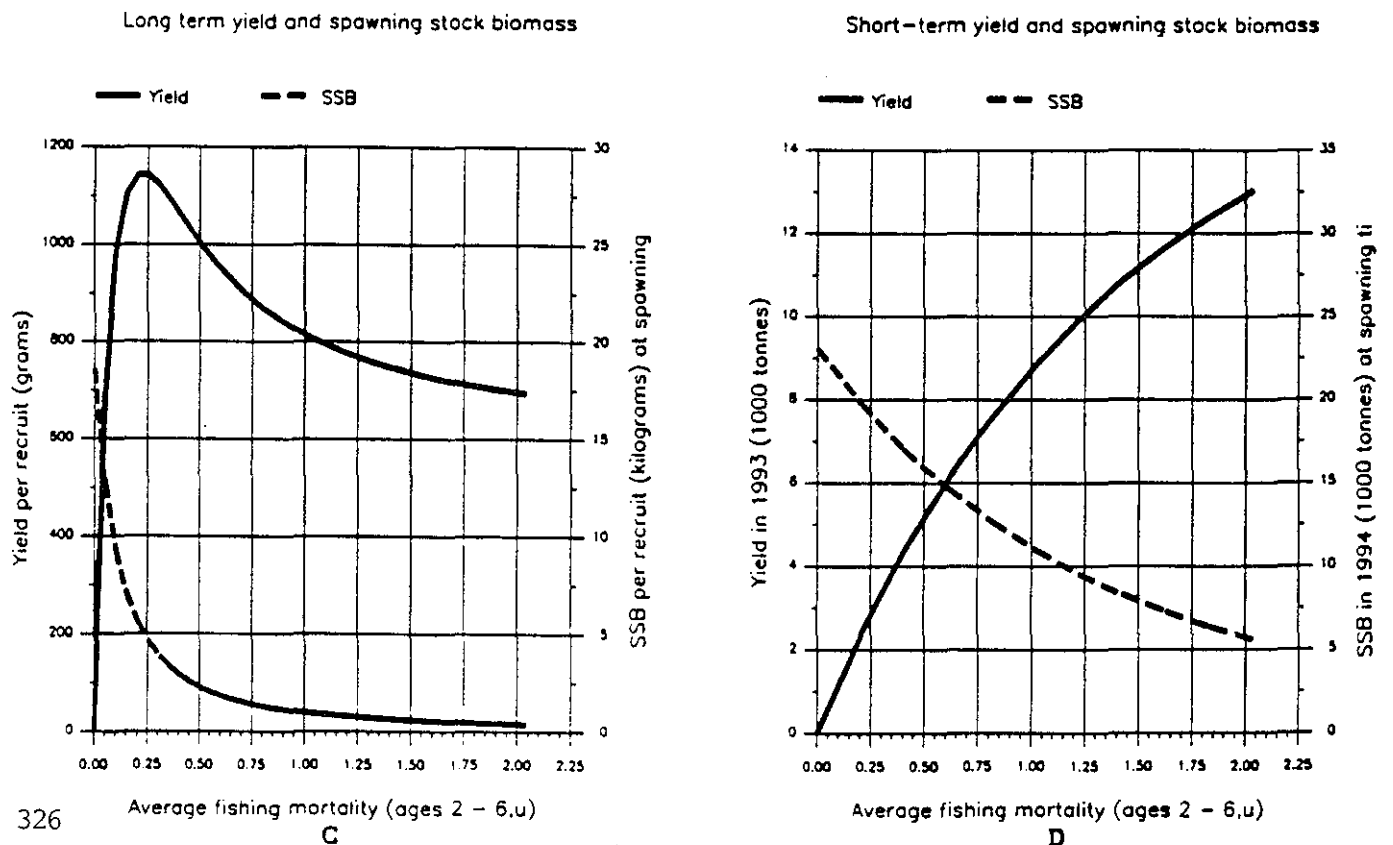
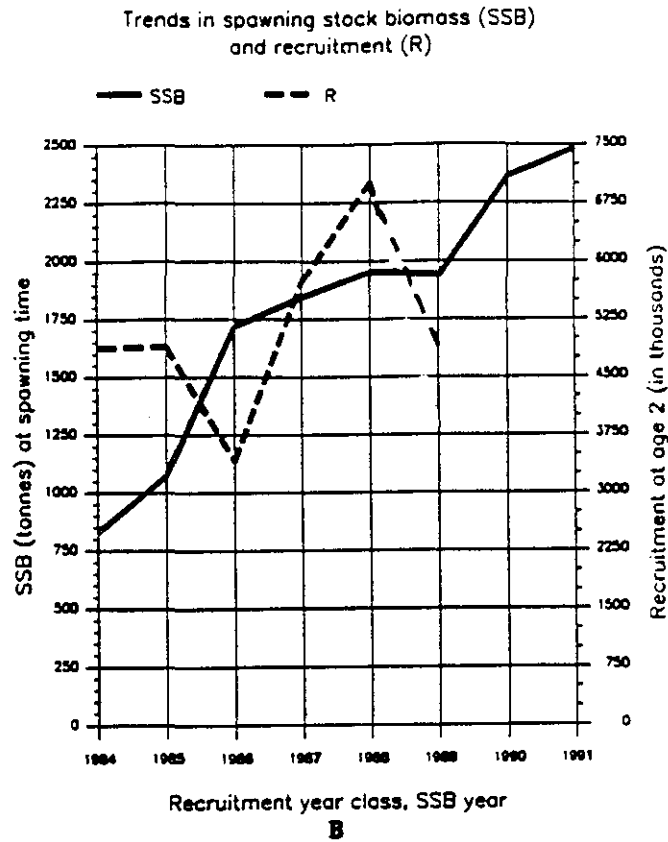
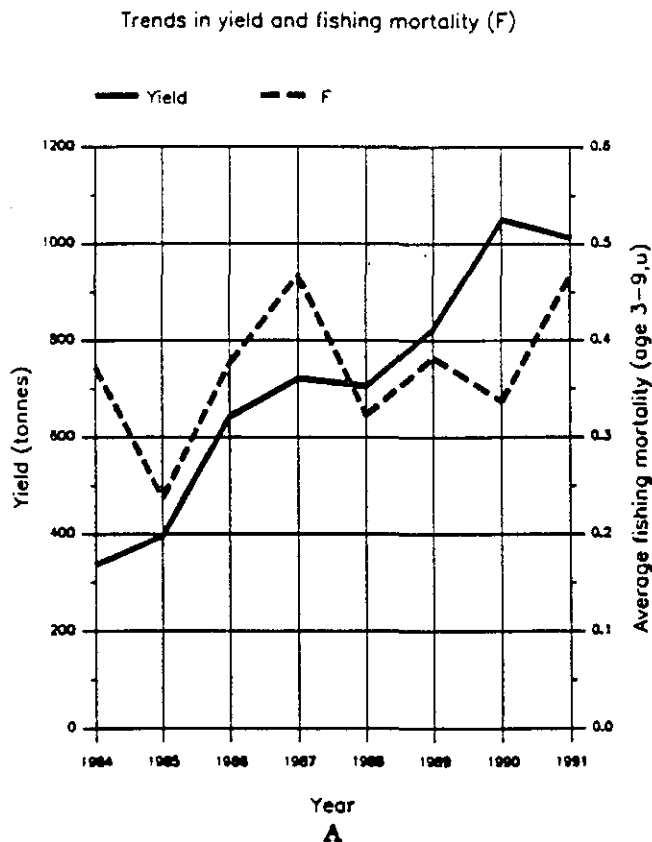
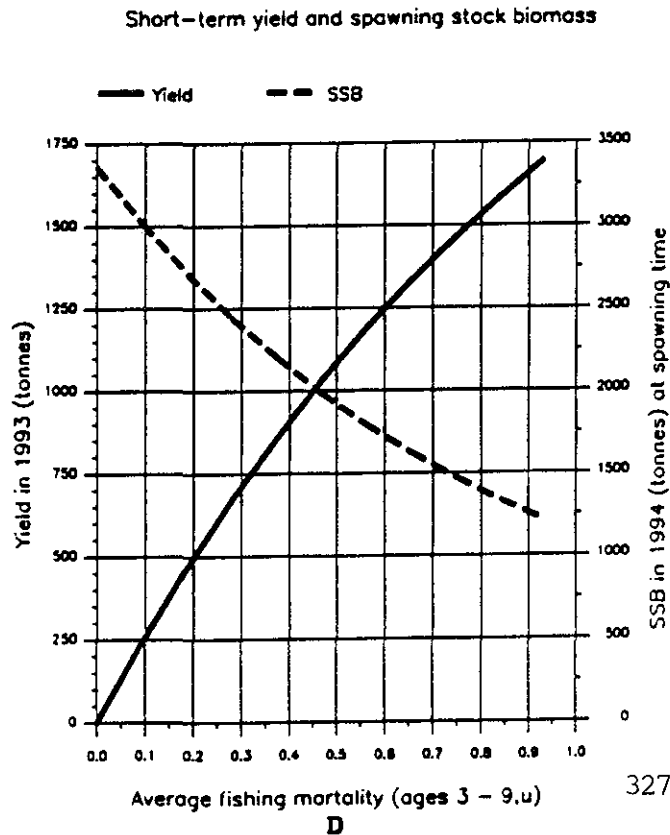
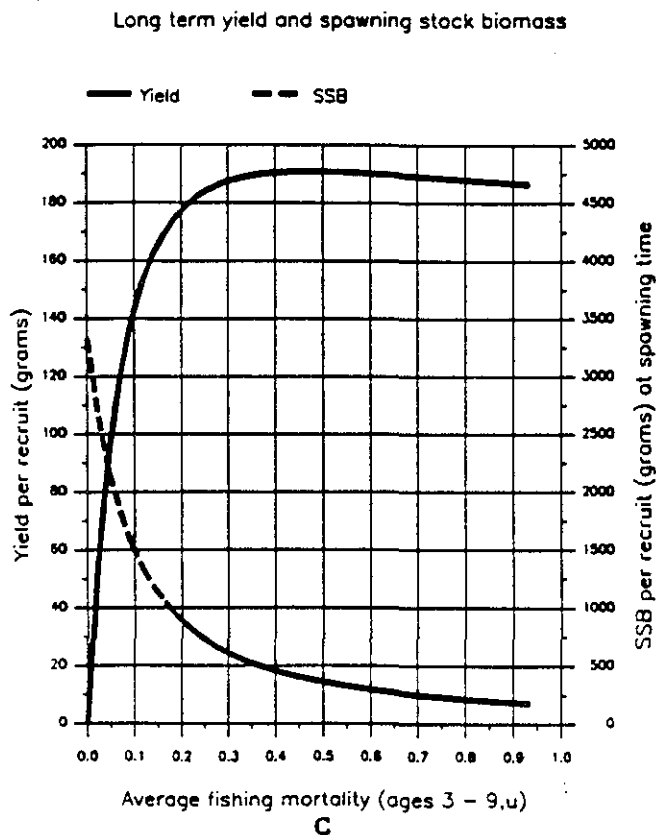


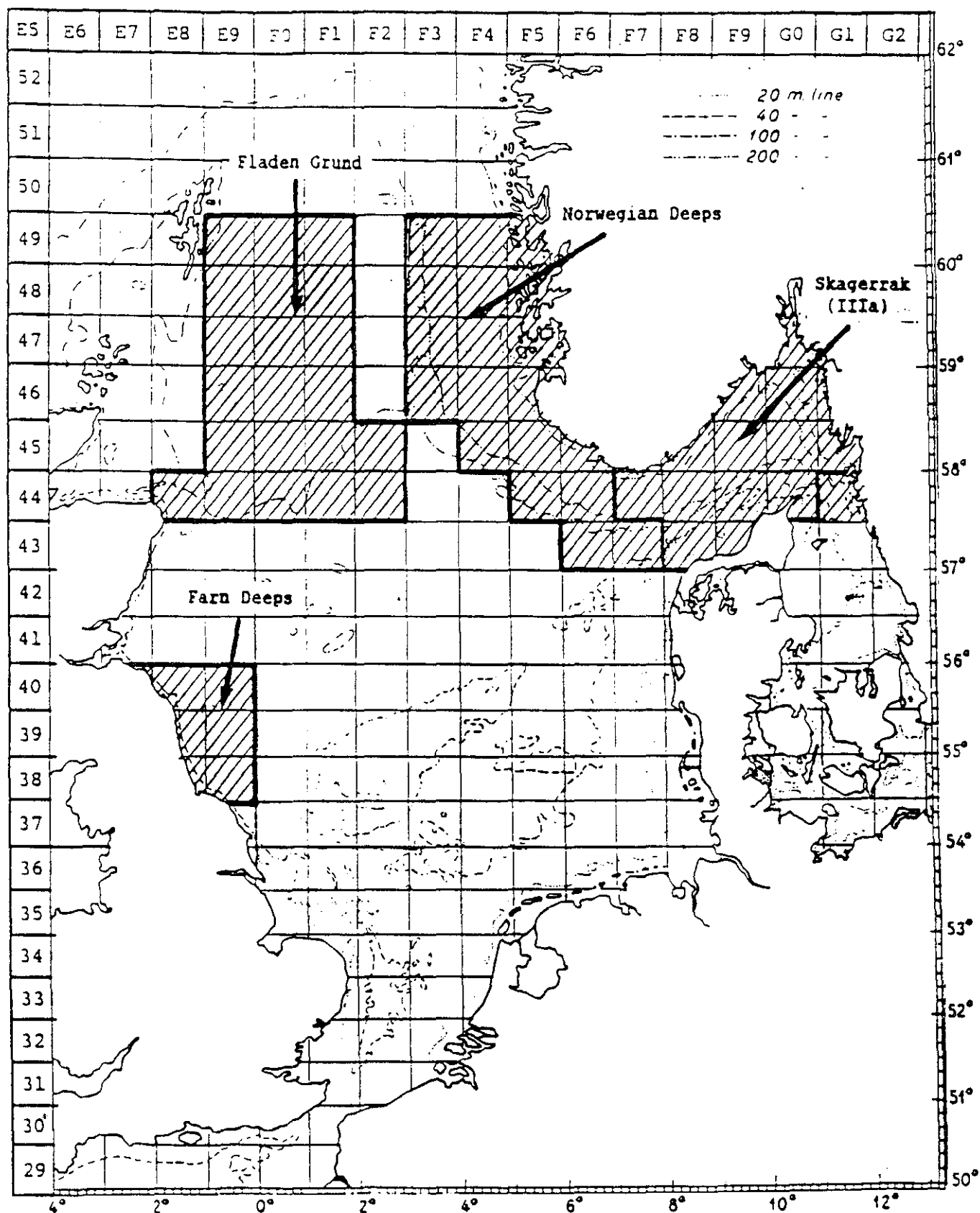
Figure 3.3.4

**FISH STOCK SUMMARY**  
**STOCK: Sole in the Kattegat and Skagerrak (Fishing Area IIIa)**  
**8-5-1992**



**FISH STOCK SUMMARY**  
**STOCK: Sole in the Kattegat and Skagerrak (Fishing Area IIIa)**  
**8-5-1992**

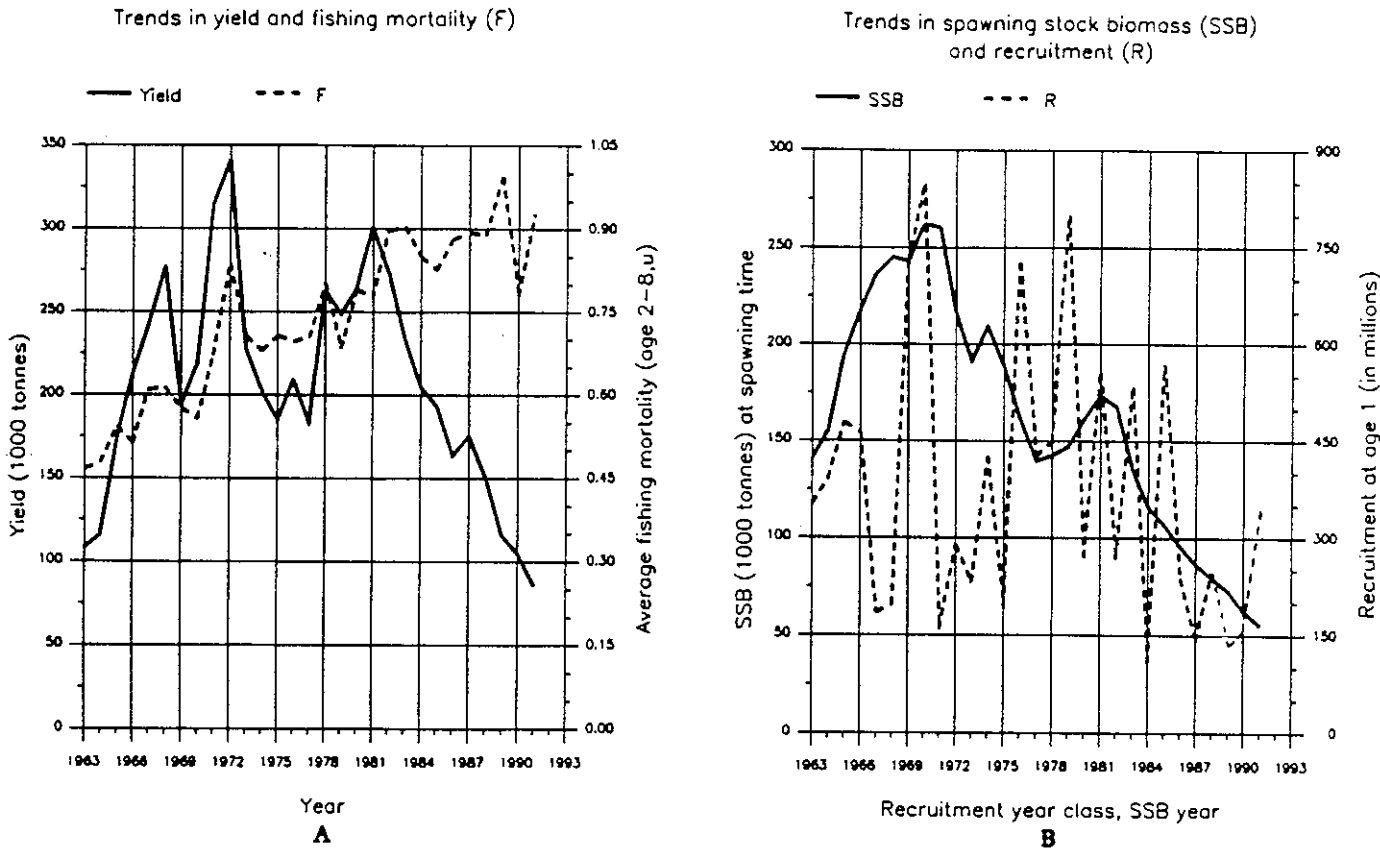




**Figure 3.4** The management units of *Pandalus* in ICES Sub-area IV and Division IIIa as defined by statistical squares according to the Working Group.

Figure 3.5.2

FISH STOCK SUMMARY  
STOCK: Cod in the North Sea (Fishing Area IV)  
9-10-1992



FISH STOCK SUMMARY  
STOCK: Cod in the North Sea (Fishing Area IV)  
20-10-1992

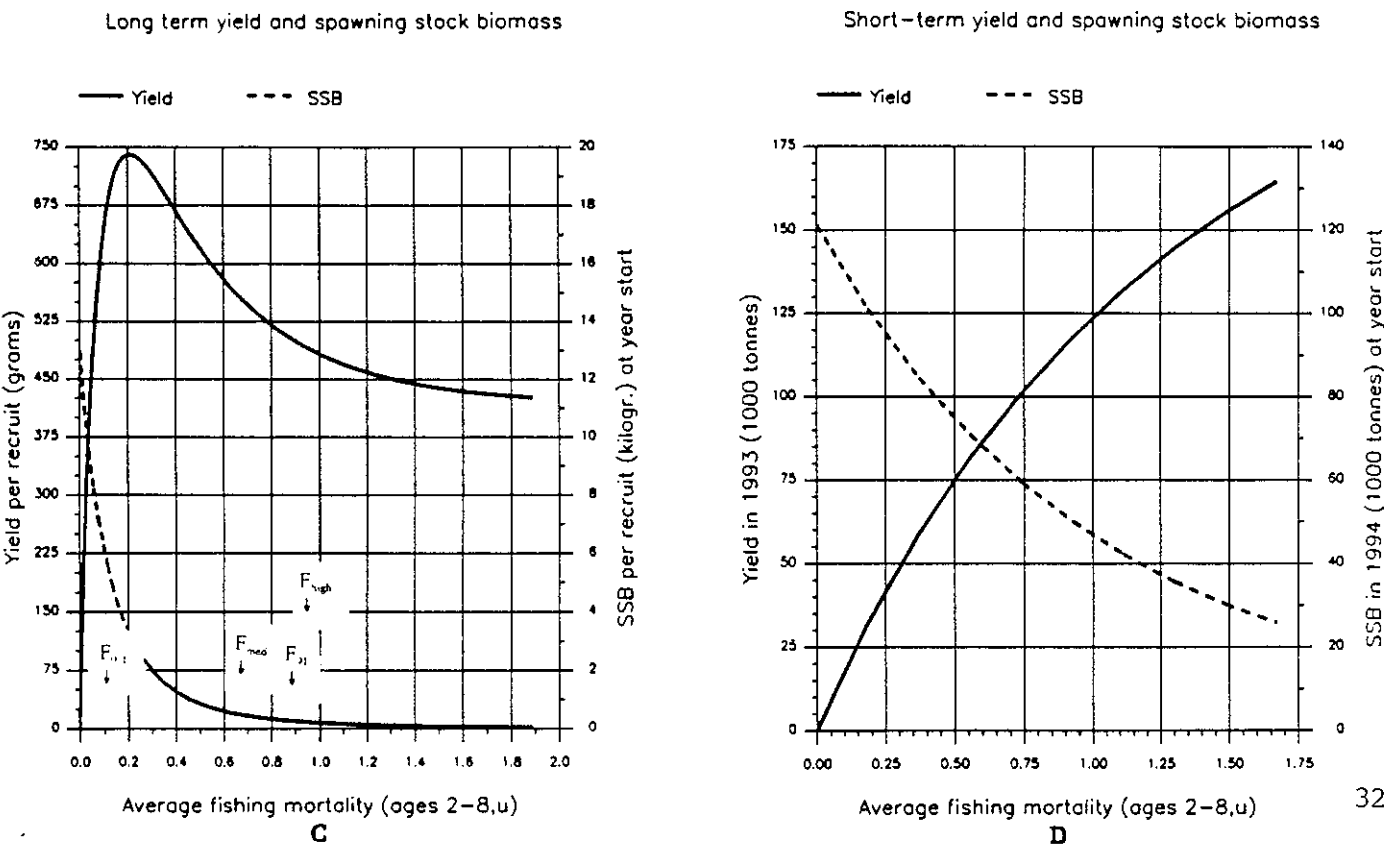


Figure 3.5.3.1 Haddock in IV

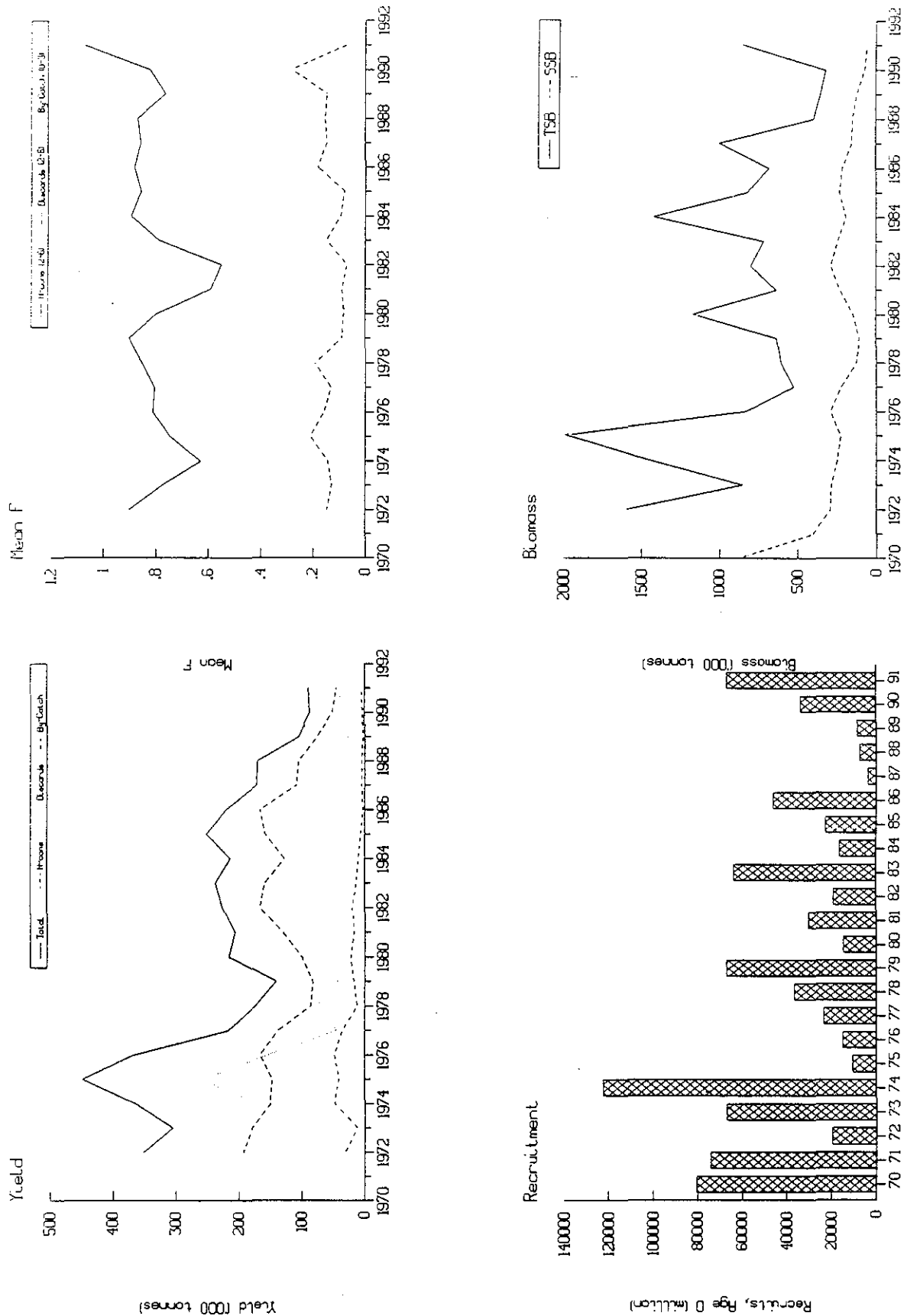
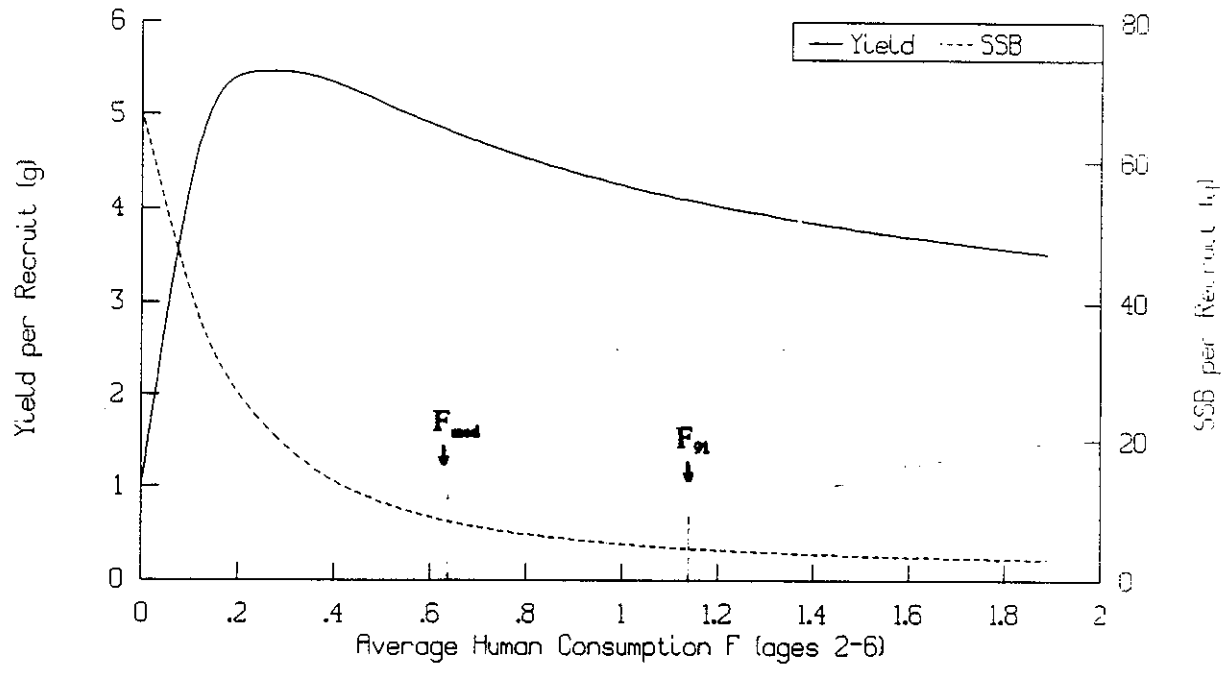


Figure 3.5.3.2

A.  
Haddock in IV  
Long Term Total Landings and Spawning Biomass.



B.  
North Sea Haddock  
Short term SSB and human consumption landings

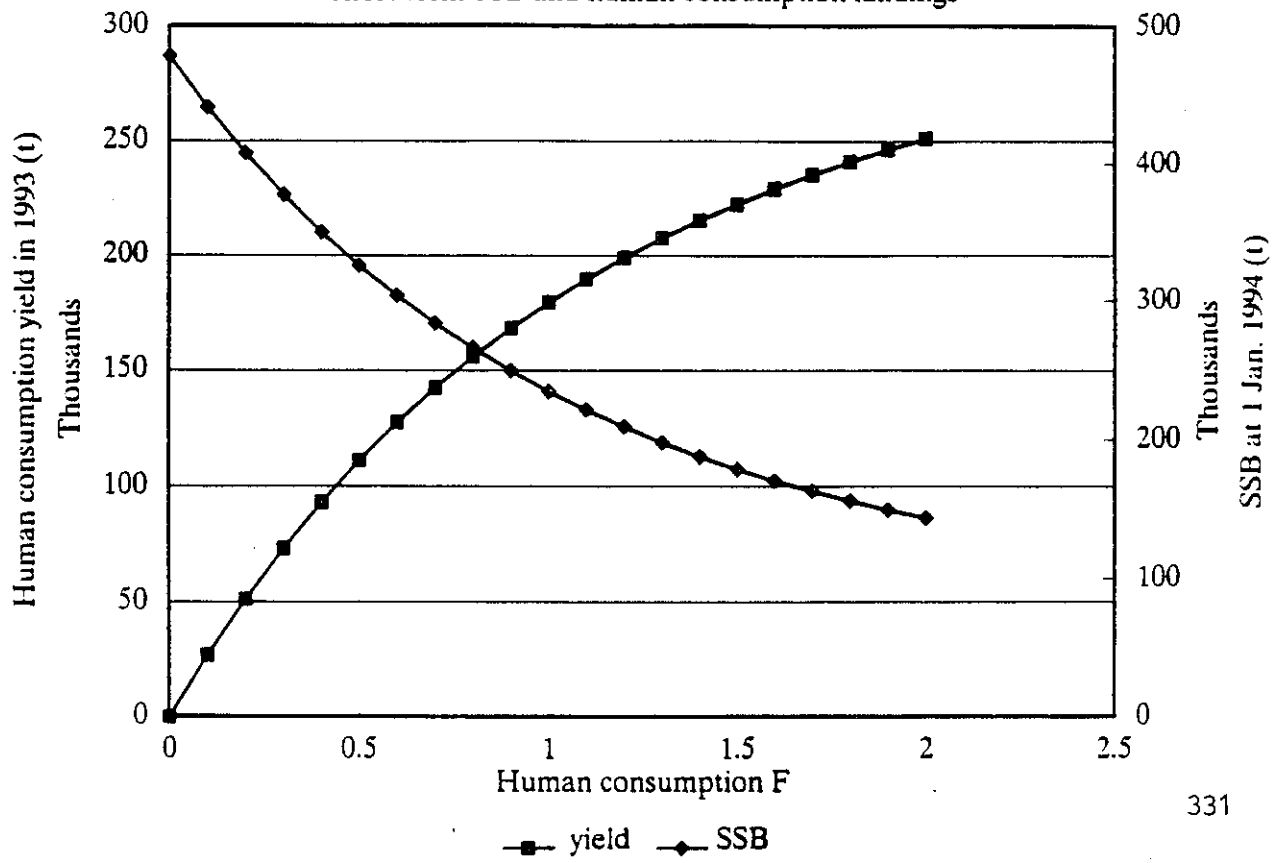
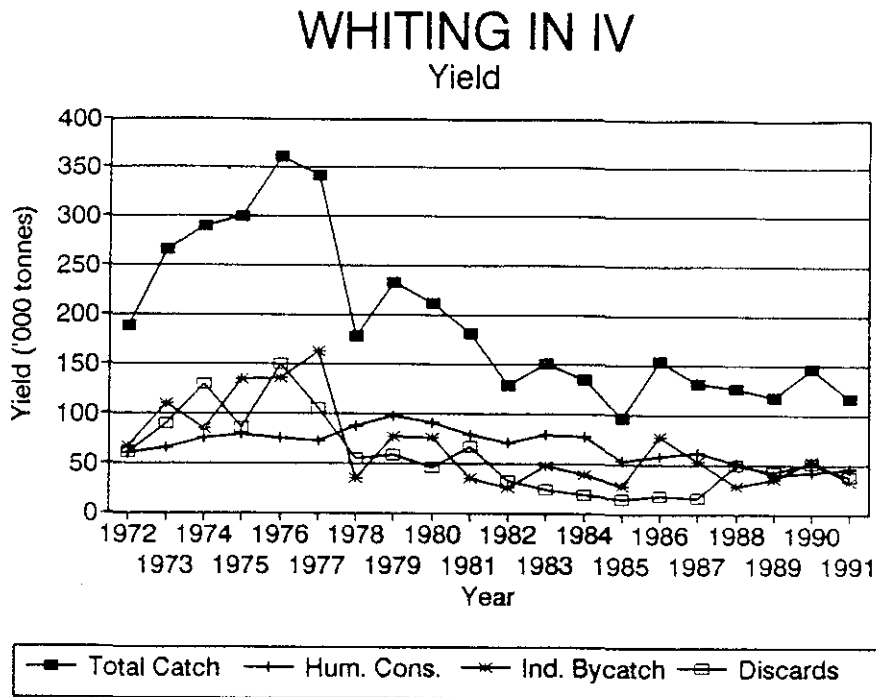


Figure 3.5.4.1

A



B

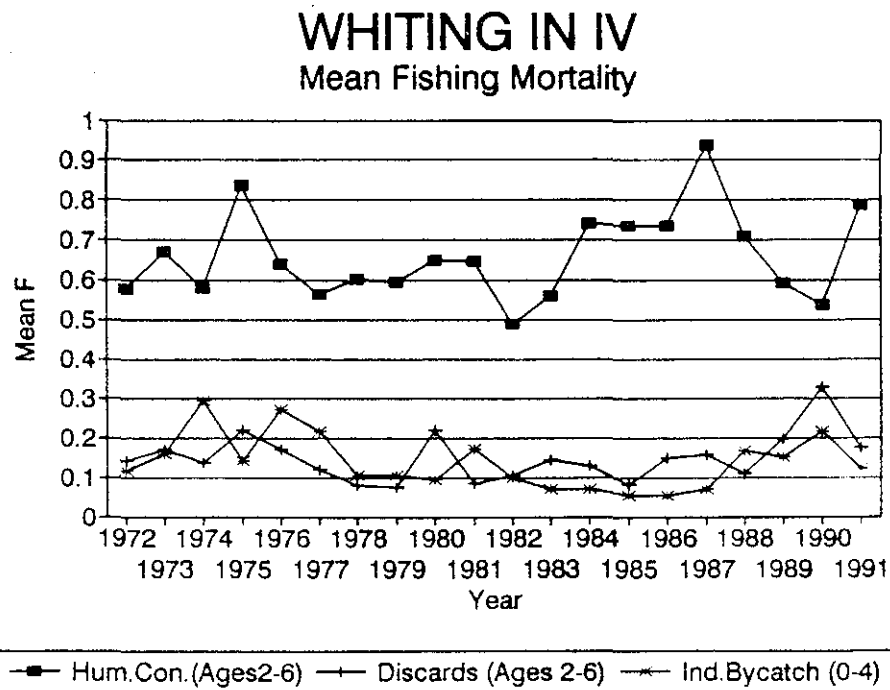
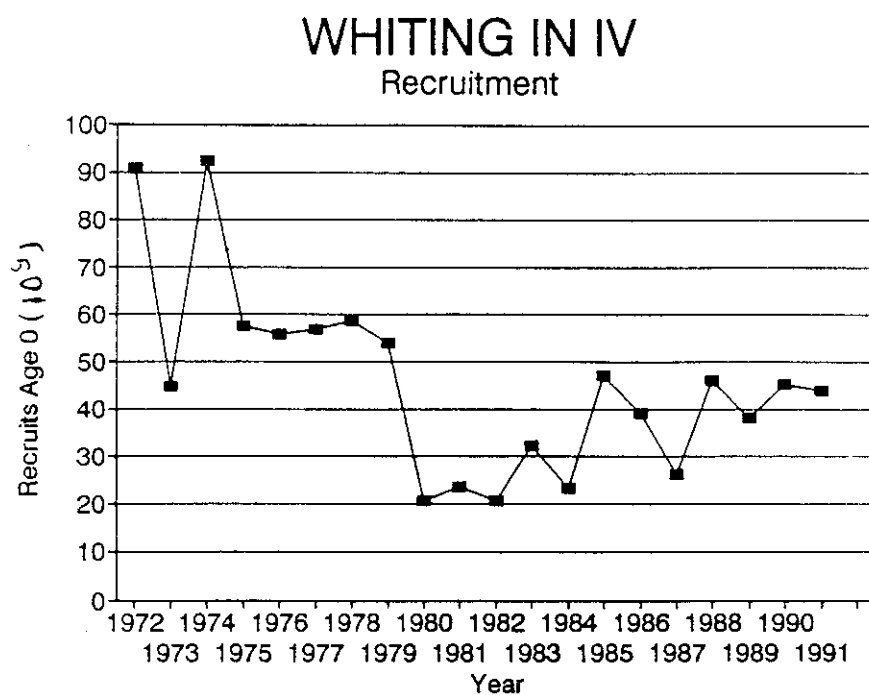




Figure 3.5.4.1 (Cont'd)

C



D

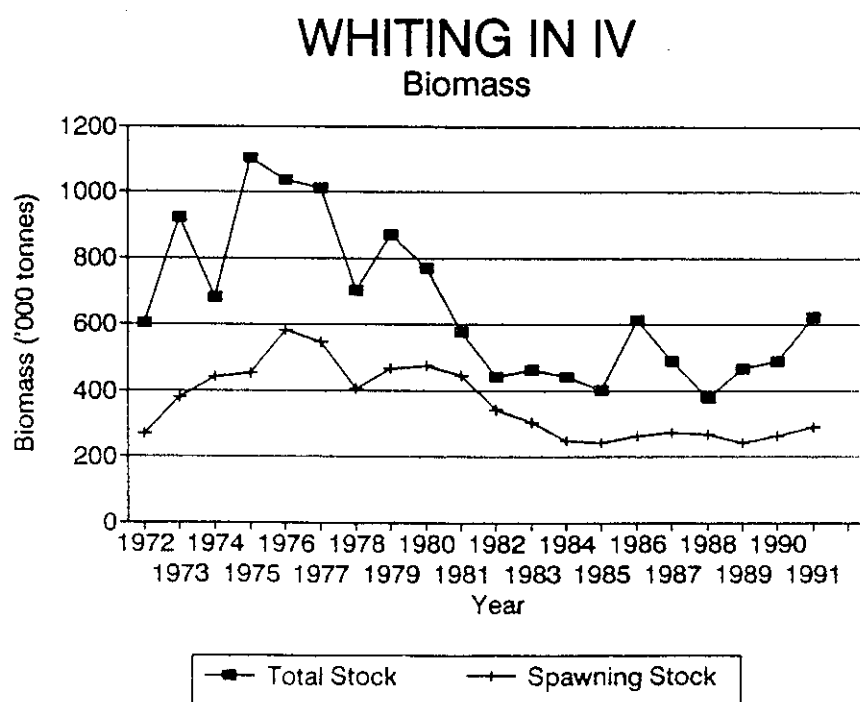
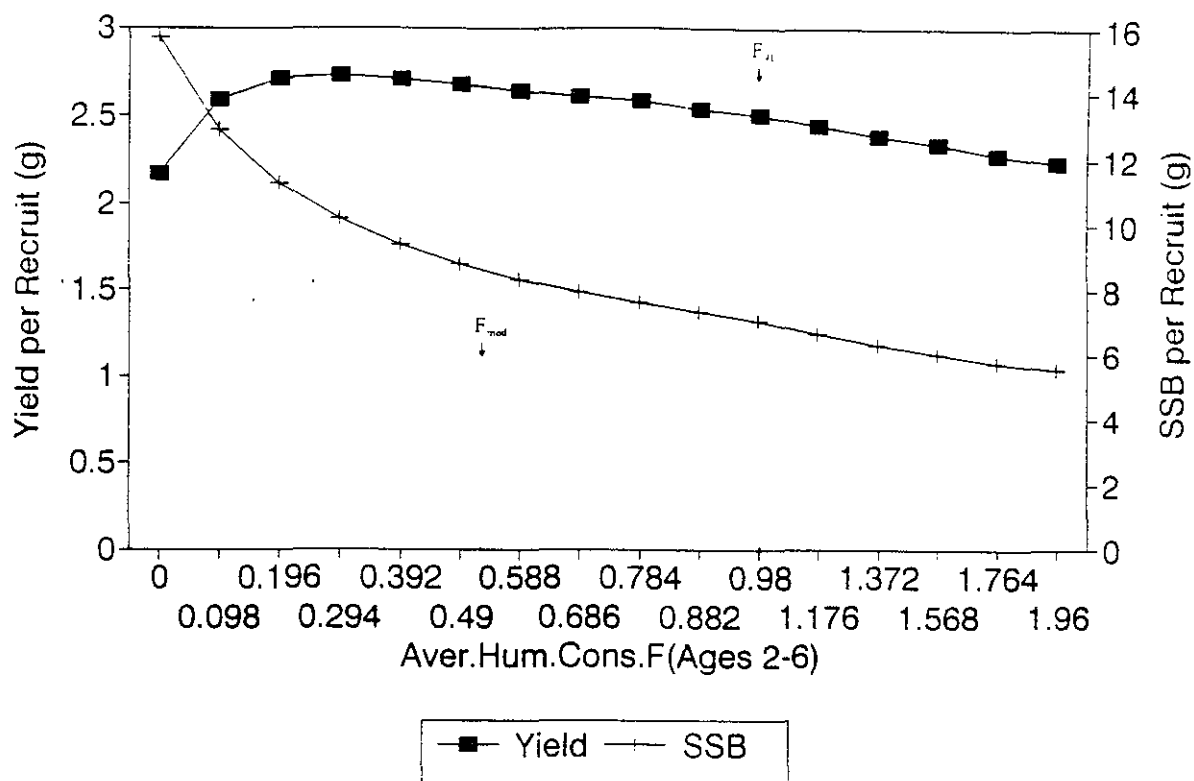


Figure 3.5.4.2

# North Sea Whiting

## Long Term Yield and Spawning Biomass



# North Sea Whiting

## Short Term Tot. Landings and Sp. Biom.

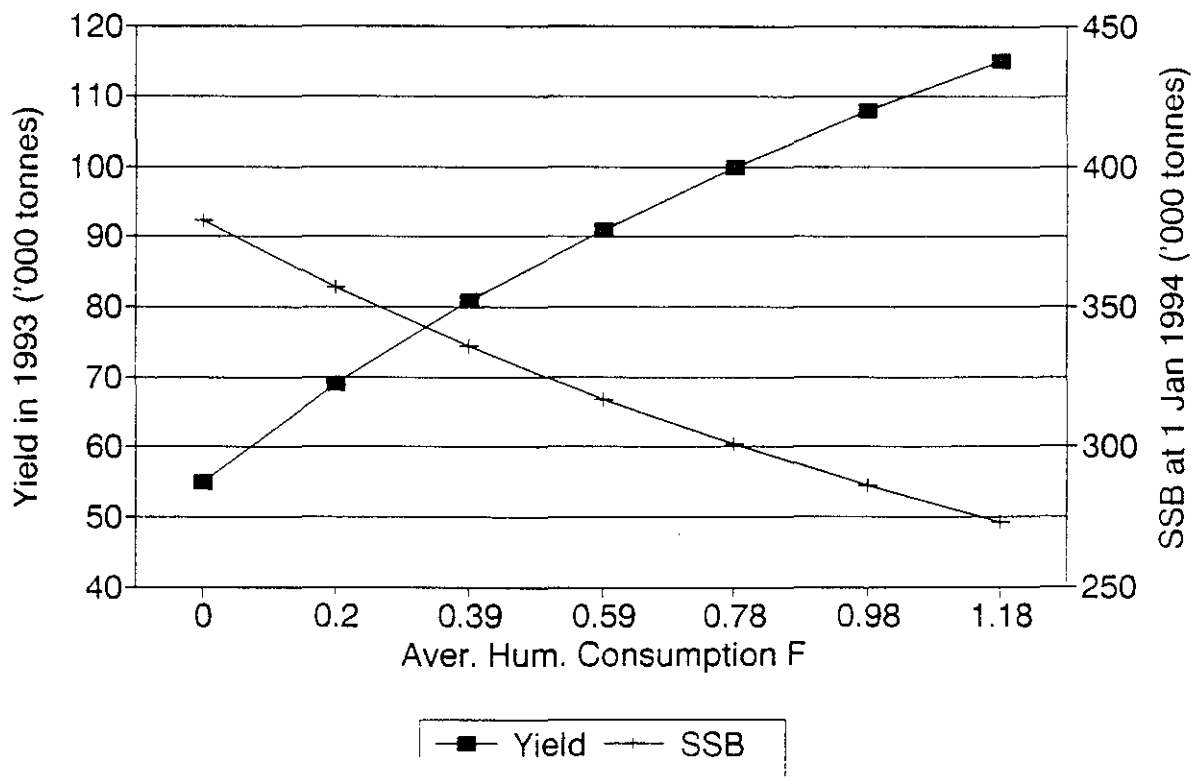
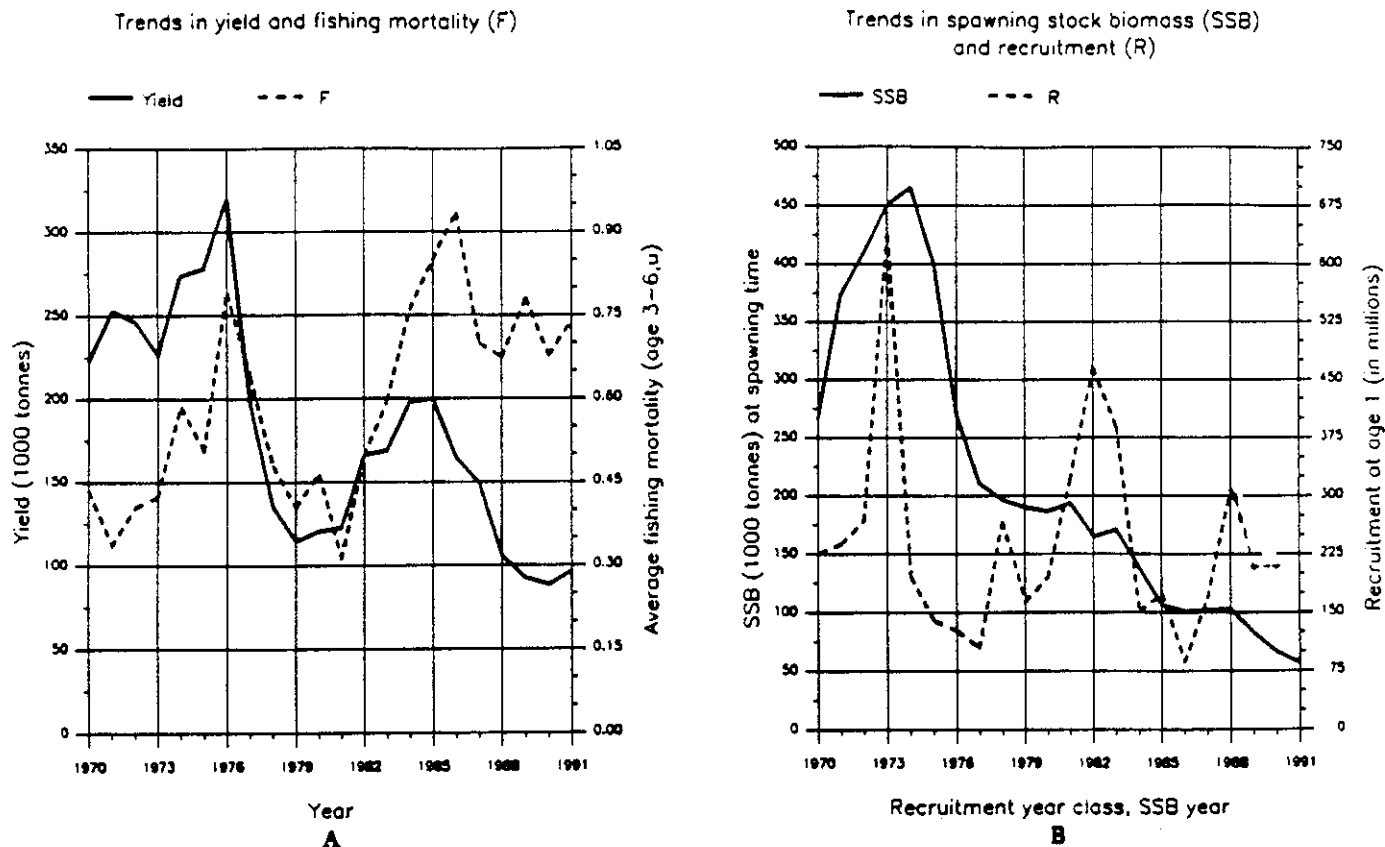


Figure 3.5.5

**FISH STOCK SUMMARY**  
**STOCK: Saithe in the North Sea Area (Fishing Areas IV and IIIa)**  
**11-10-1992**



**FISH STOCK SUMMARY**  
**STOCK: Saithe in the North Sea Area (Fishing Areas IV and IIIa)**  
**11-10-1992**

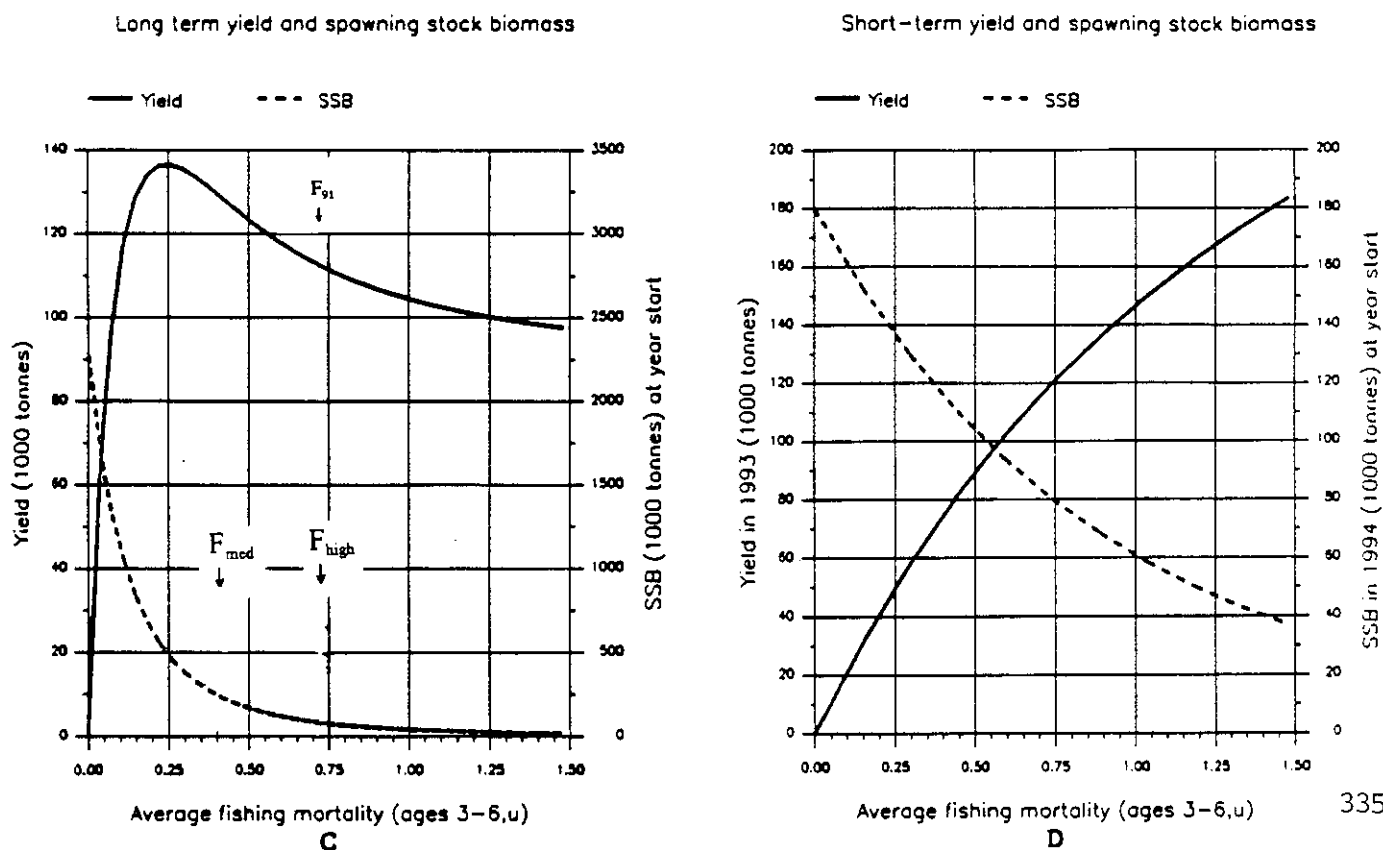
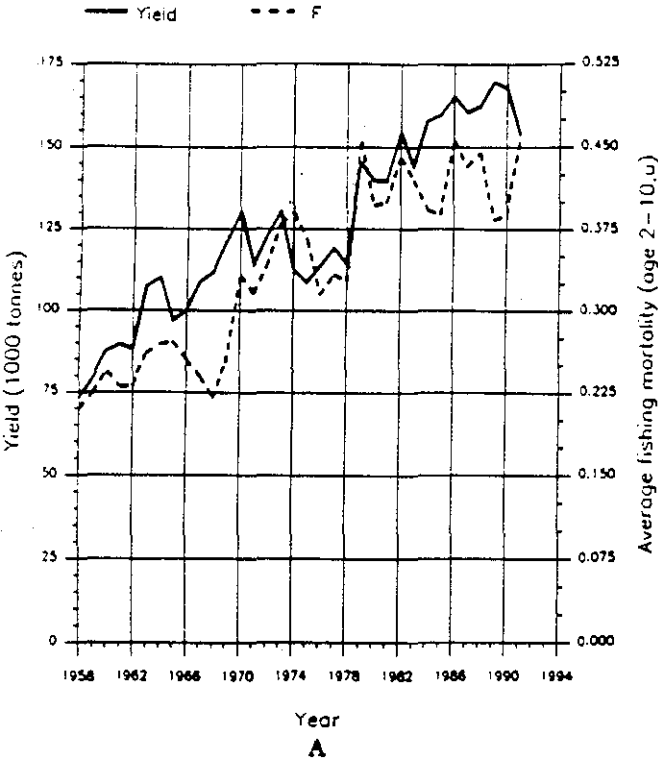


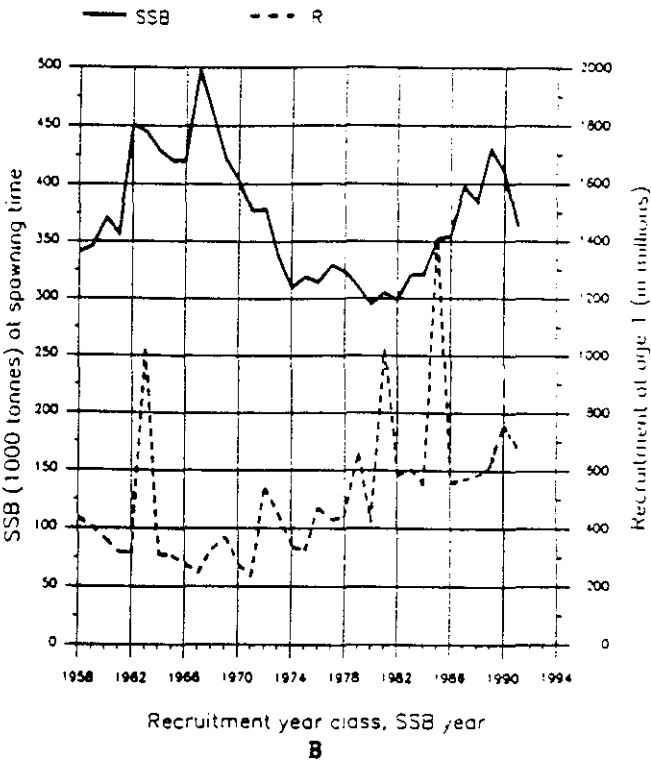
Figure 3.5.6

**FISH STOCK SUMMARY**  
**STOCK: Plaice in the North Sea (Fishing Area IV)**  
**14-10-1992**

Trends in yield and fishing mortality (F)

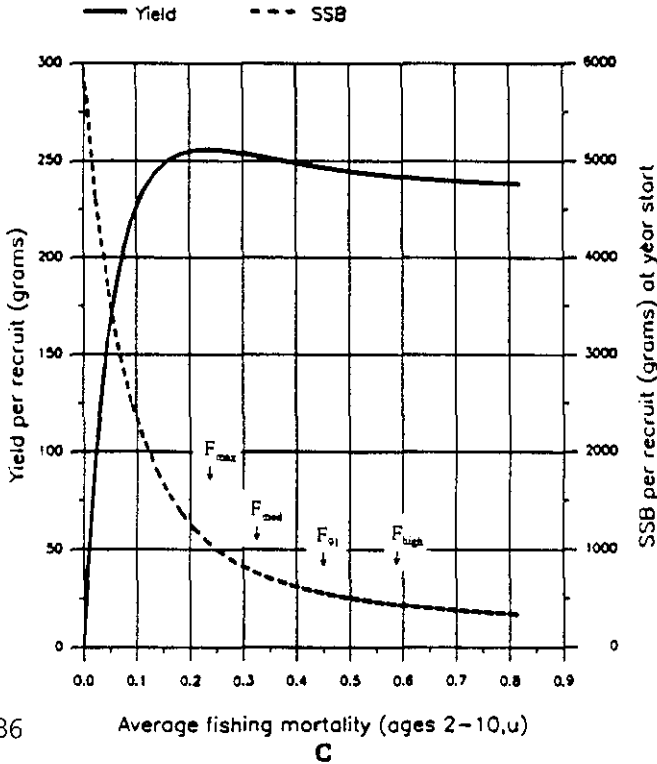


Trends in spawning stock biomass (SSB) and recruitment (R)

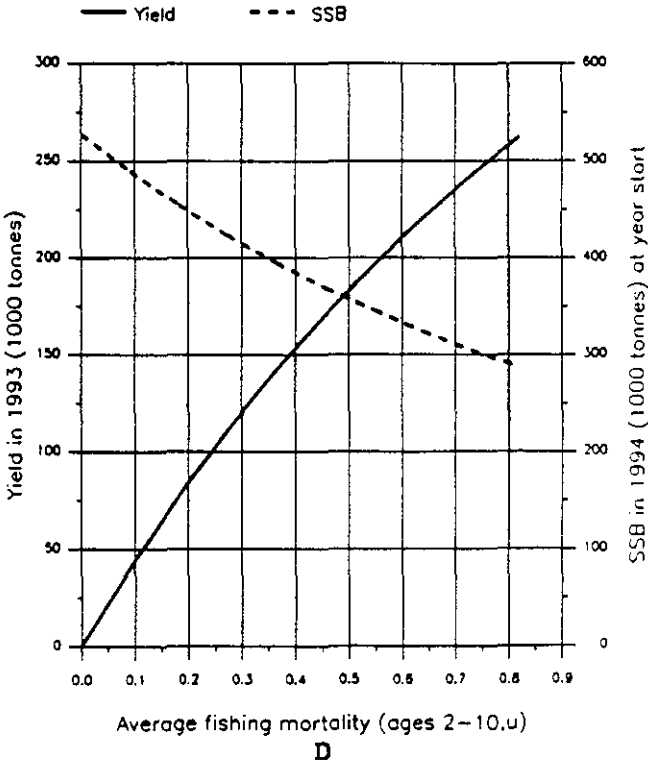


**FISH STOCK SUMMARY**  
**STOCK: Plaice in the North Sea (Fishing Area IV)**  
**20-10-1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

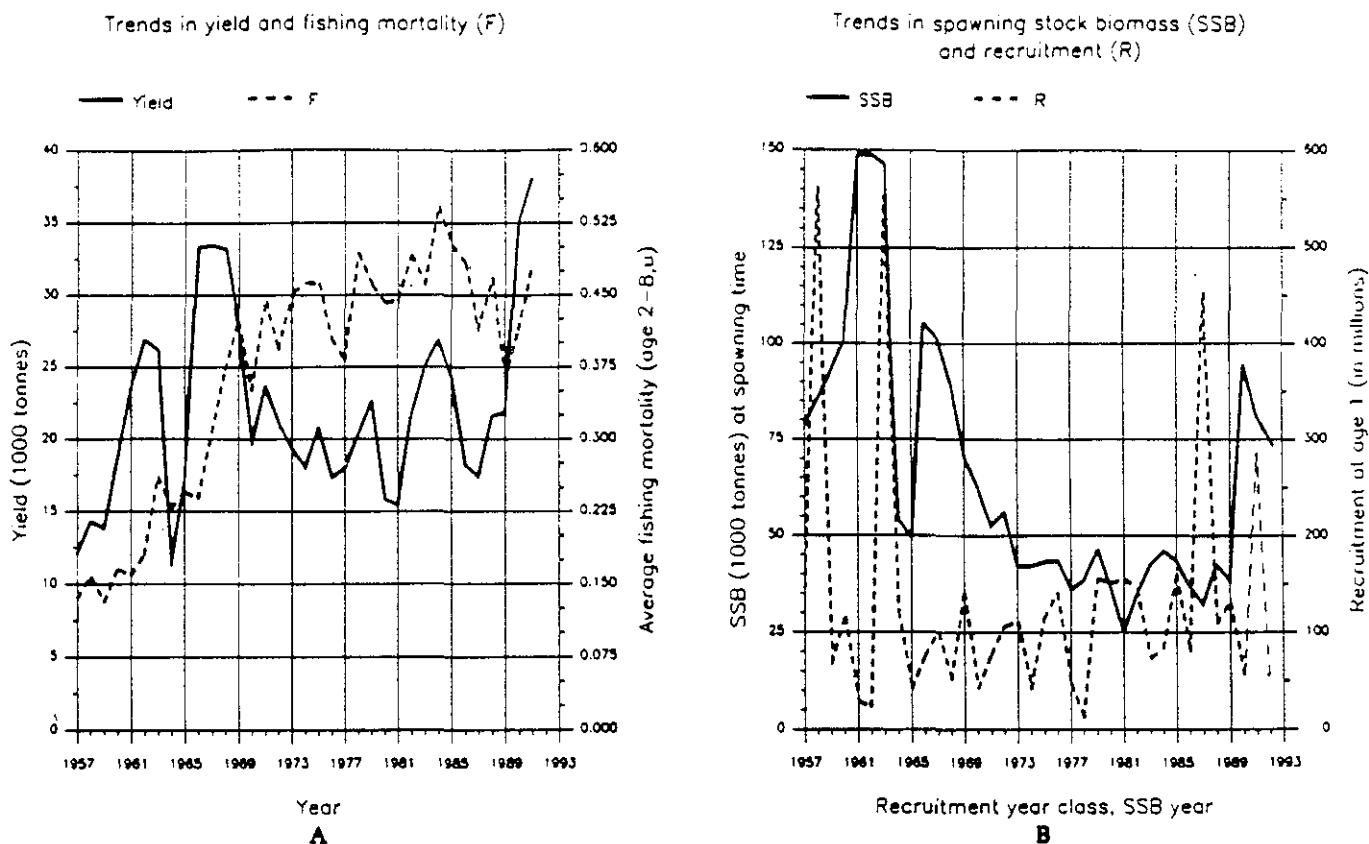


# FISH STOCK SUMMARY

Figure 3.5.7

STOCK: Sole in the North Sea (Fishing Area IV)

11-10-1992



# FISH STOCK SUMMARY

STOCK: Sole in the North Sea (Fishing Area IV)

9-10-1992

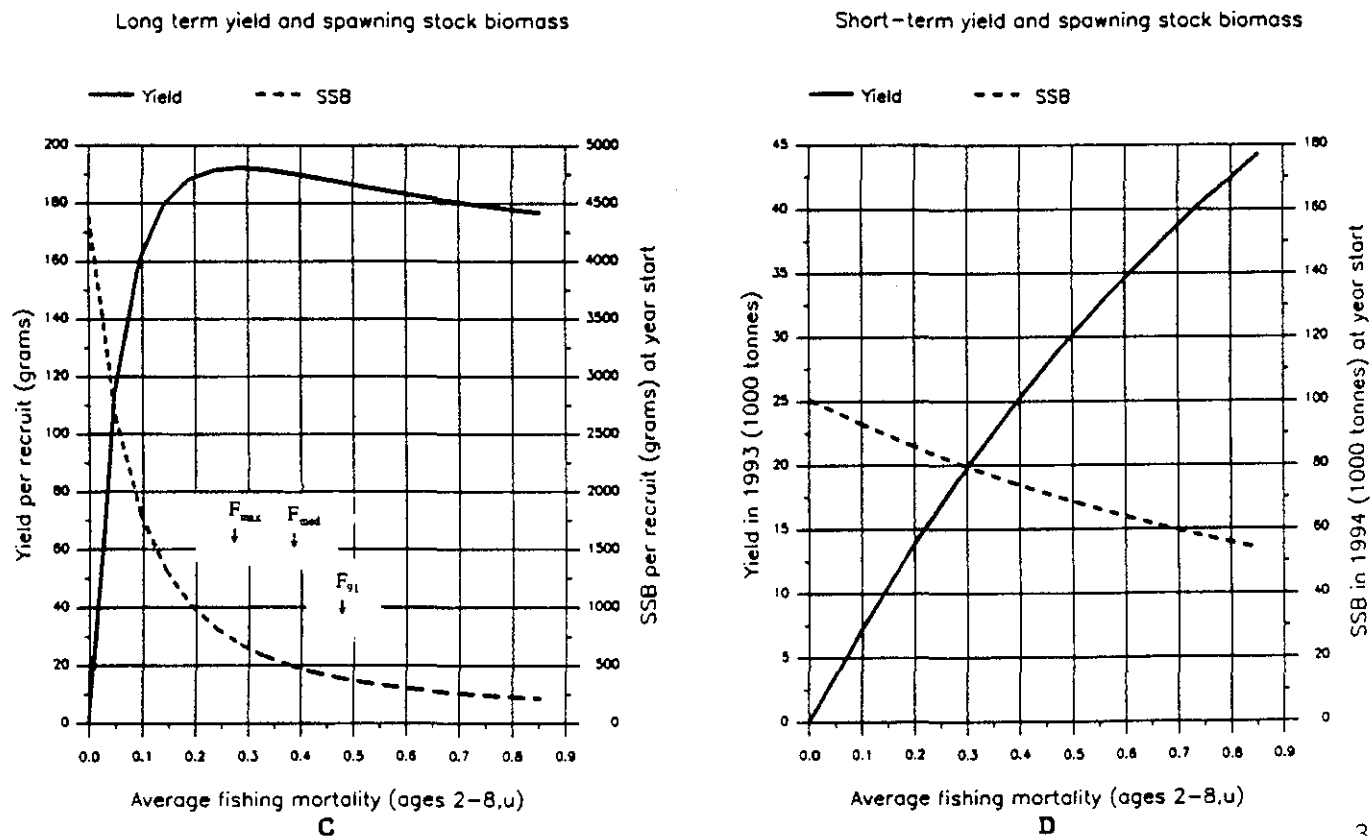


Figure 3.6.2.1A

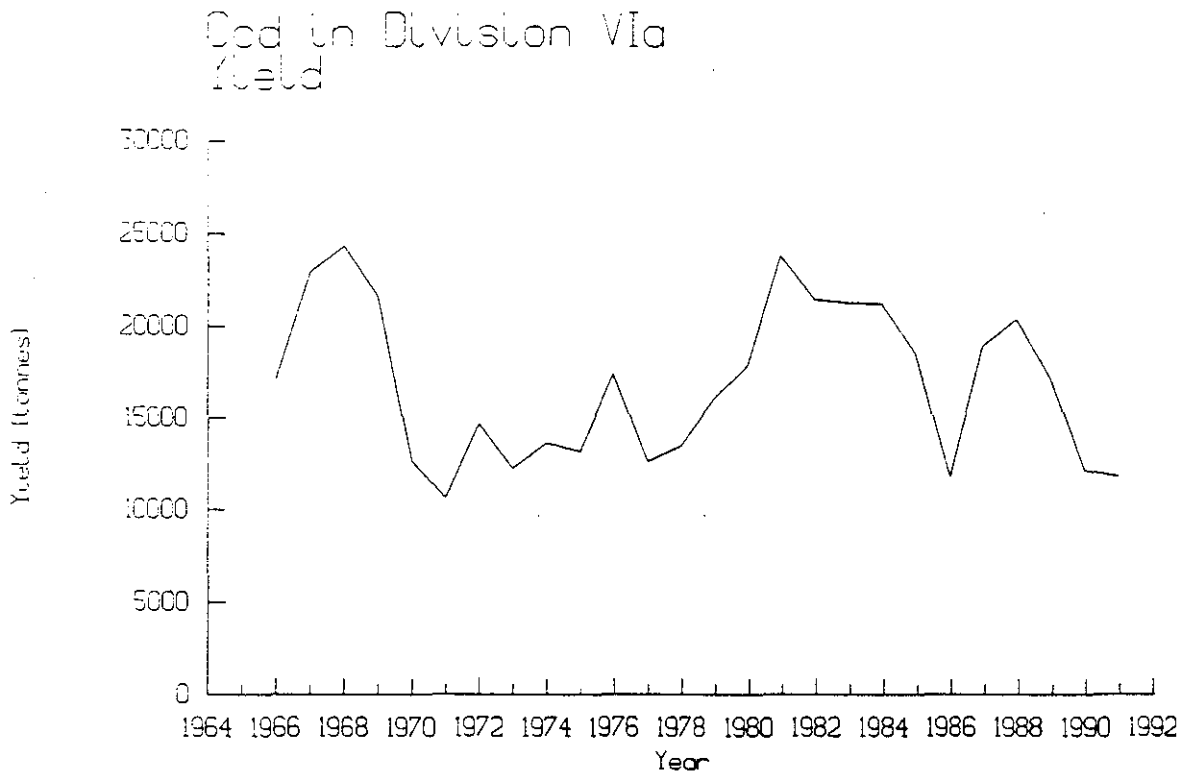


Figure 3.6.2.1B

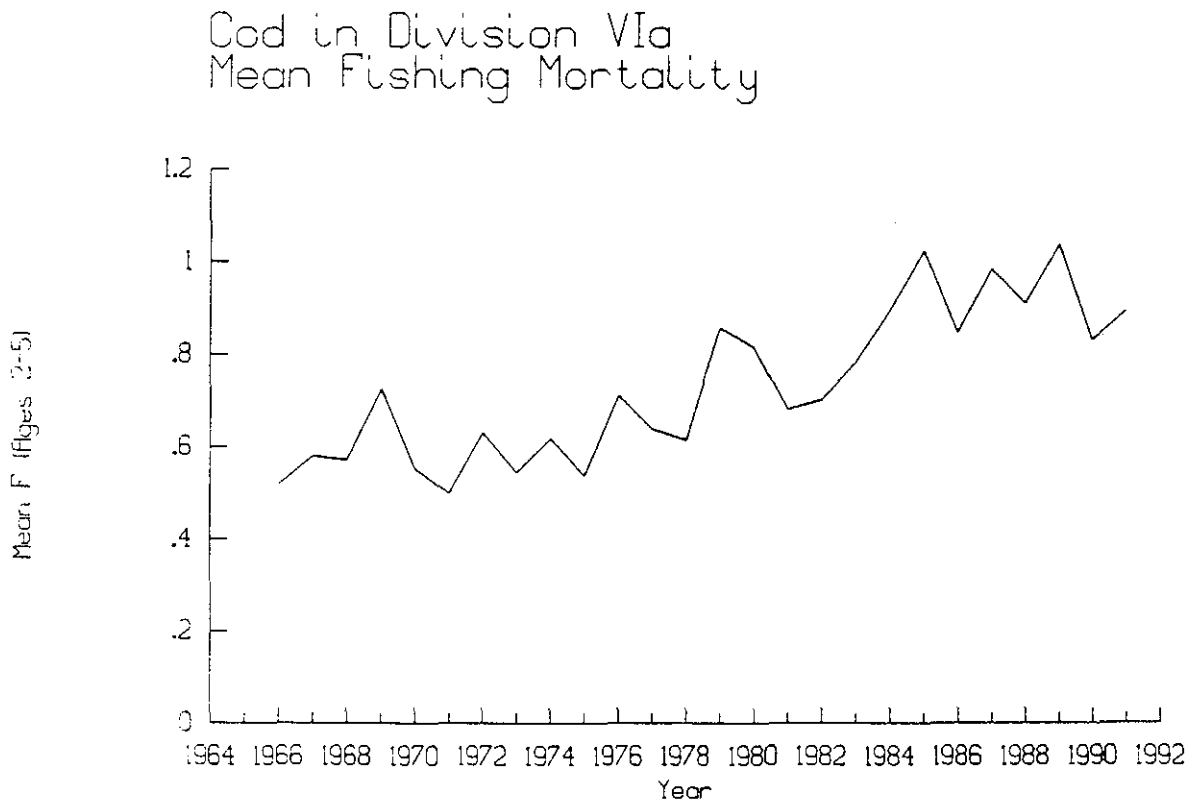


Figure 3.6.2.1C

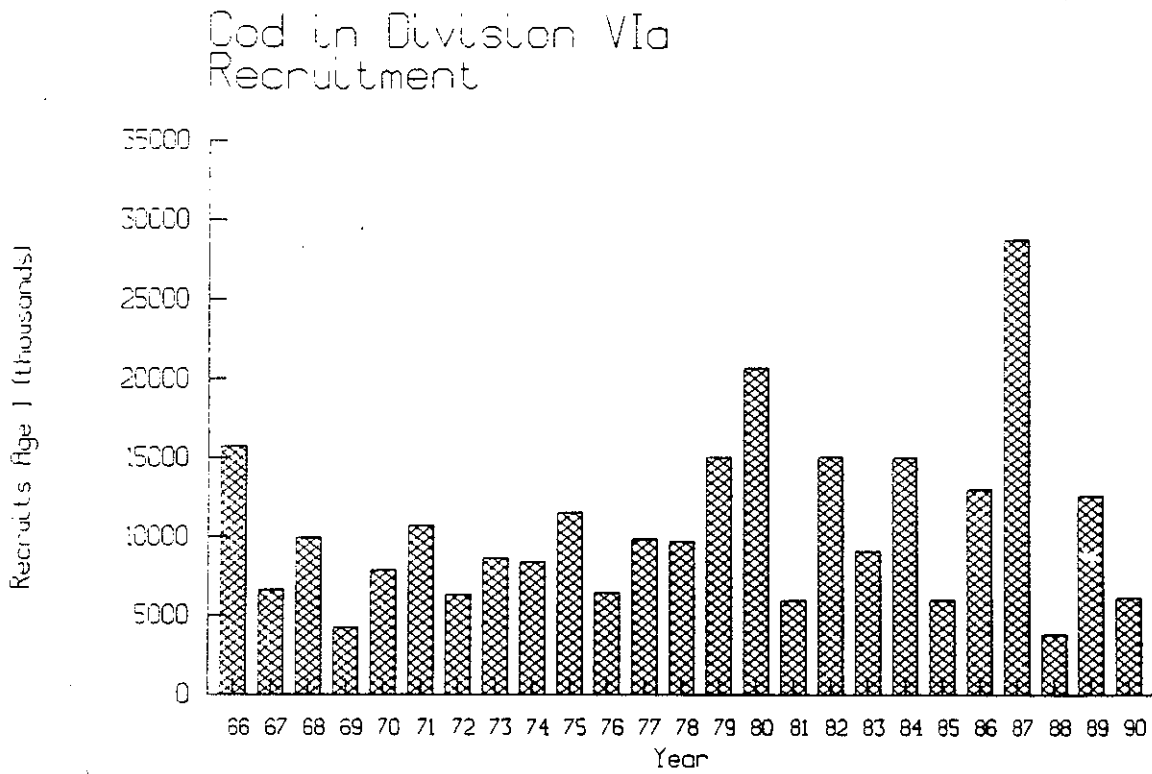
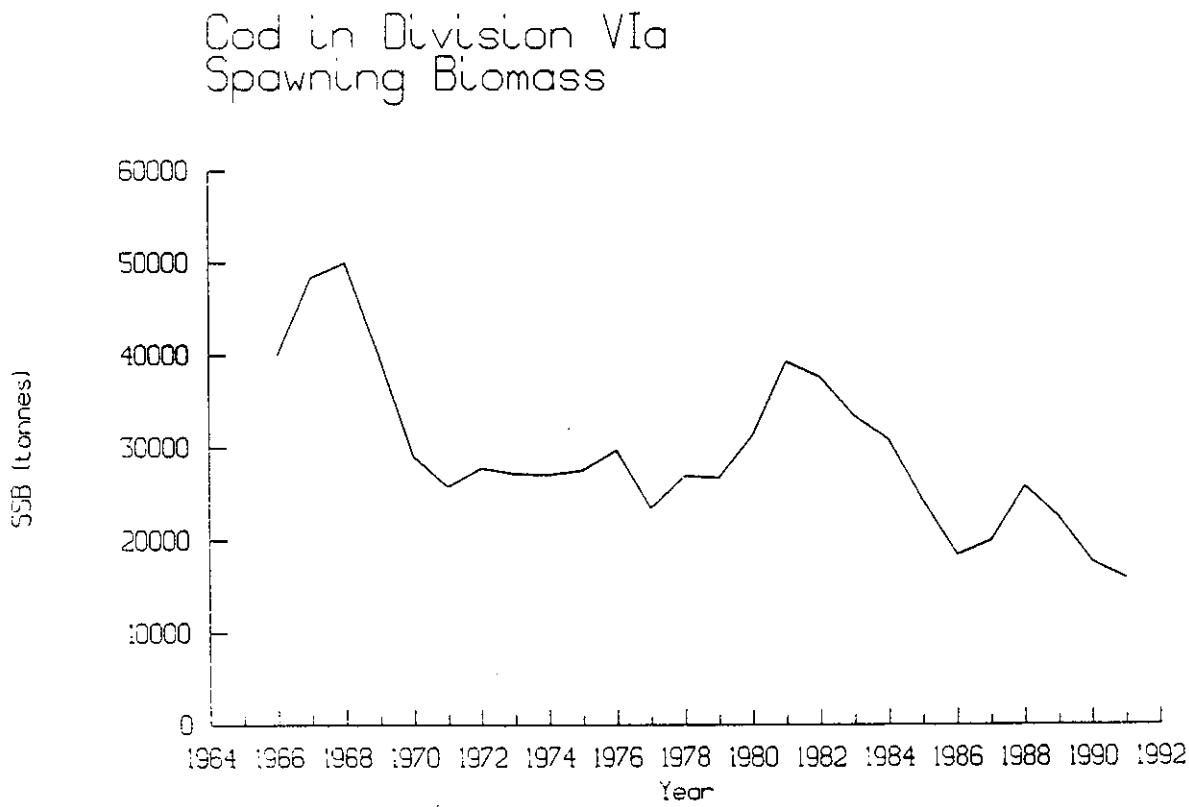
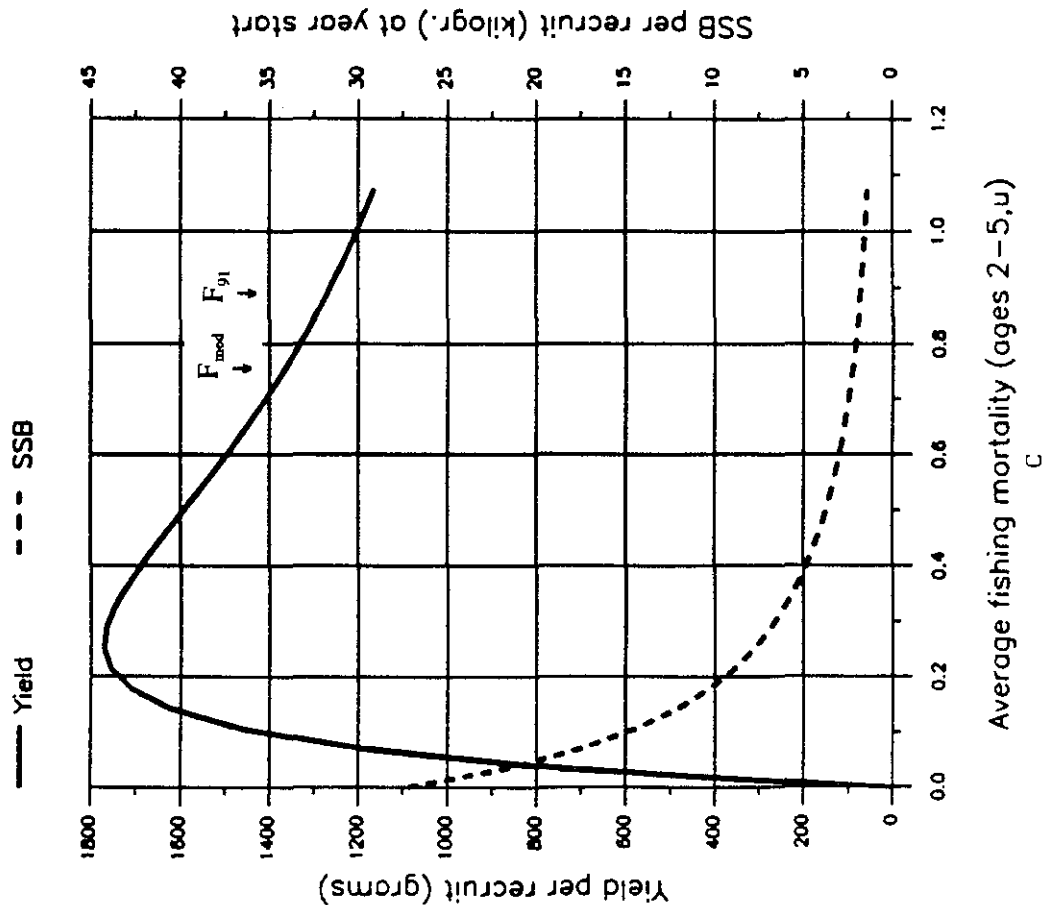


Figure 3.6.2.1D



FISH STOCK SUMMARY  
STOCK: Cod in the North-west Coast of Scotland and North Ireland  
27-10-1992

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

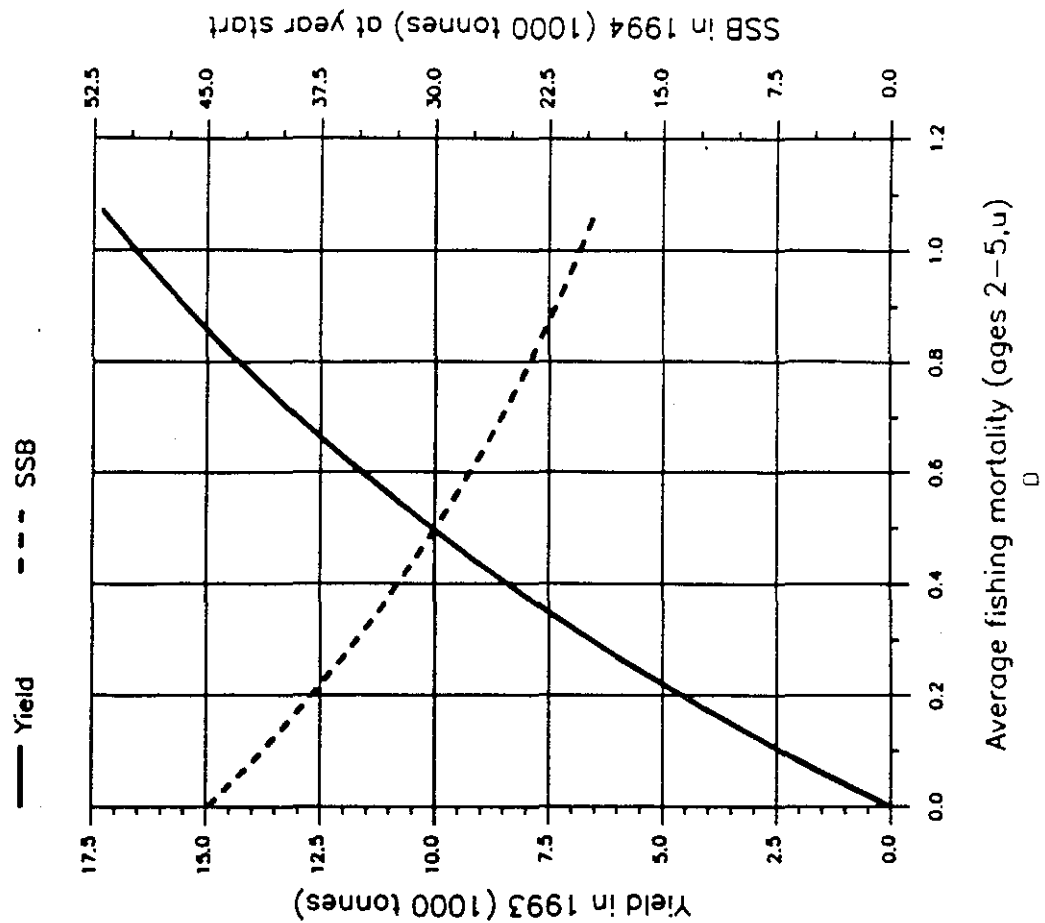




Figure 3.6.4.1A

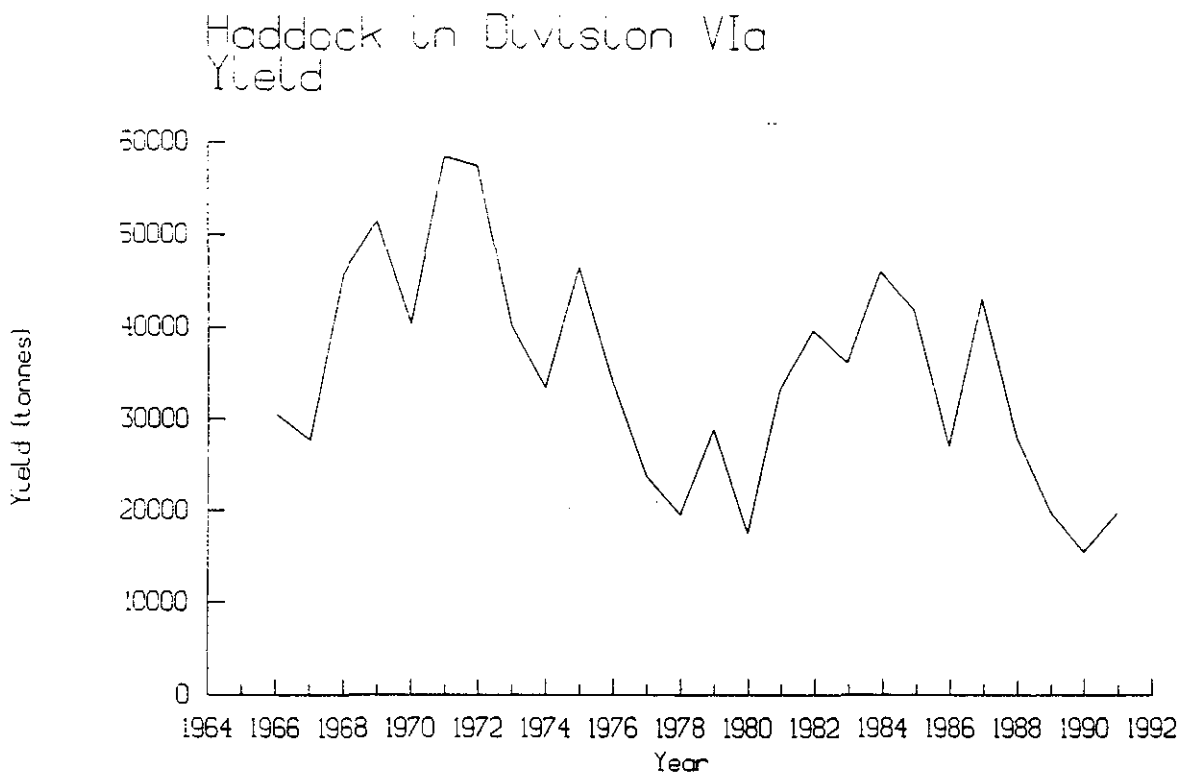


Figure 3.6.4.1B

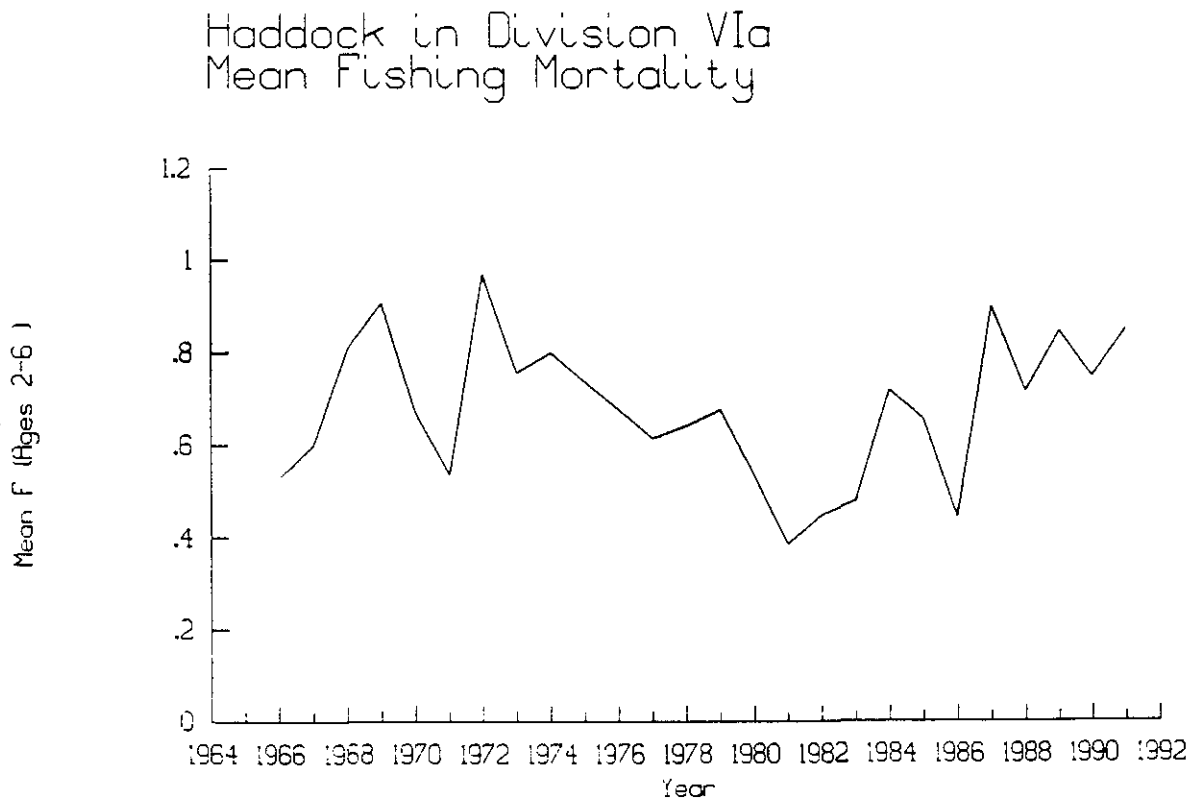


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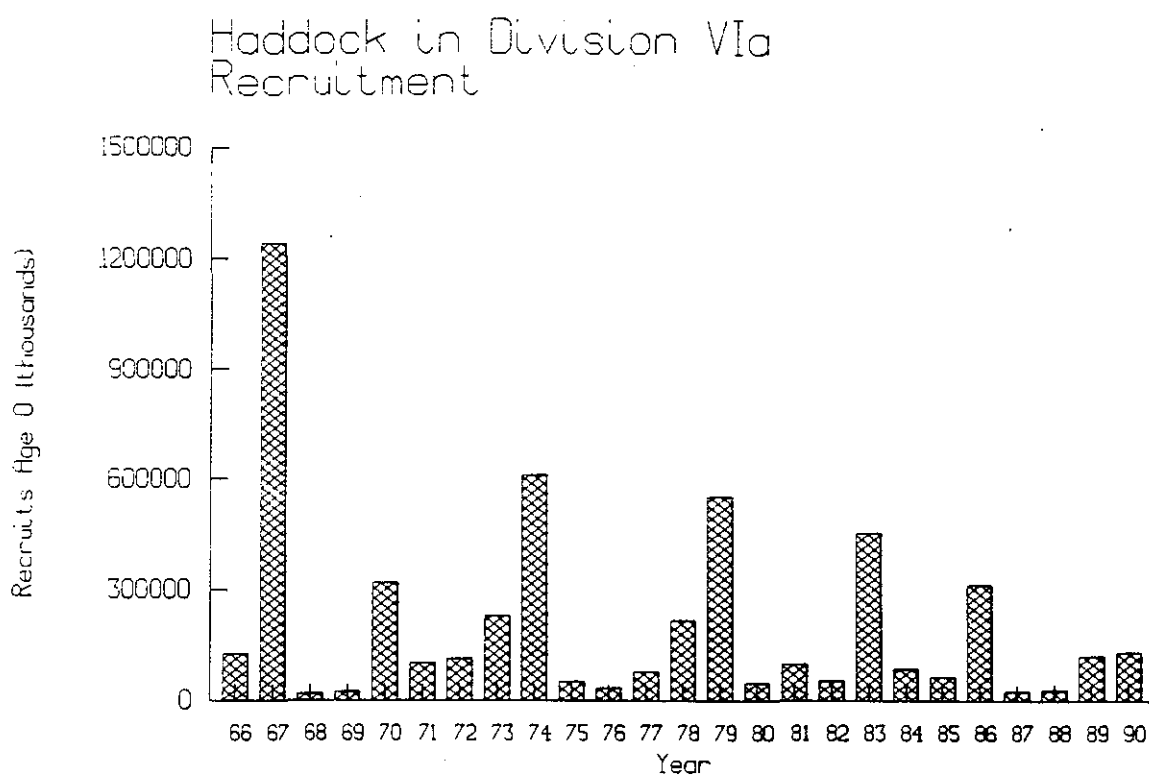


Figure 3.6.4.1D

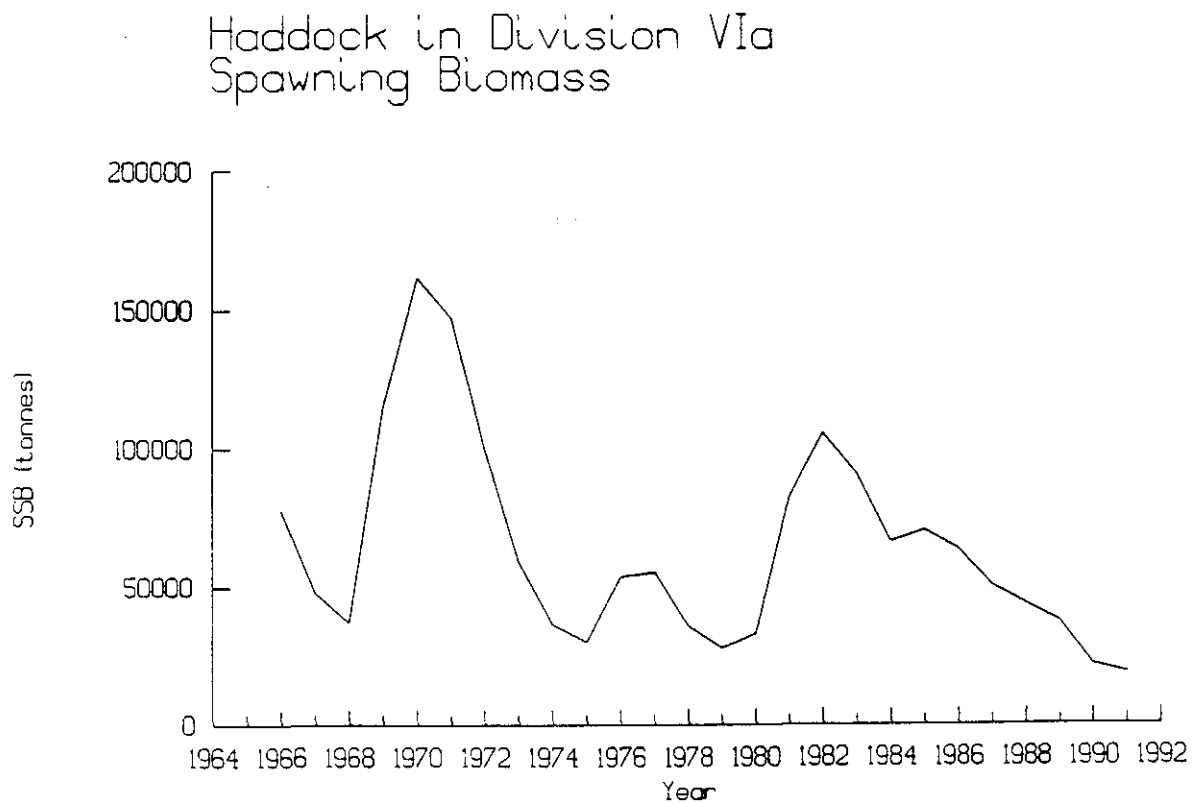


Figure 3.6.4.2A

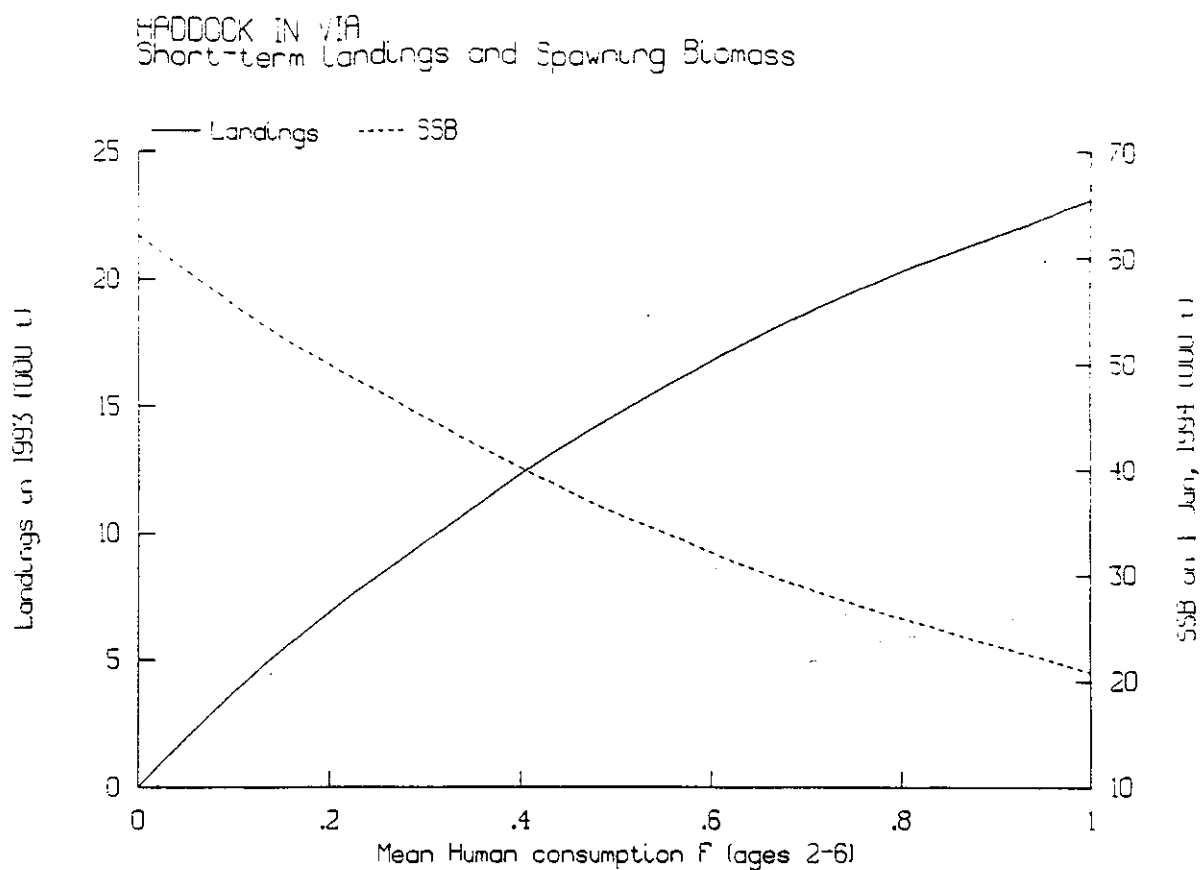


Figure 3.6.4.2B

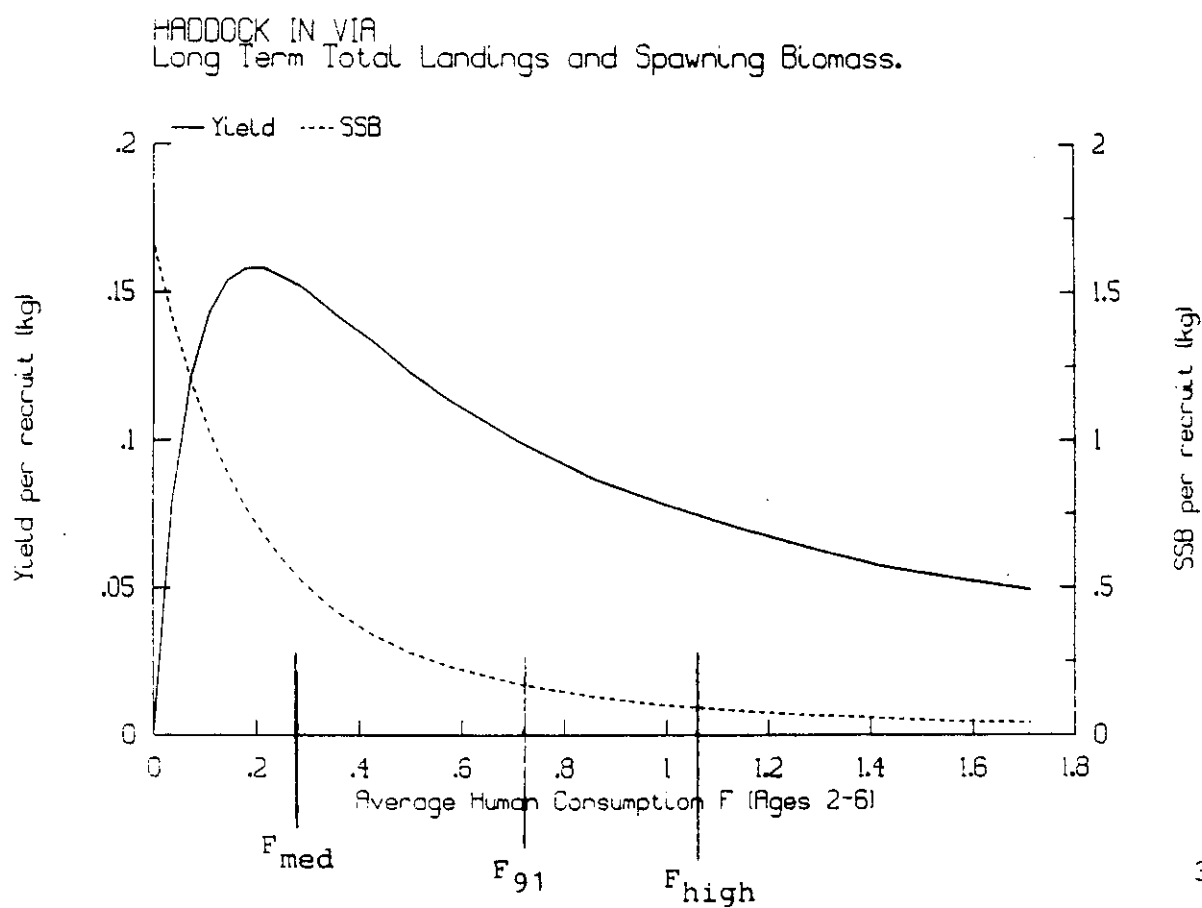


Figure 3.6.5.1A

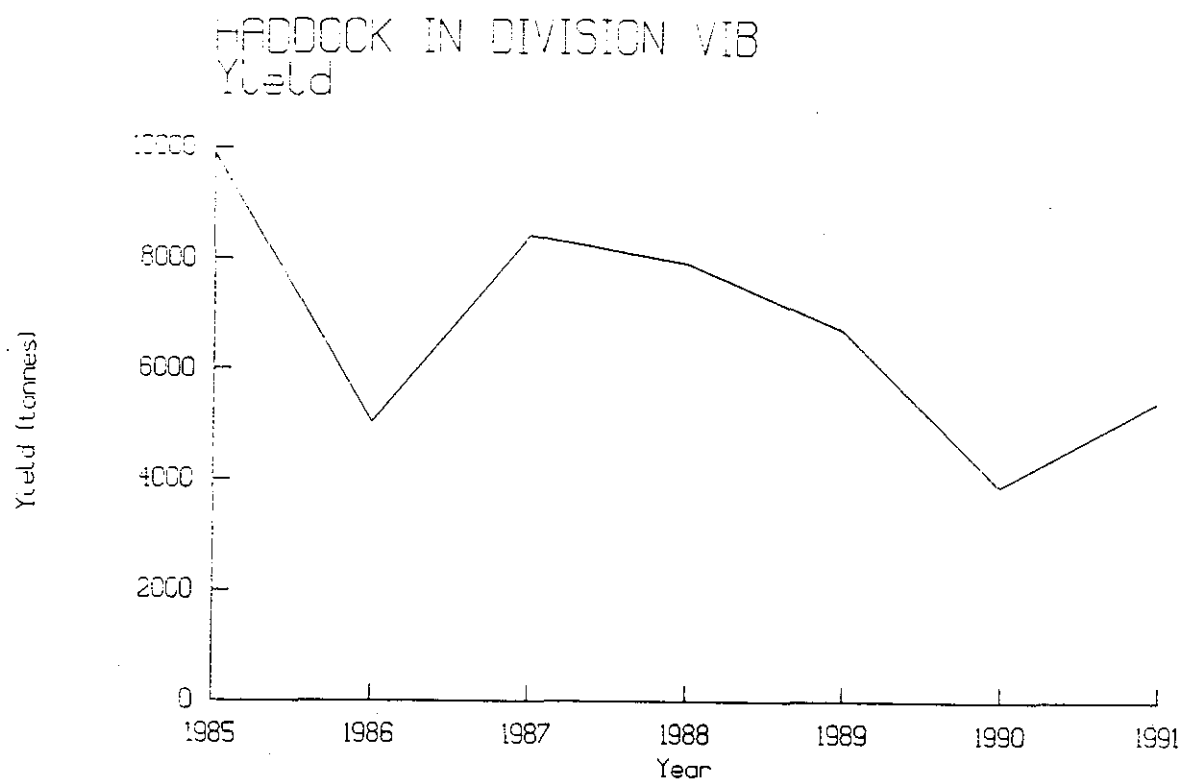


Figure 3.6.5.1B

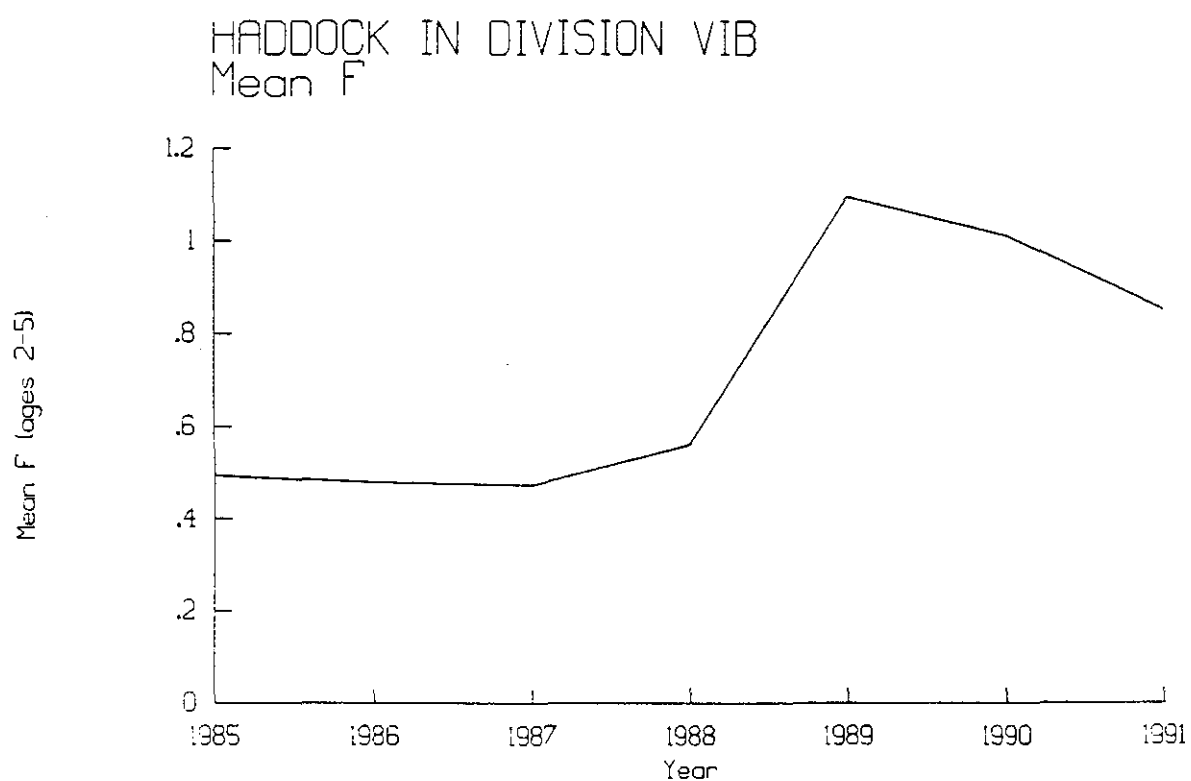


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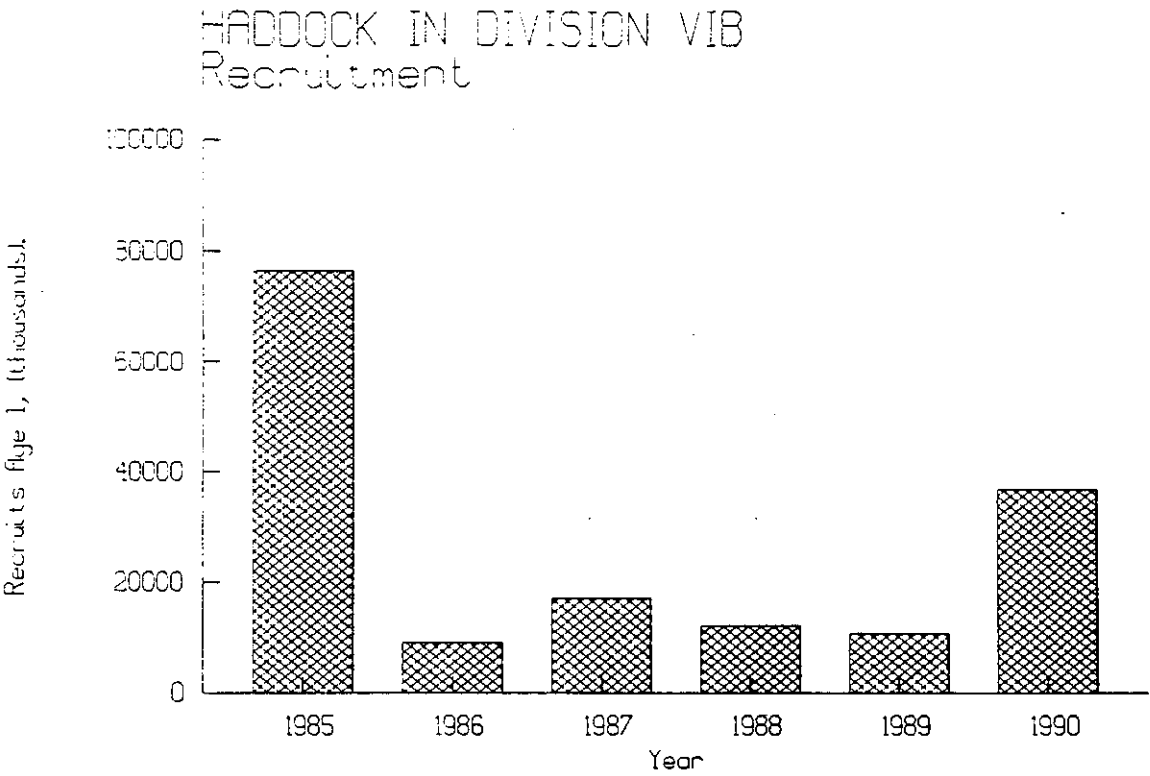


Figure 3.6.5.1D

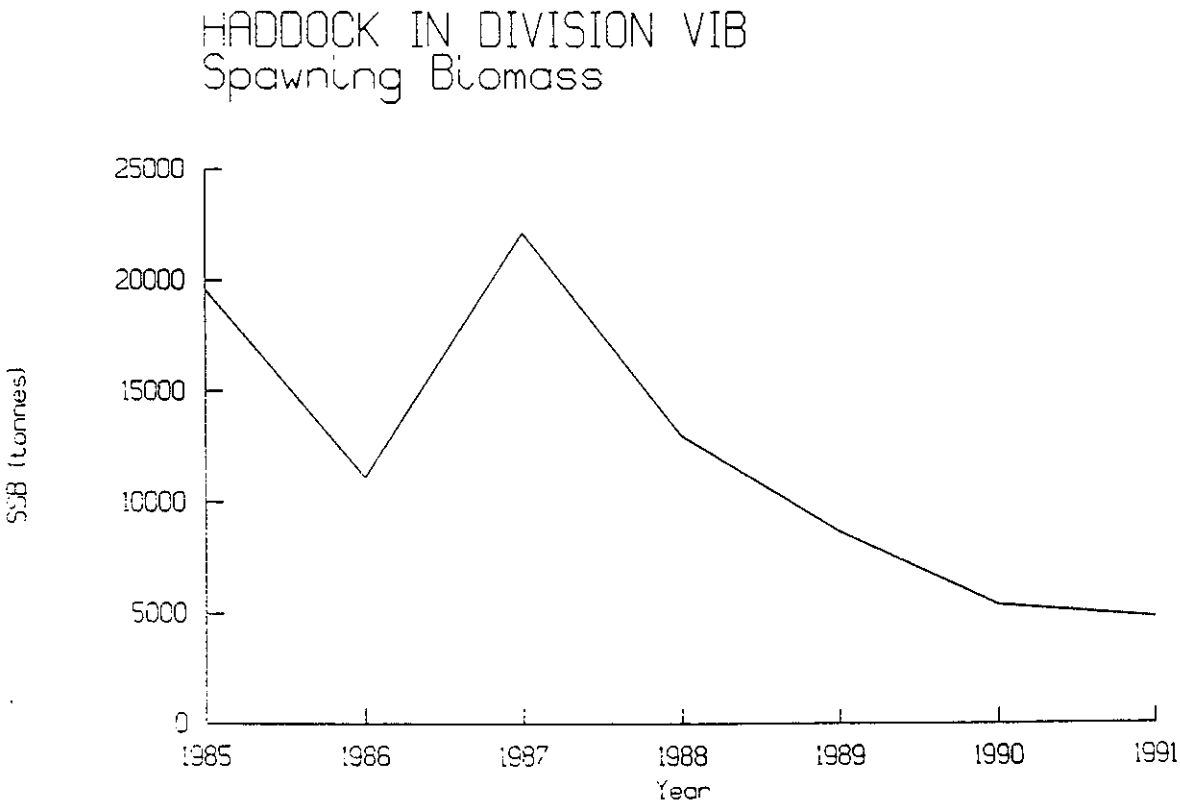


Figure 3.6.5.2A

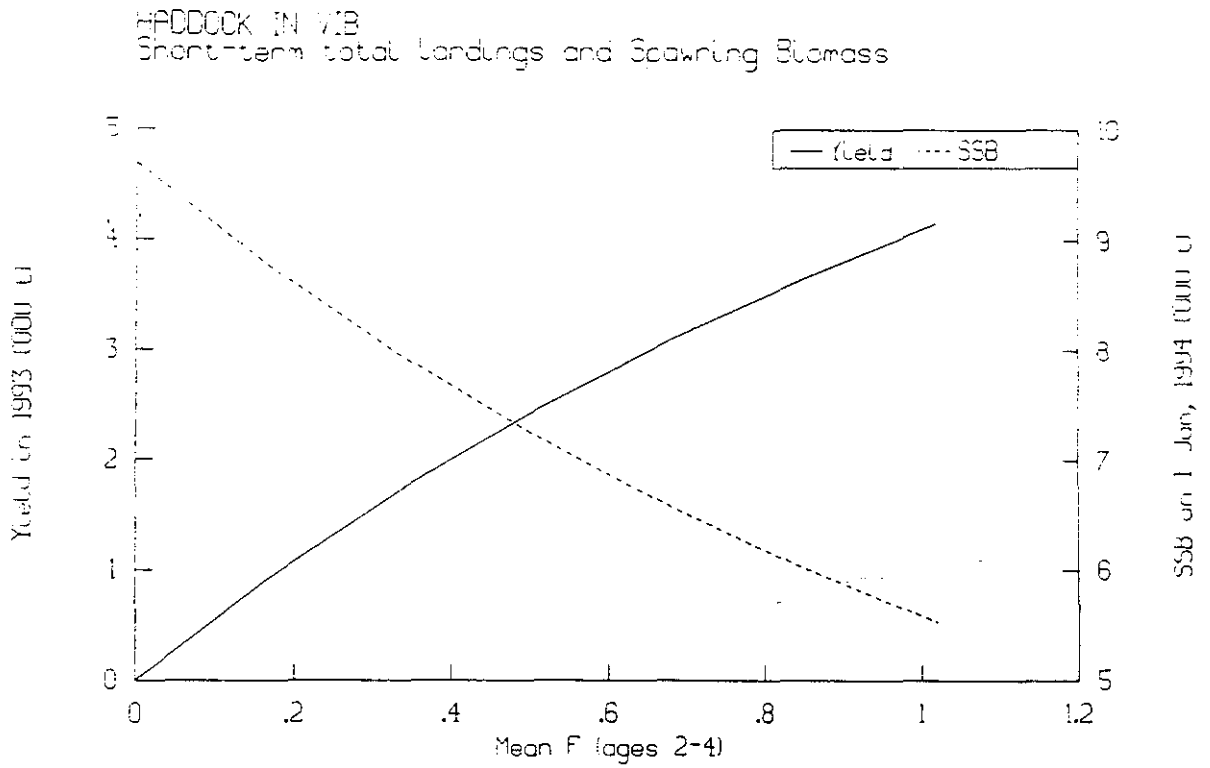


Figure 3.6.5.2B

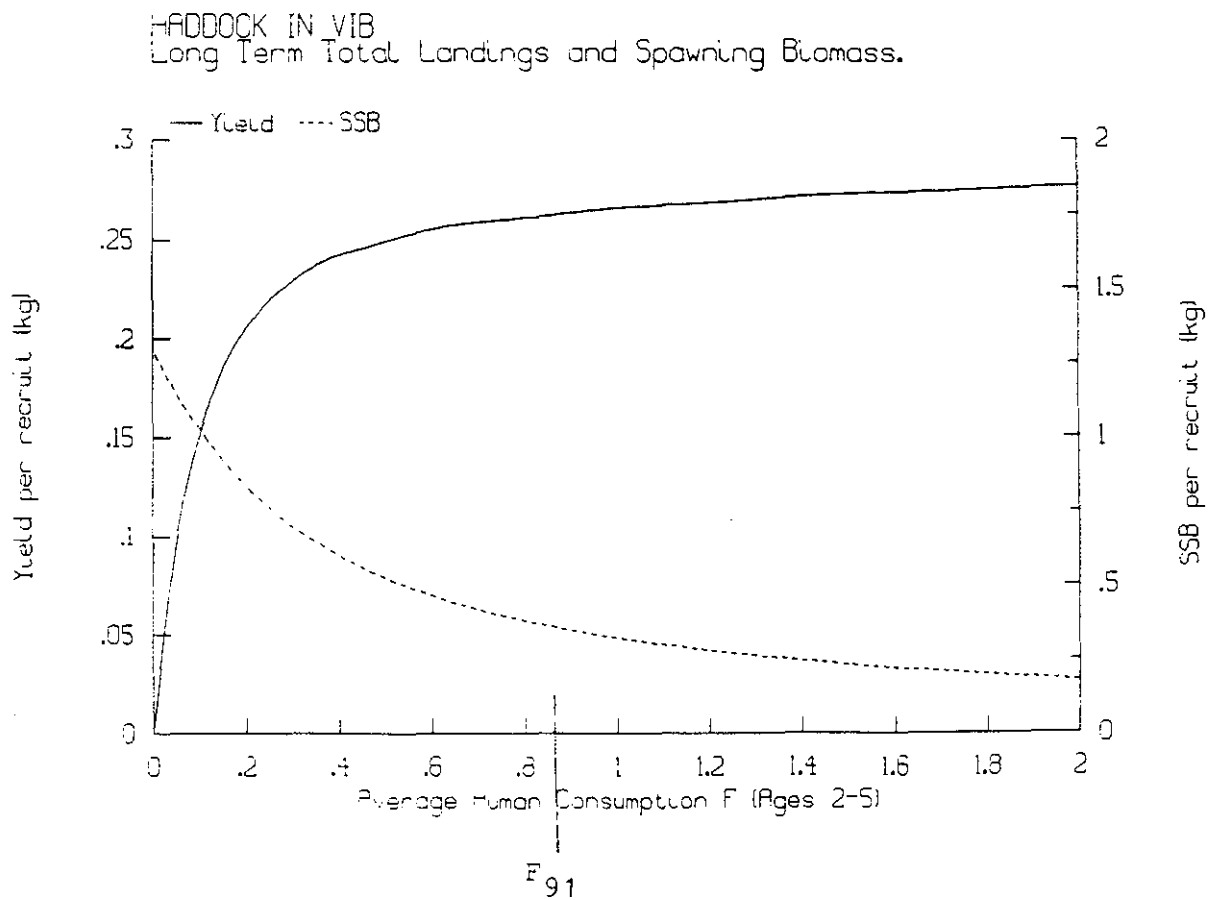


Figure 3.6.6.1A

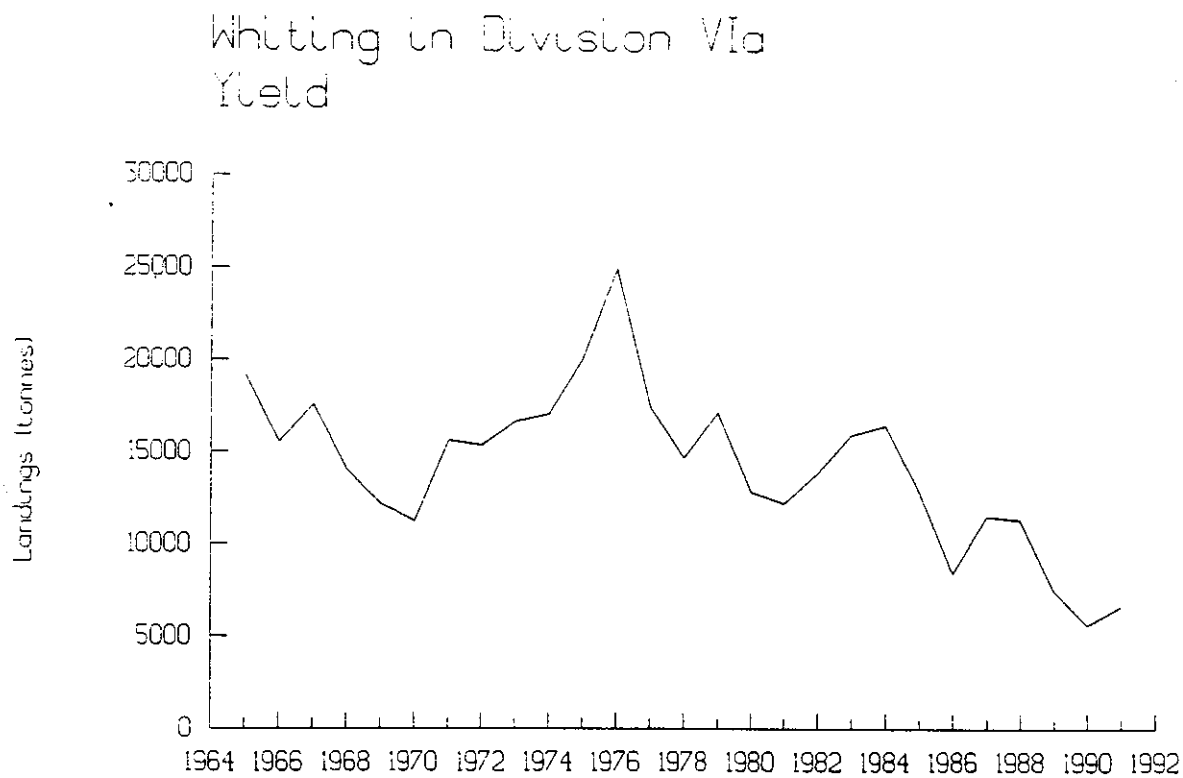


Figure 3.6.6.1B

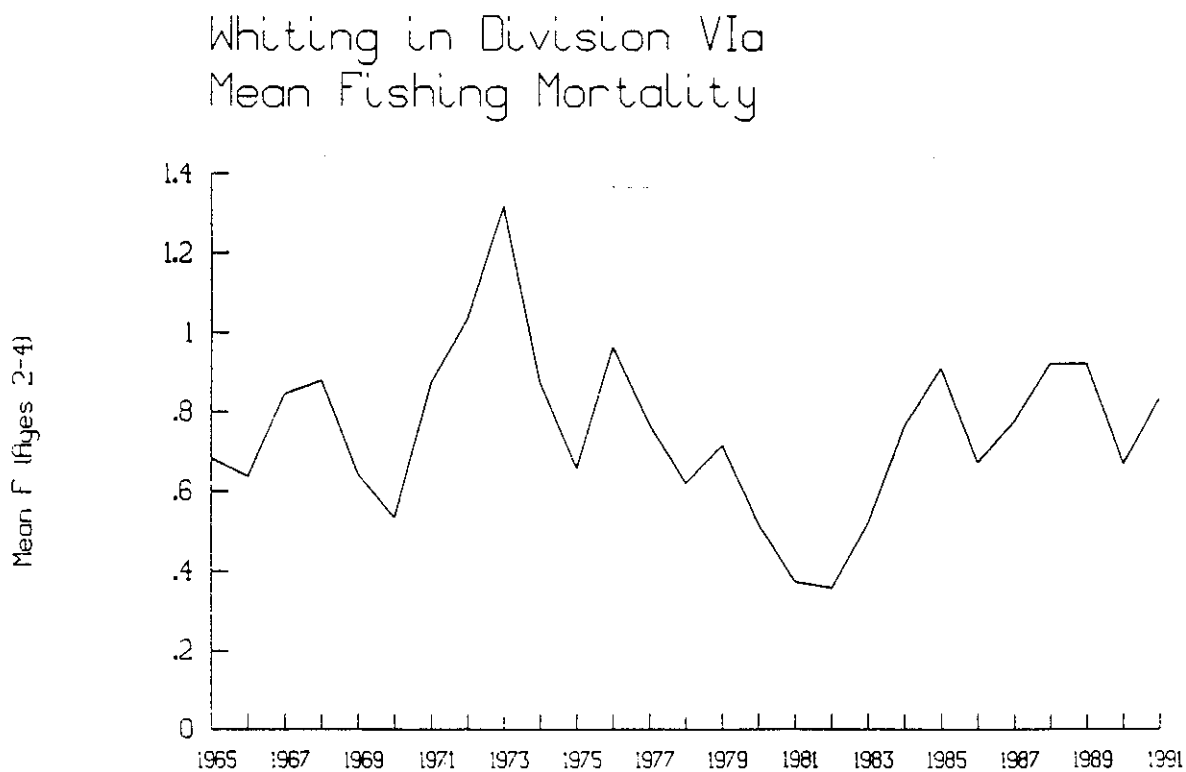


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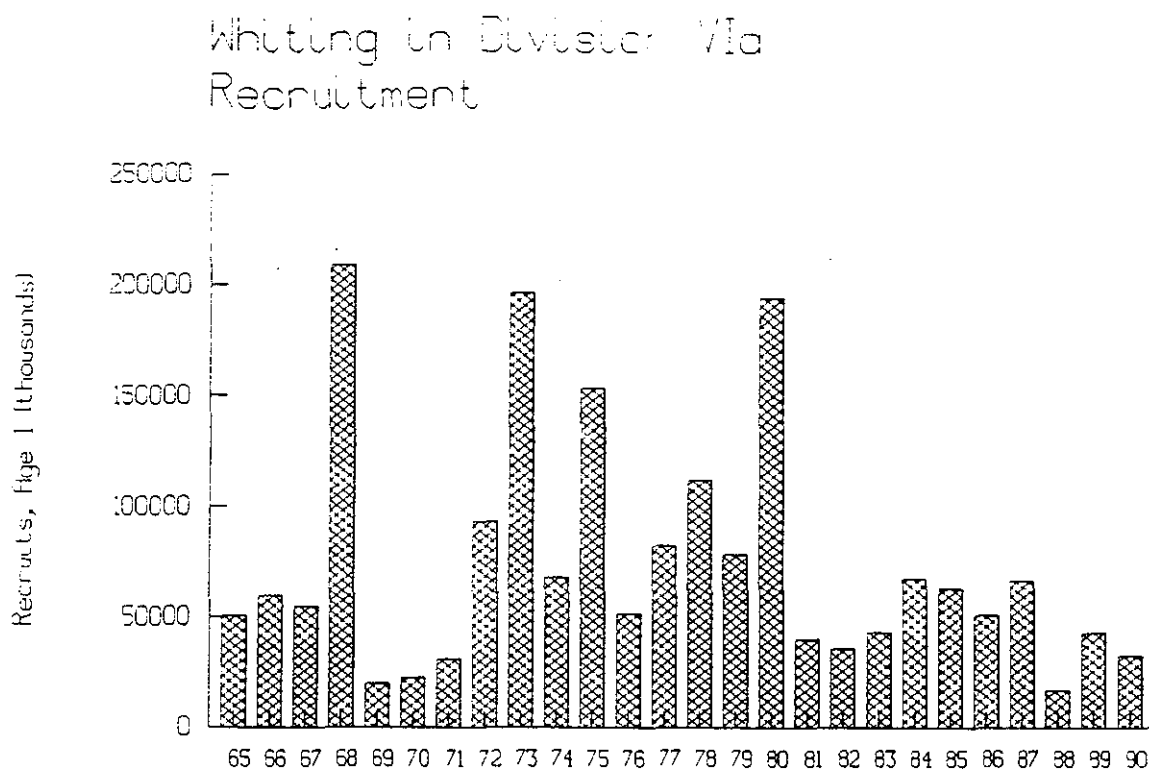


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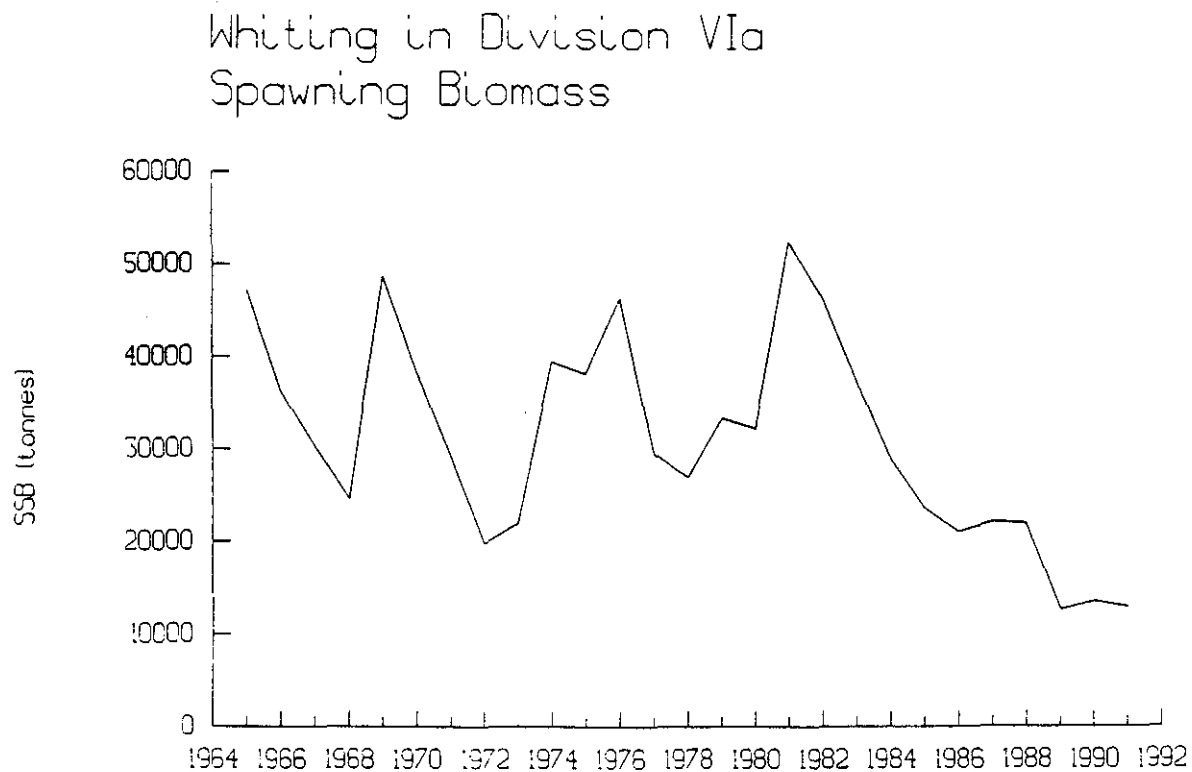




Figure 3.6.6.2A

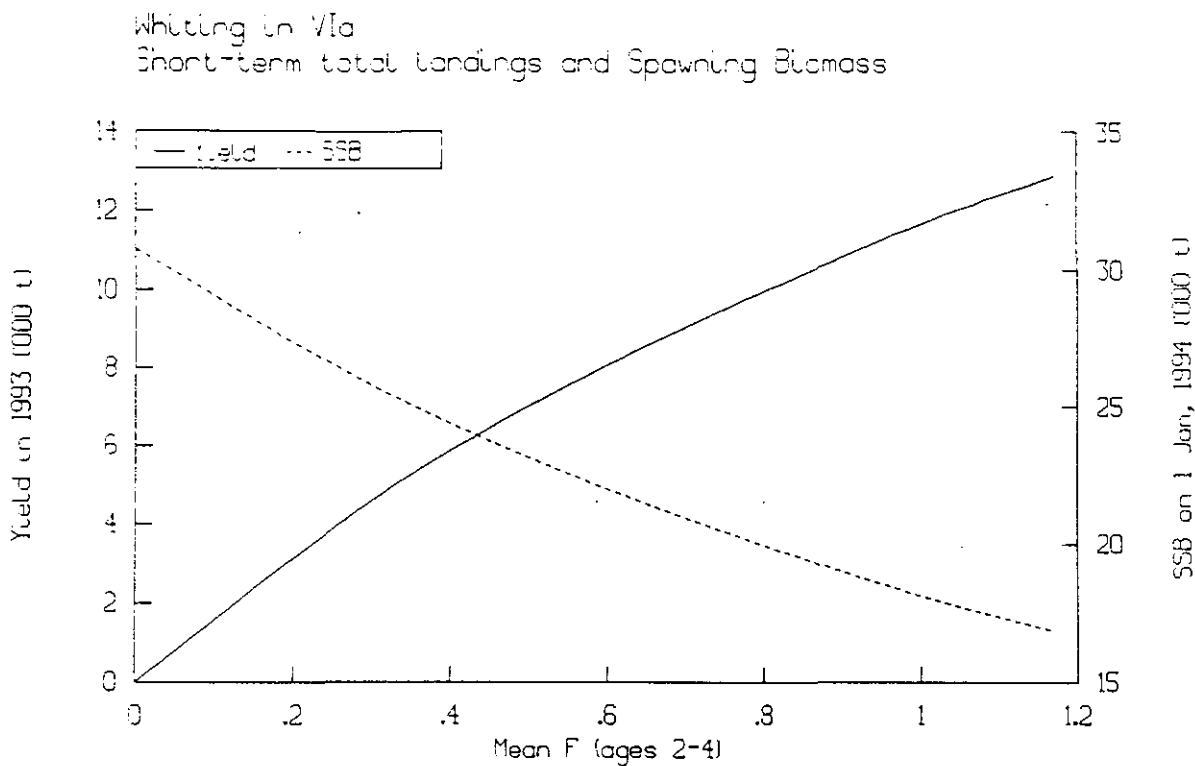


Figure 3.6.6.2B

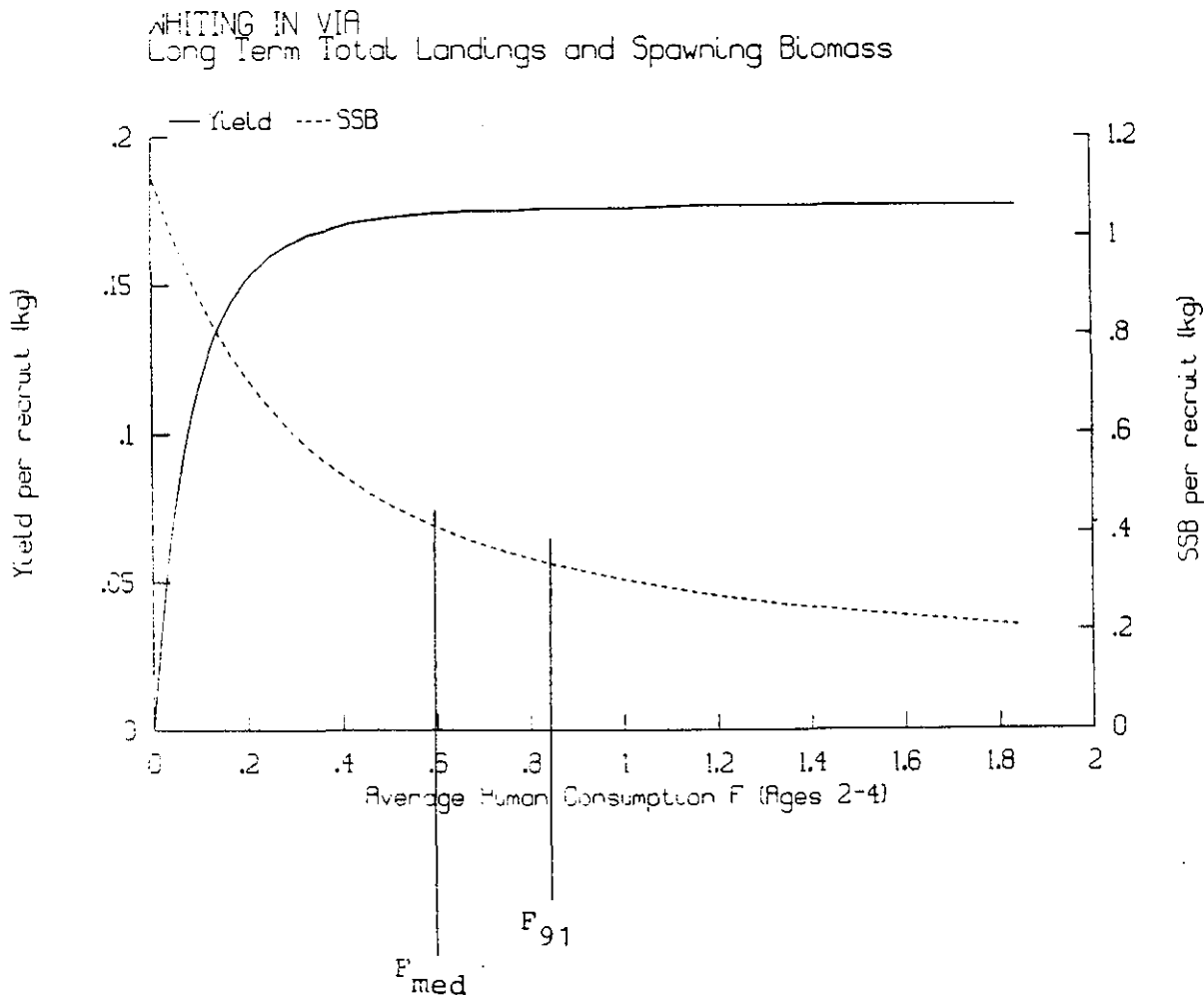


Figure 3.6.8.1A : SAITHE IN AREA VI.  
Yield (000t)

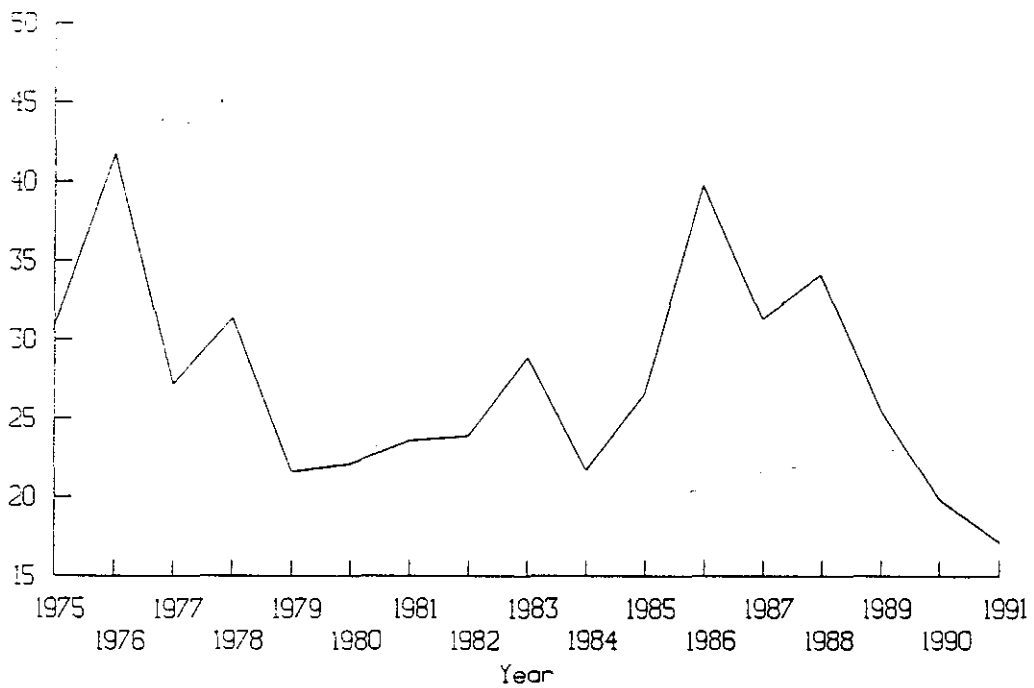


Figure 3.6.8.1B : SAITHE IN AREA VI  
Mean Fishing Mortality (3-6)

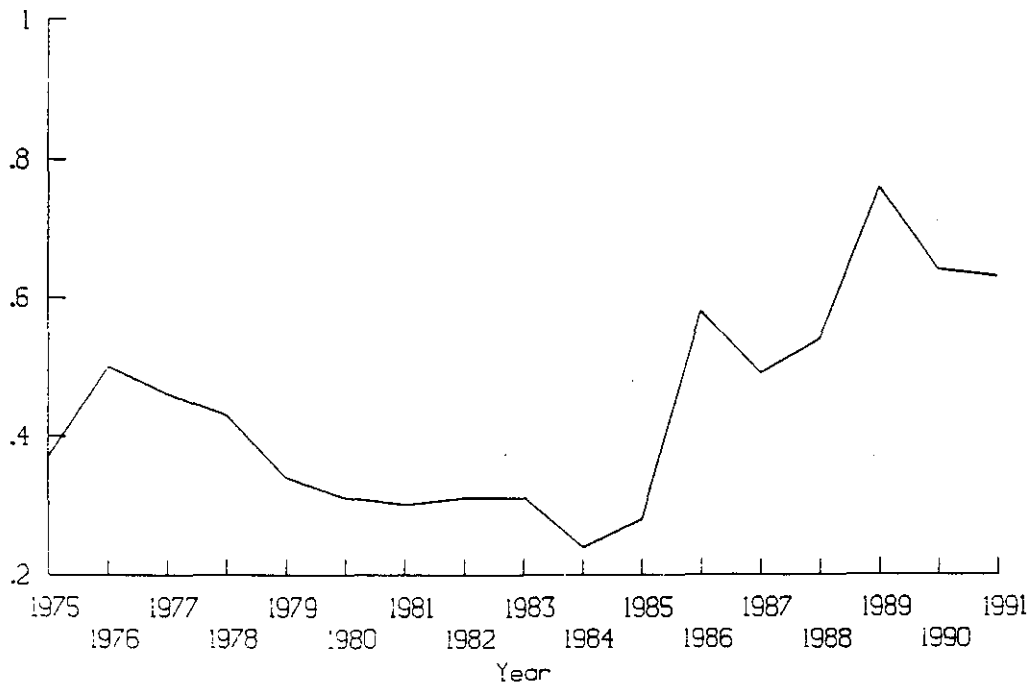


Figure 3.6.8.1C : SAITHE IN AREA VI  
Biomass

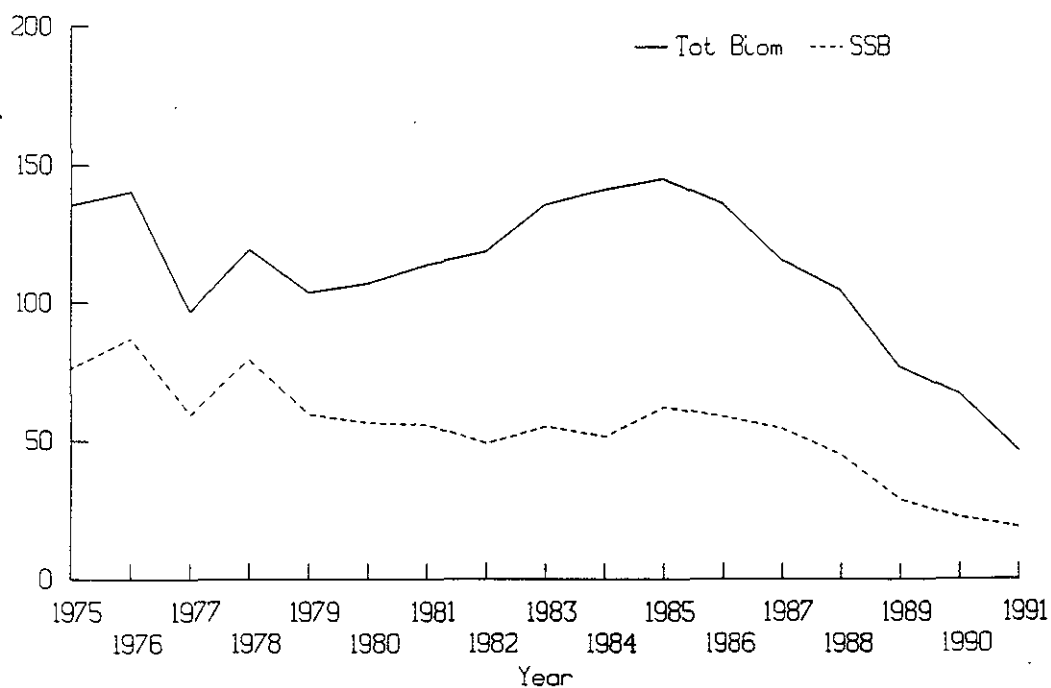


Figure 3.6.8.1D : SAITHE IN AREA VI  
Recruit at age 1 (millions)

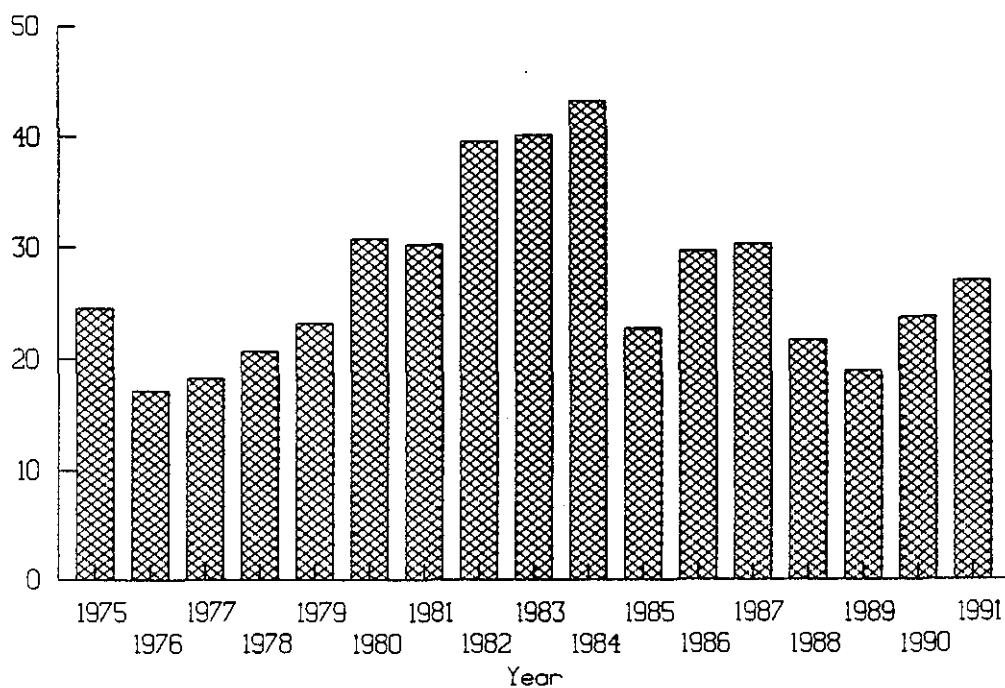


Figure 3.6.8.2A : SAITHE IN AREA VI  
Short term total landing and ssb

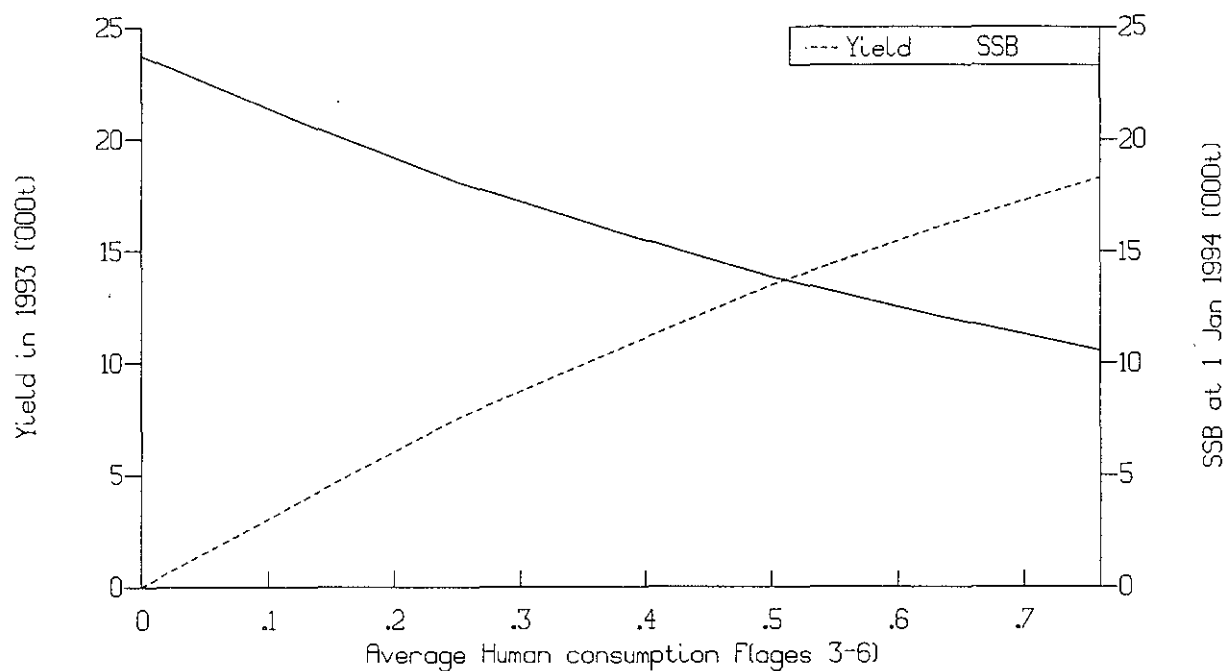


Figure 3.6.8.2B : SAITHE IN SUB-AREA VI  
Long term total landing and SSB

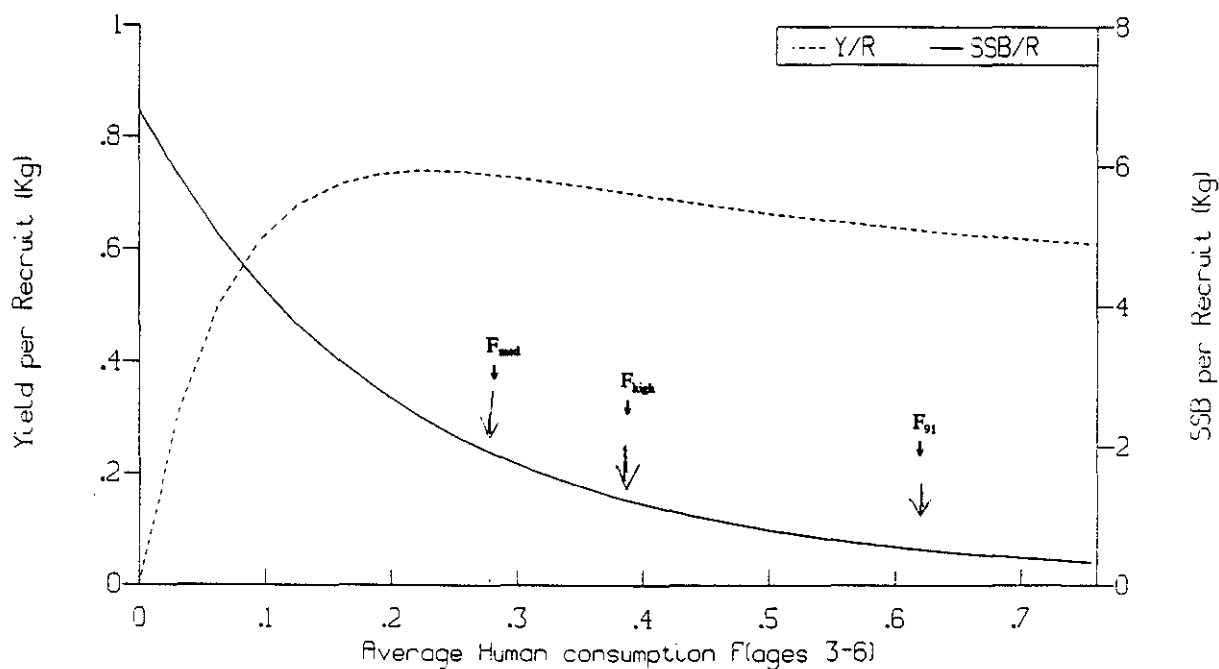


Figure 3.7.2A

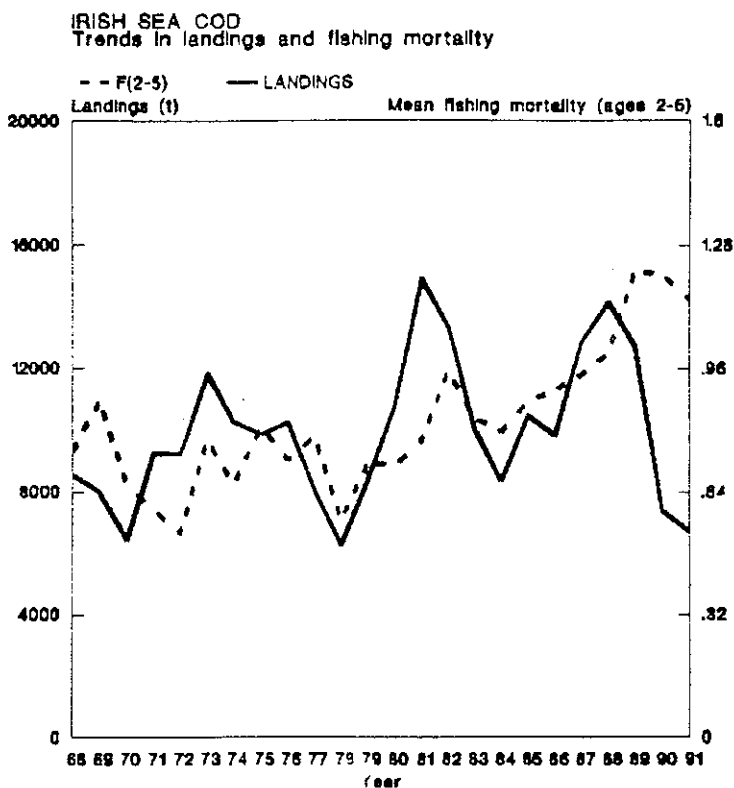


Figure 3.7.2B

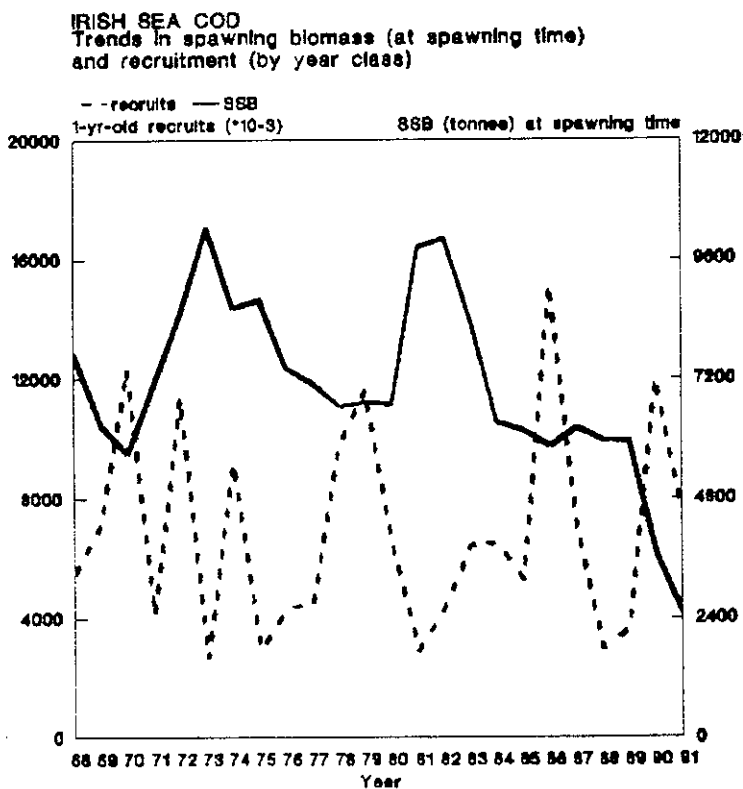


Figure 3.7.2C

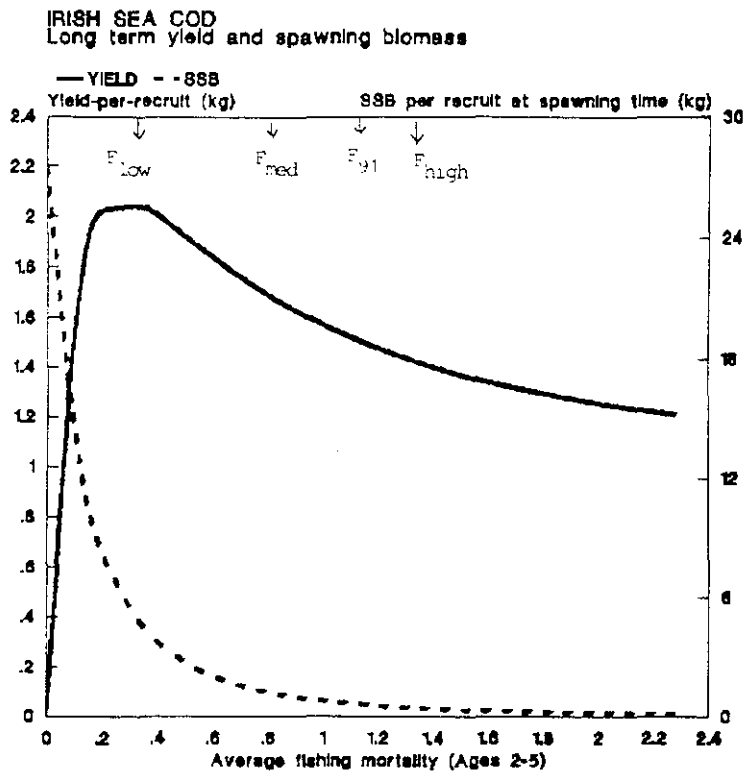


Figure 3.7.2D

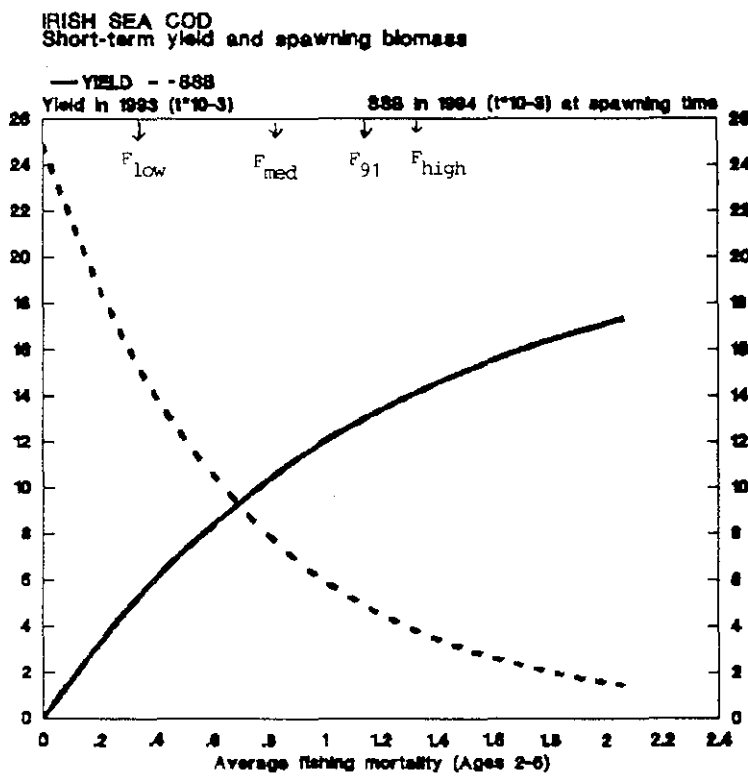


Figure 3.7.3A

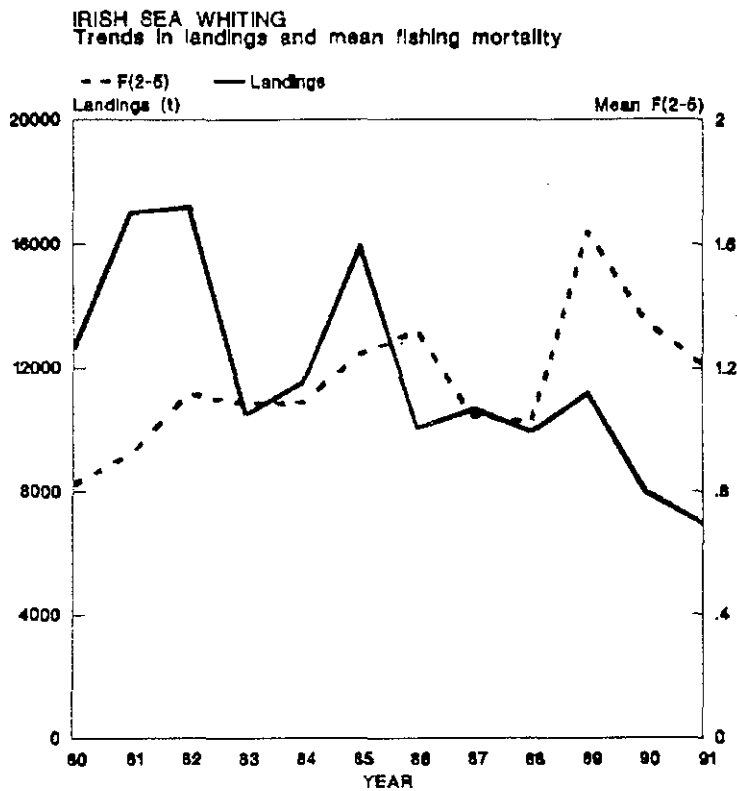


Figure 3.7.3B

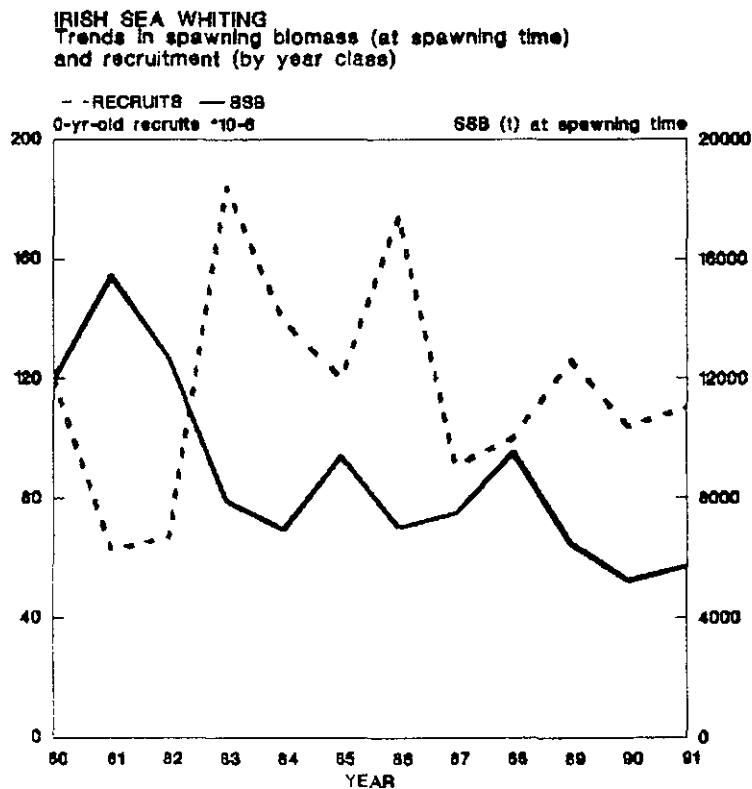


Figure 3.7.3C

IRISH SEA WHITING: NO REDUCTION IN DISCARD RATE  
Short-term yield and spawning biomass

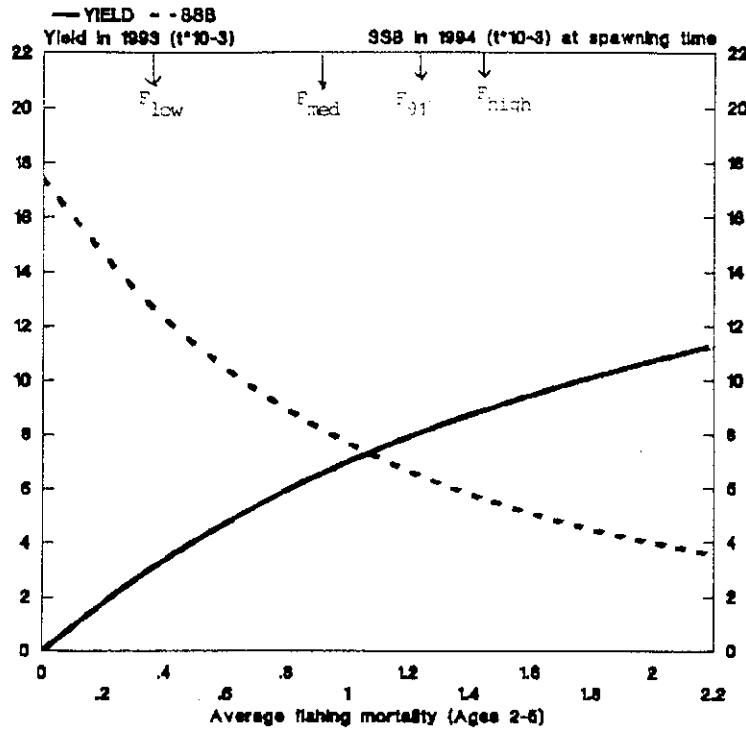


Figure 3.7.3D

IRISH SEA WHITING: 50% REDUCTION IN DISCARD RATE  
Short-term yield and spawning biomass

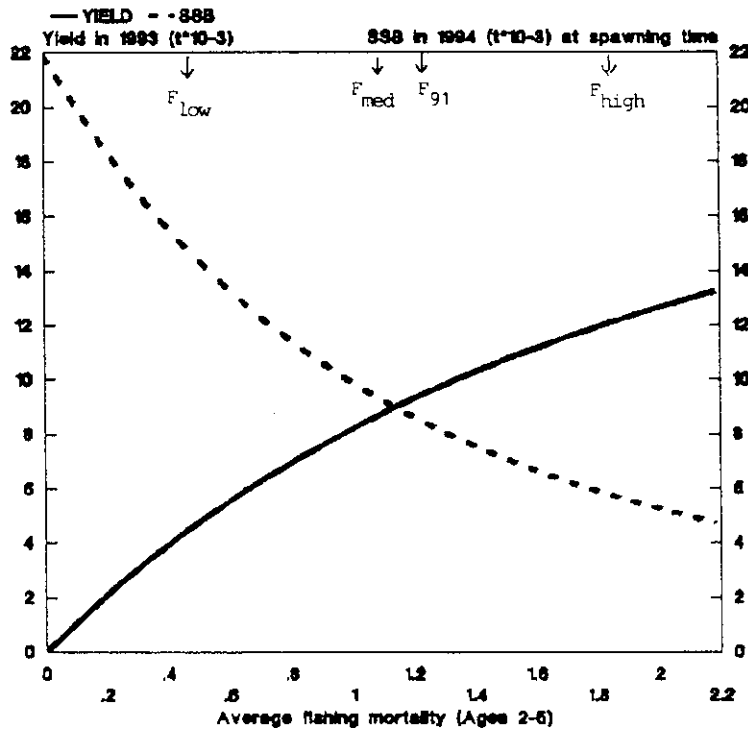




Figure 3.7.3E

IRISH SEA WHITING: NO REDUCTION IN DISCARD RATE  
Long term yield and spawning biomass

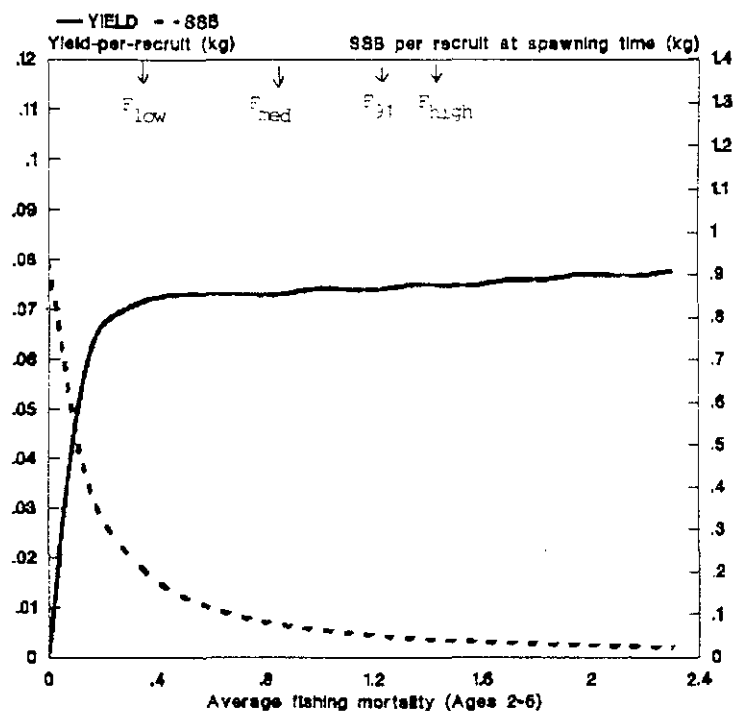


Figure 3.7.3F

IRISH SEA WHITING: 50% REDUCTION IN DISCARD RATE  
Long term yield and spawning biomass

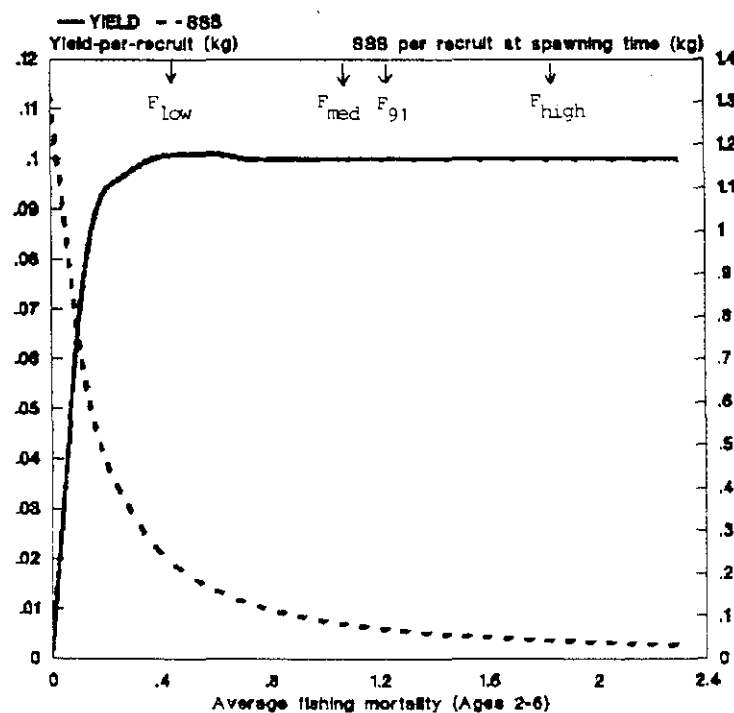


Figure 3.7.4A

: VII a plaice

Trend in yield and fishing mortality

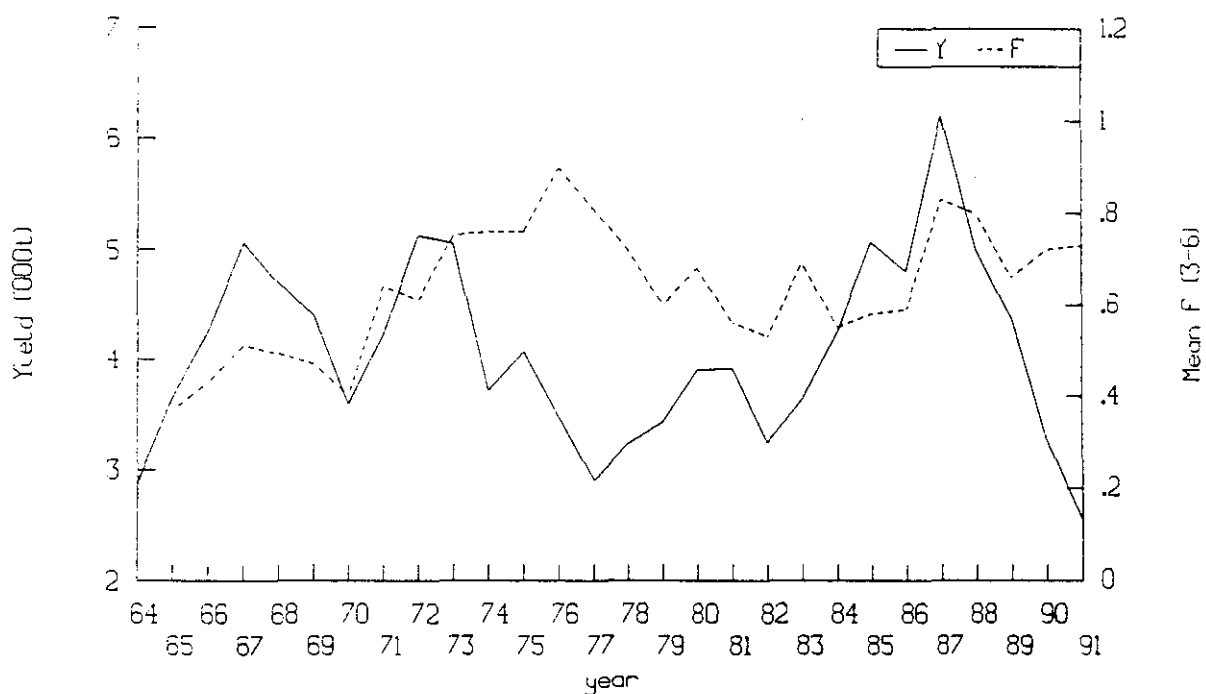


Figure 3.7.4B

: VII a plaice

Trend in recruitment and SSB

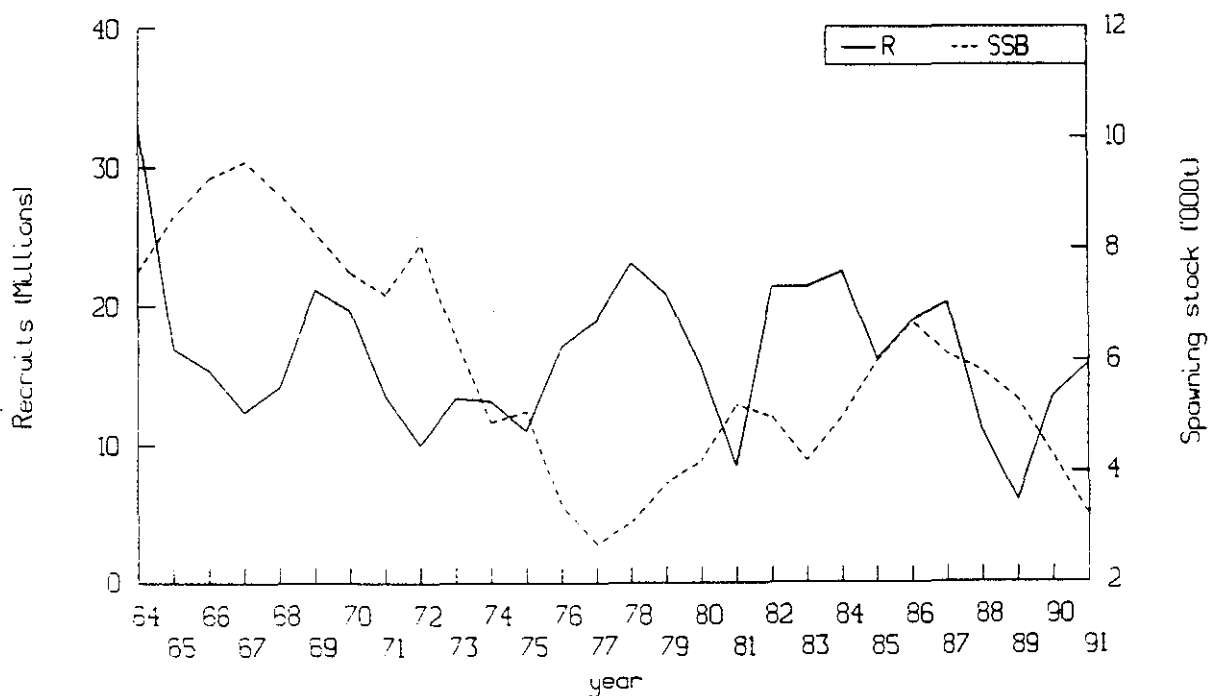


Figure 3.7.4C

: VIIa plaice

Long term yield and SSB

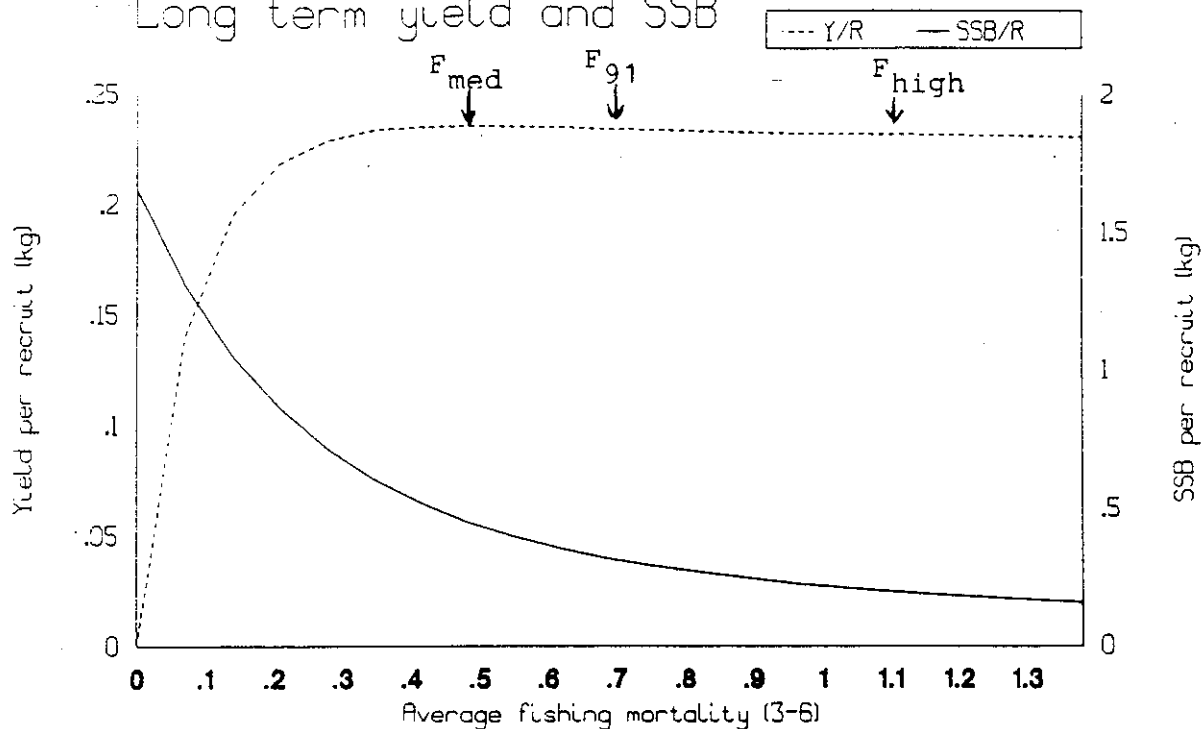


Figure 3.7.4D

Plaice in VIIa

Short term total landing and ssb

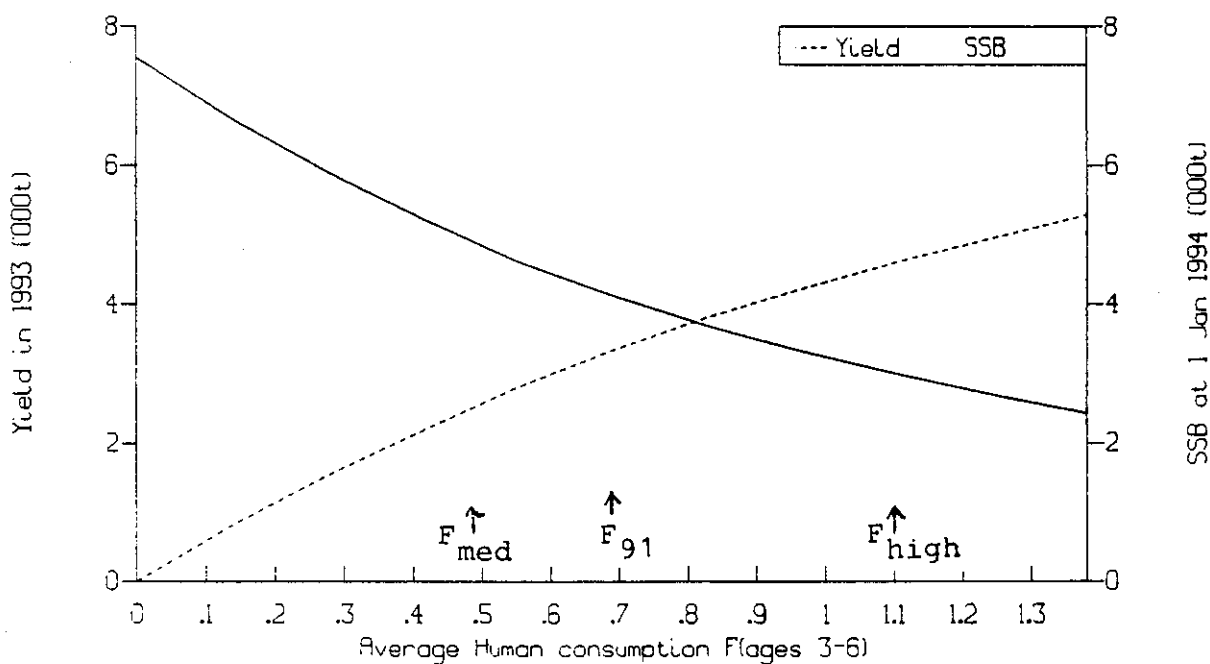
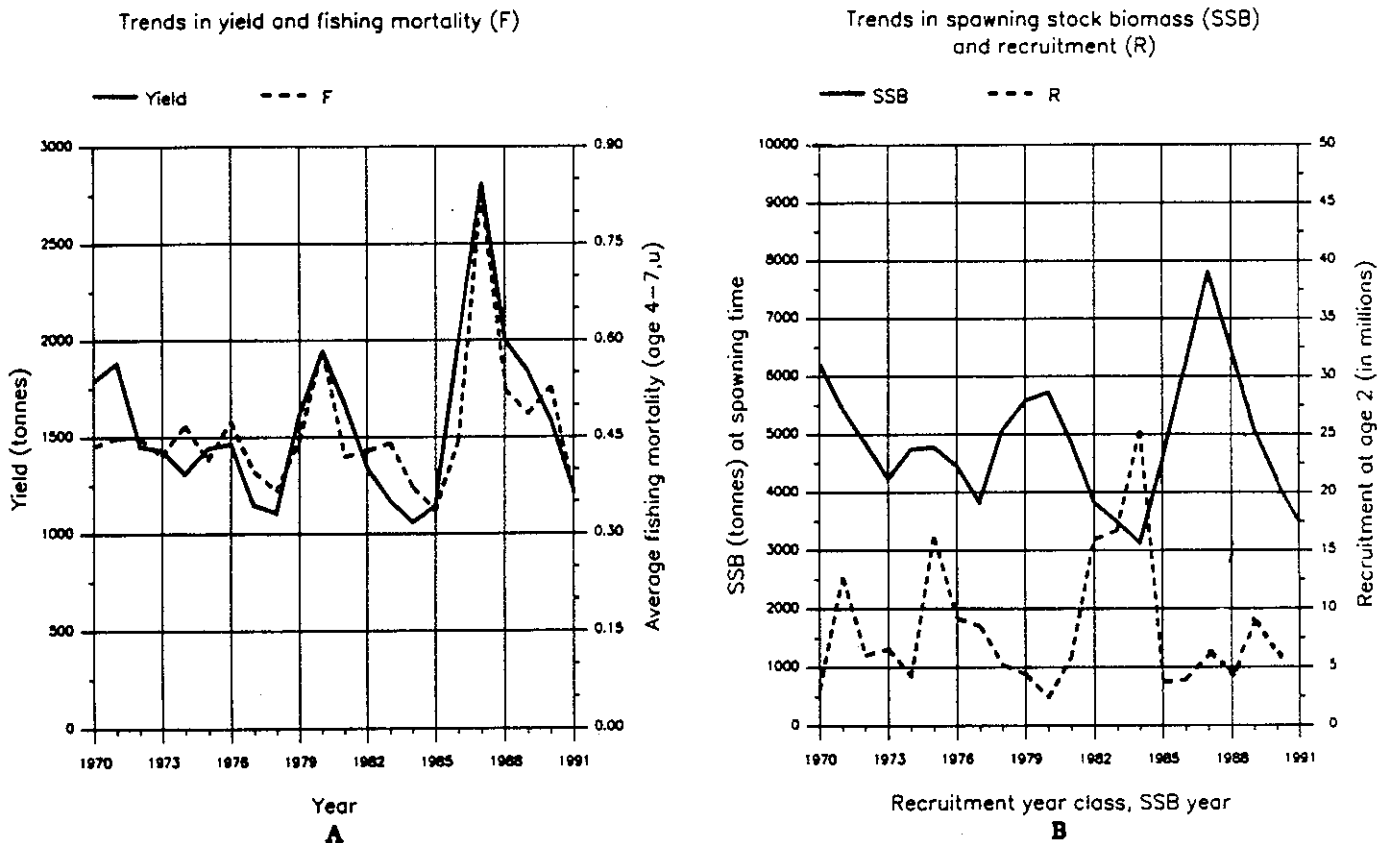


Figure 3.7.5

**FISH STOCK SUMMARY**  
**STOCK: Sole in the Irish Sea (Fishing Area VIIa)**  
**29-10-1992**



**FISH STOCK SUMMARY**  
**STOCK: Sole in the Irish Sea (Fishing Area VIIa)**  
**30-10-1992**

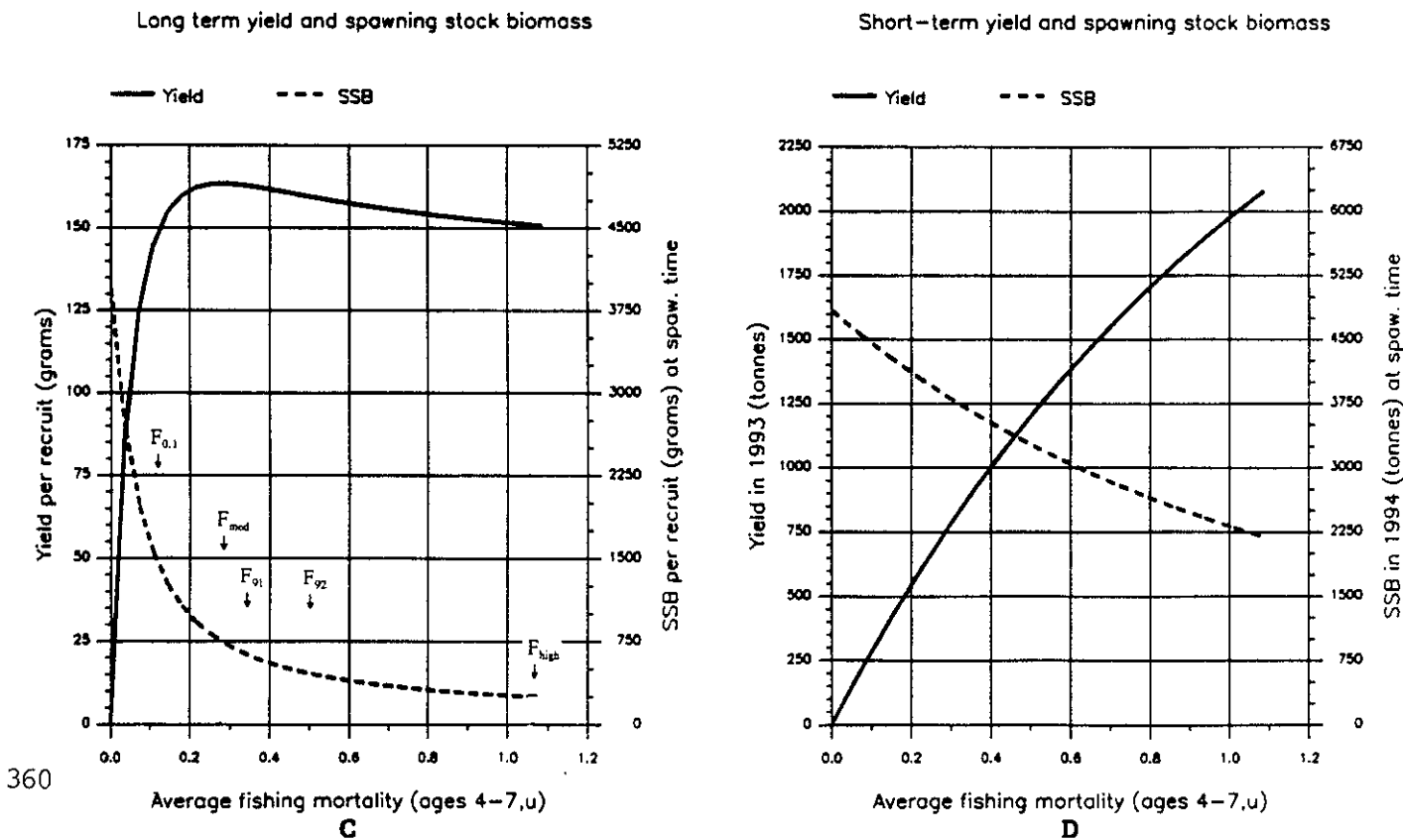
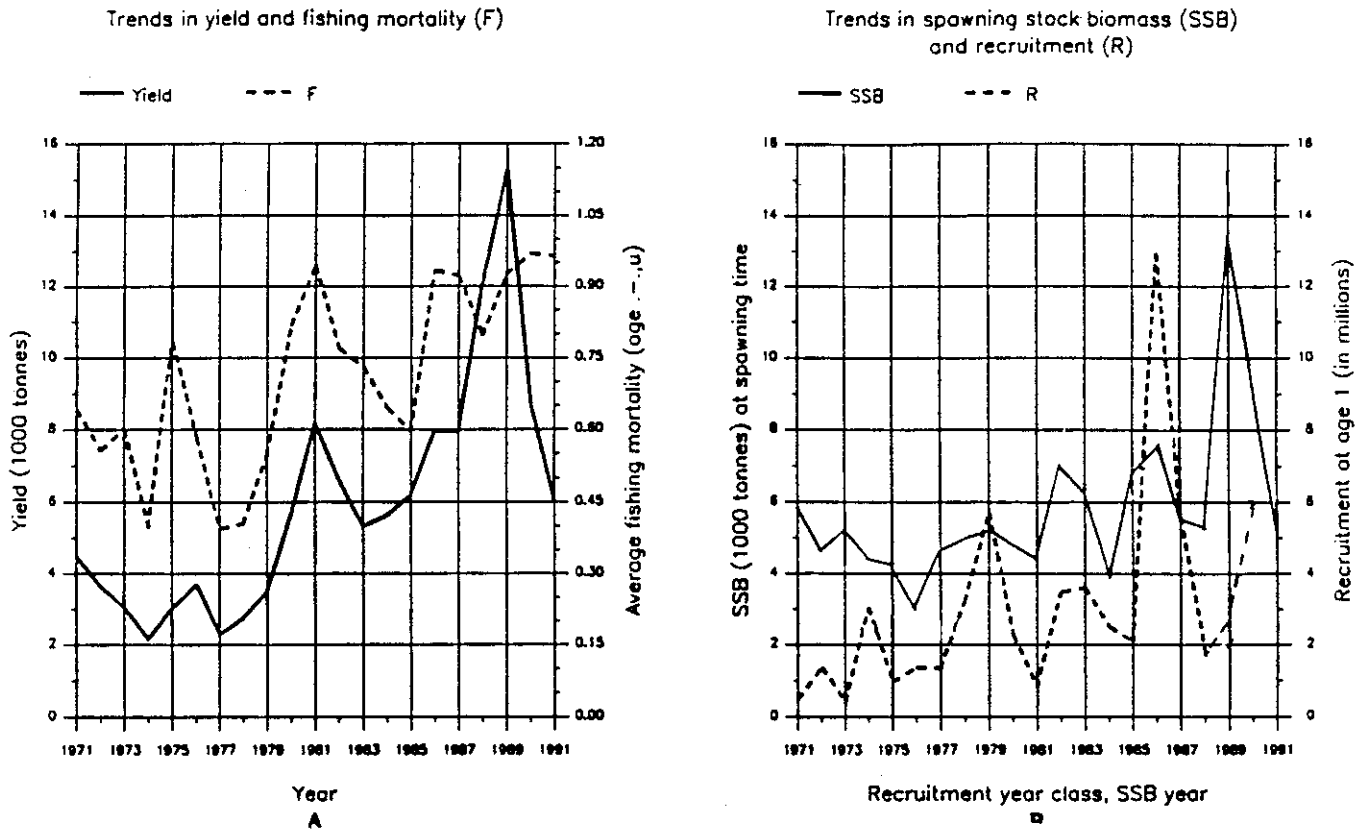


Figure 3.8.1

**FISH STOCK SUMMARY**  
**STOCK: Cod in the Celtic Sea (Fishing Areas VII<sub>f</sub> and VII<sub>g</sub>)**  
**15-9-1992**



**FISH STOCK SUMMARY**  
**STOCK: Cod in the Celtic Sea (Fishing Areas VII<sub>f</sub> and VII<sub>g</sub>)**  
**15-9-1992**

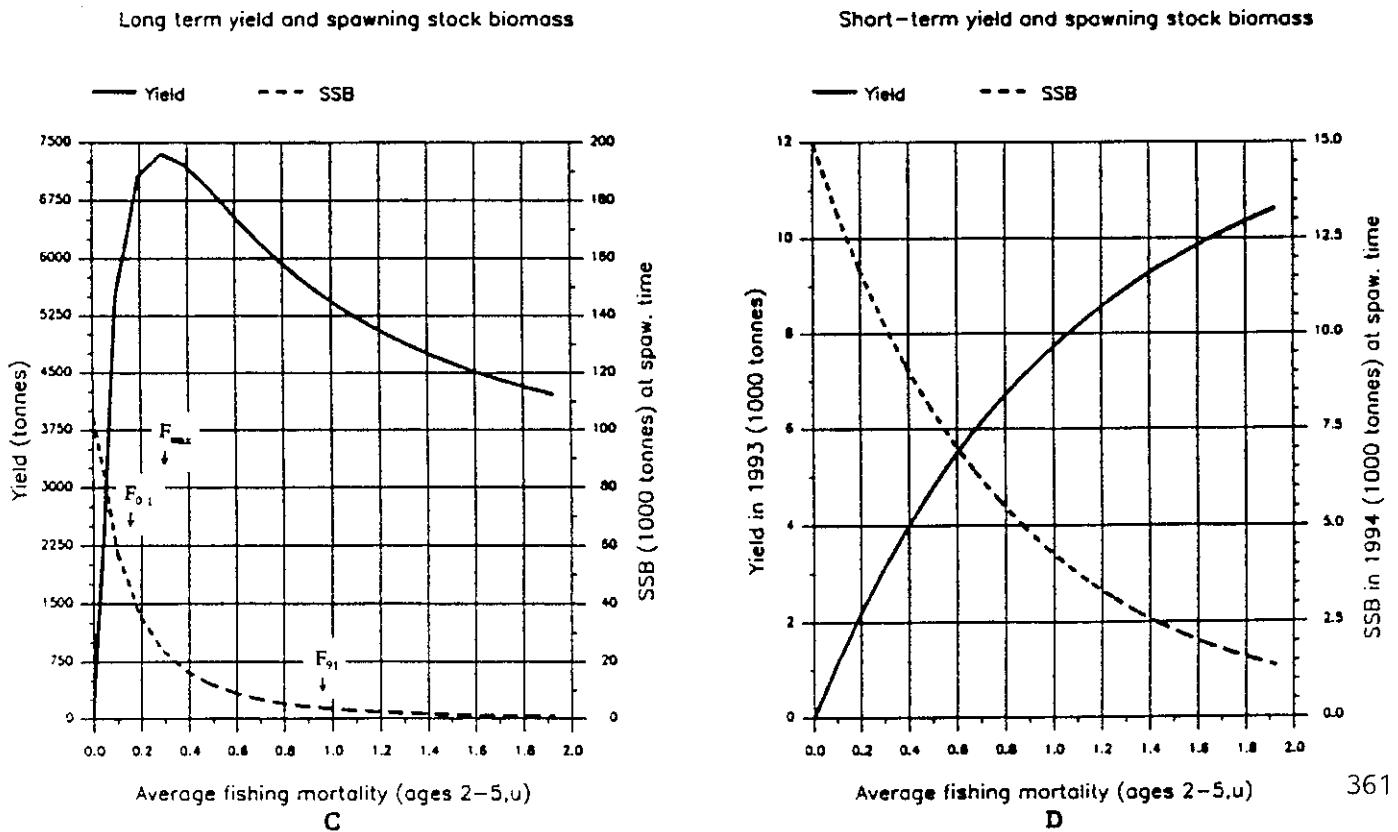
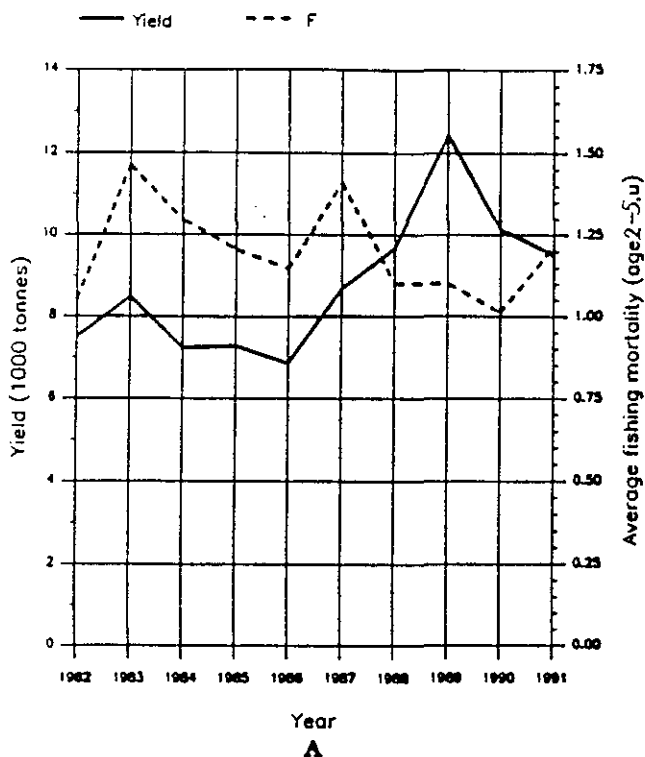


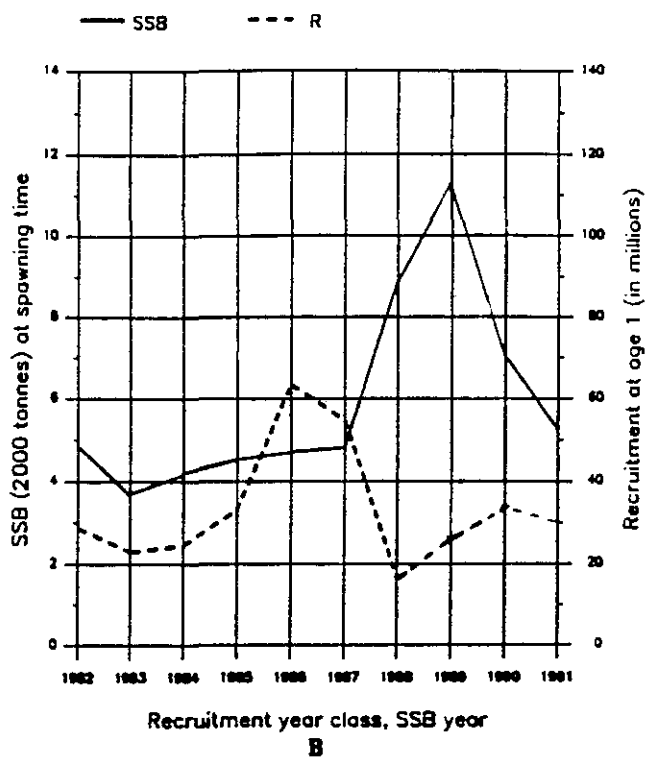
Figure 3.8.2

**FISH STOCK SUMMARY**  
**STOCK: Whiting in the Celtic Sea (Fishing Areas VIIc and VIIg)**  
**15-9-1992**

Trends in yield and fishing mortality (F)

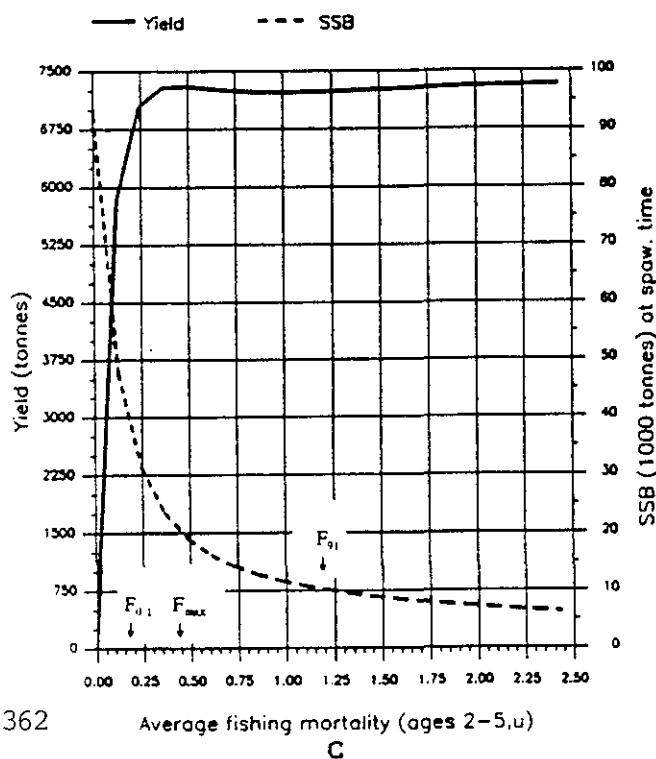


Trends in spawning stock biomass (SSB) and recruitment (R)



**FISH STOCK SUMMARY**  
**STOCK: Whiting in the Celtic Sea (Fishing Areas VIIc and VIIg)**  
**15-9-1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

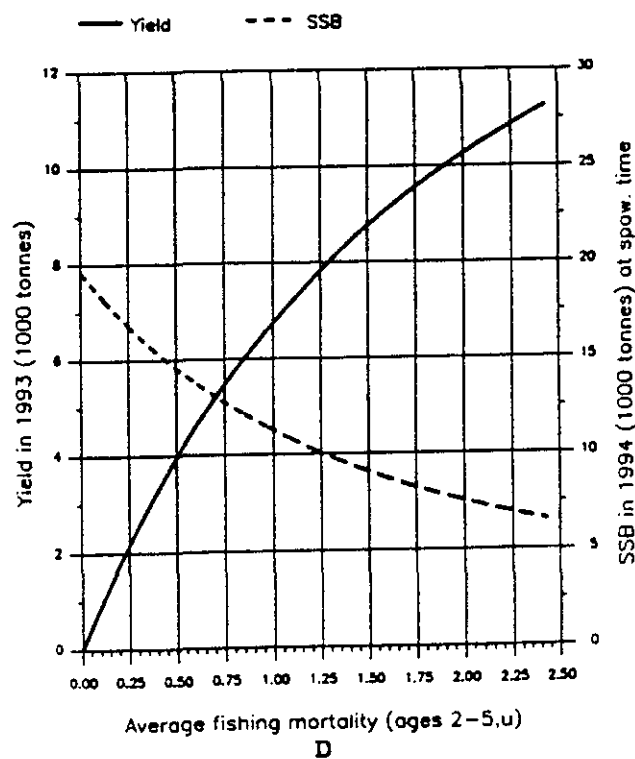
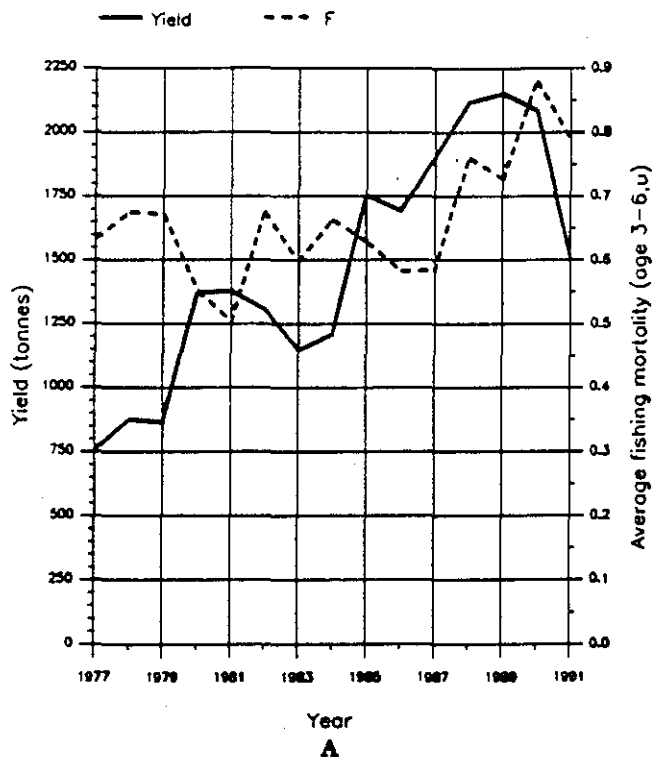


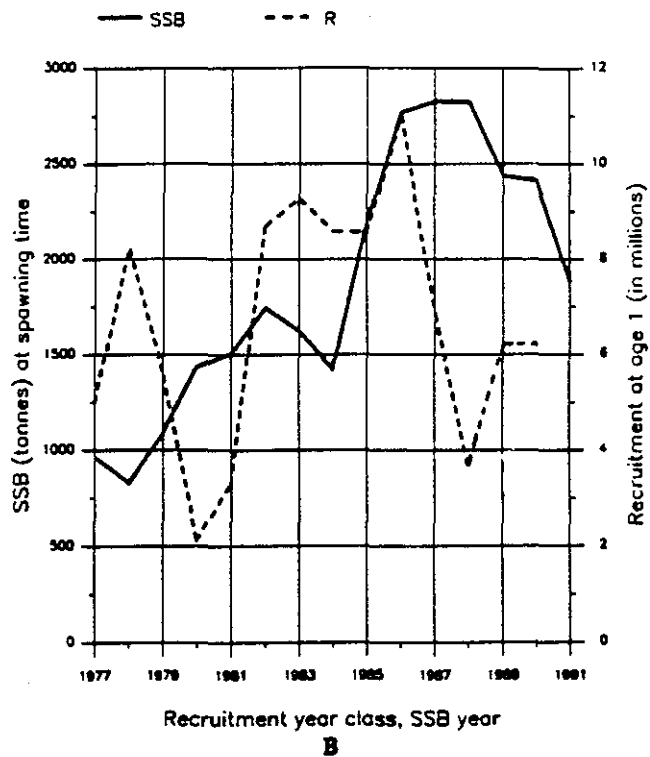
Figure 3.8.3.1

**FISH STOCK SUMMARY**  
**STOCK: Plaice in the Celtic Sea (Fishing Areas VIIc and VIIg)**  
**22-9-1992**

Trends in yield and fishing mortality (F)

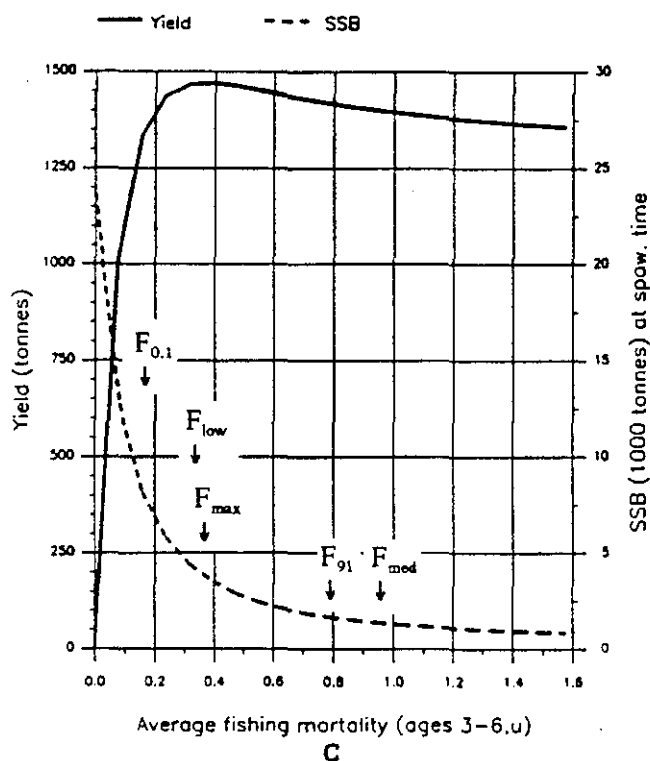


Trends in spawning stock biomass (SSB) and recruitment (R)



**FISH STOCK SUMMARY**  
**STOCK: Plaice in the Celtic Sea (Fishing Areas VIIc and VIIg)**  
**13-9-1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

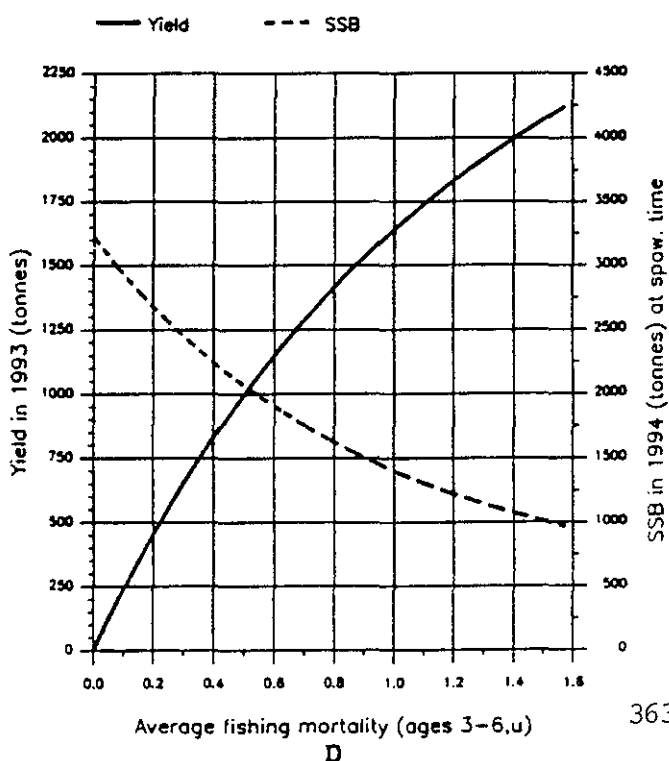
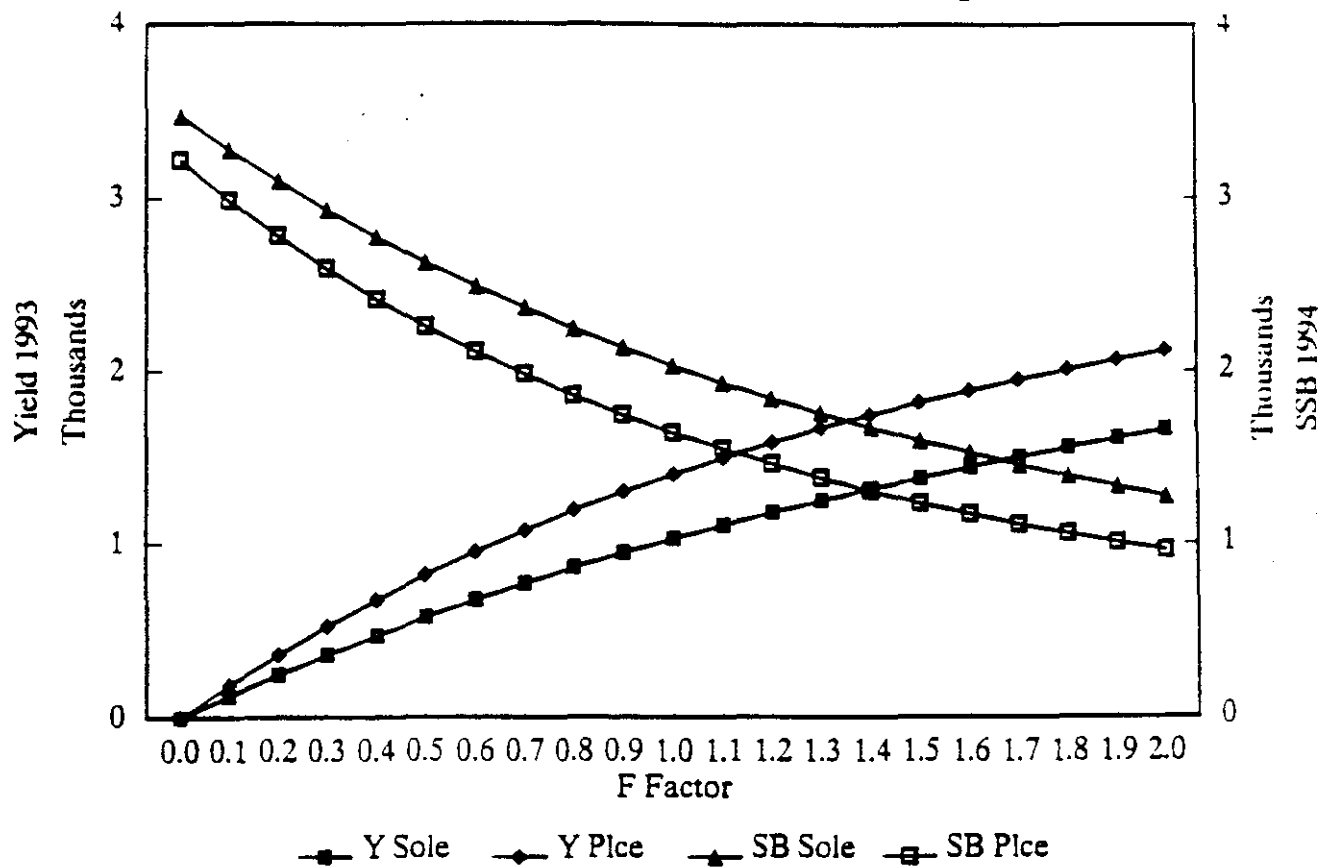


Figure 3.8.3.2

# CÉLTIC SEA SOLE and PLAICE

Combined Short Term Forecasts of yield and SSB



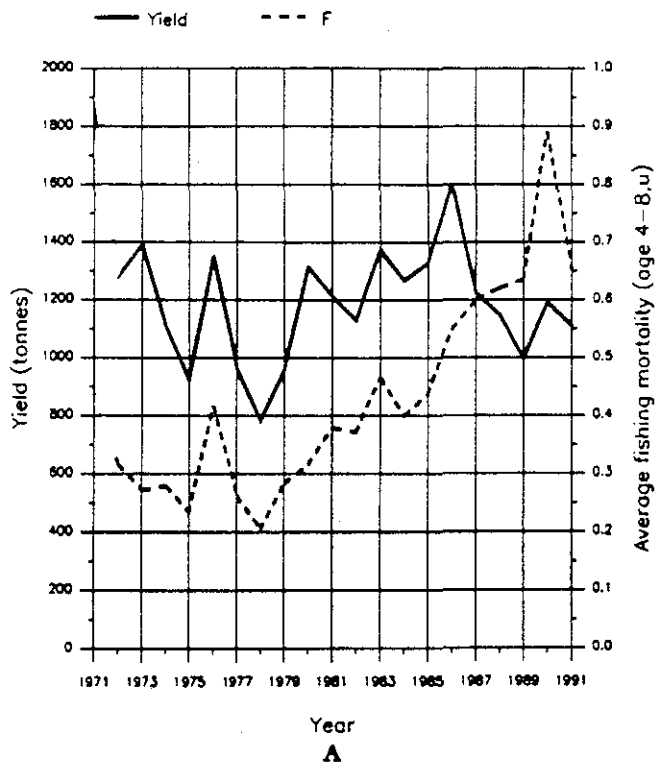
Assuming Status Quo in 1992



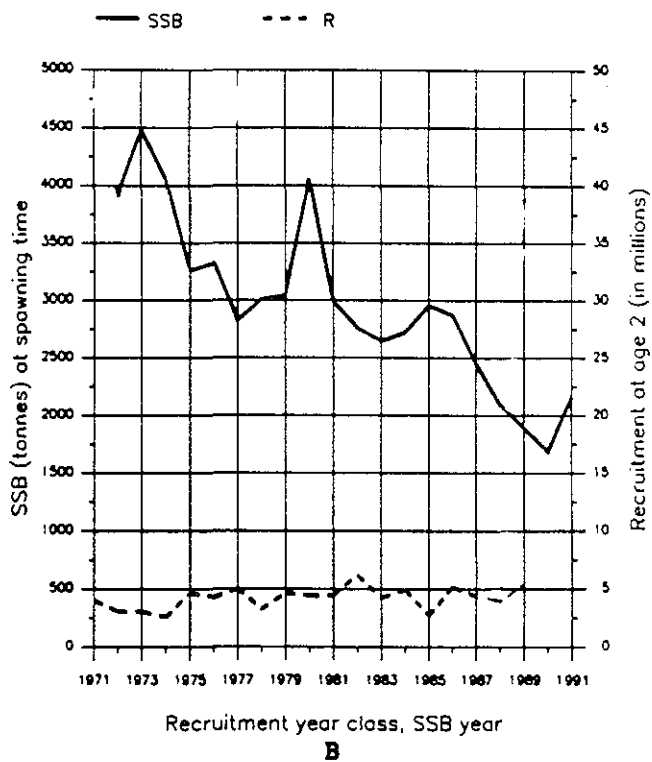
Figure 3.8.4

**FISH STOCK SUMMARY**  
**STOCK: Sole in the Celtic Sea (Fishing Areas VII<sub>f</sub> and VII<sub>g</sub>)**  
**22-9-1992**

Trends in yield and fishing mortality (F)

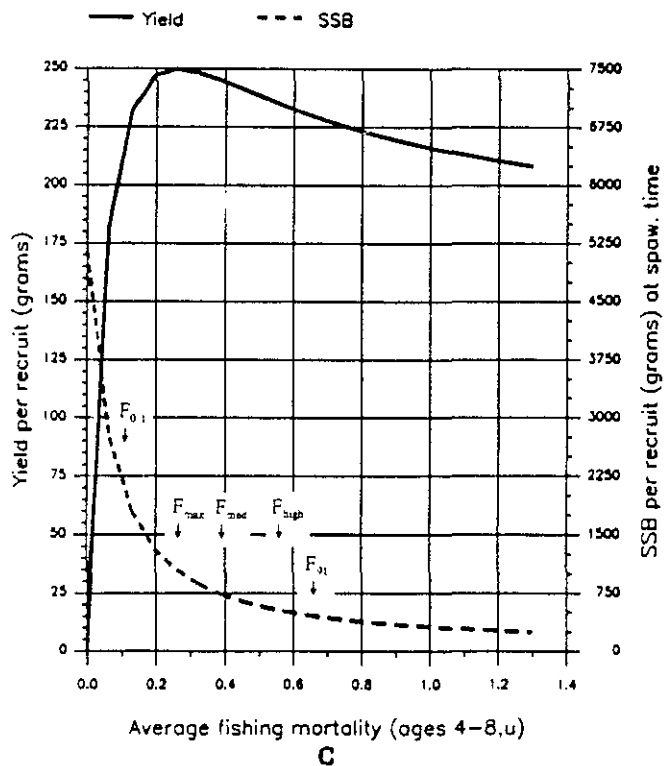


Trends in spawning stock biomass (SSB) and recruitment (R)



**FISH STOCK SUMMARY**  
**STOCK: Sole in the Celtic Sea (Fishing Areas VII<sub>f</sub> and VII<sub>g</sub>)**  
**14-9-1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

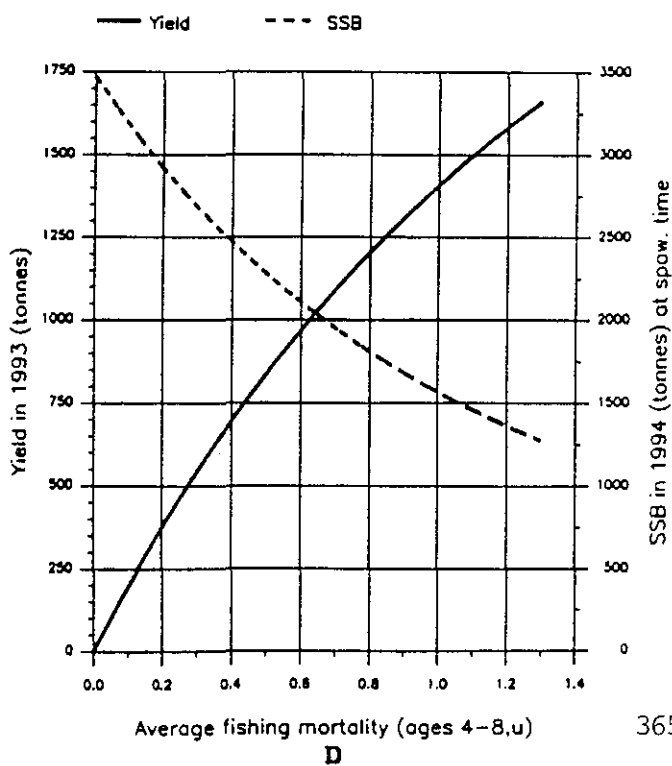
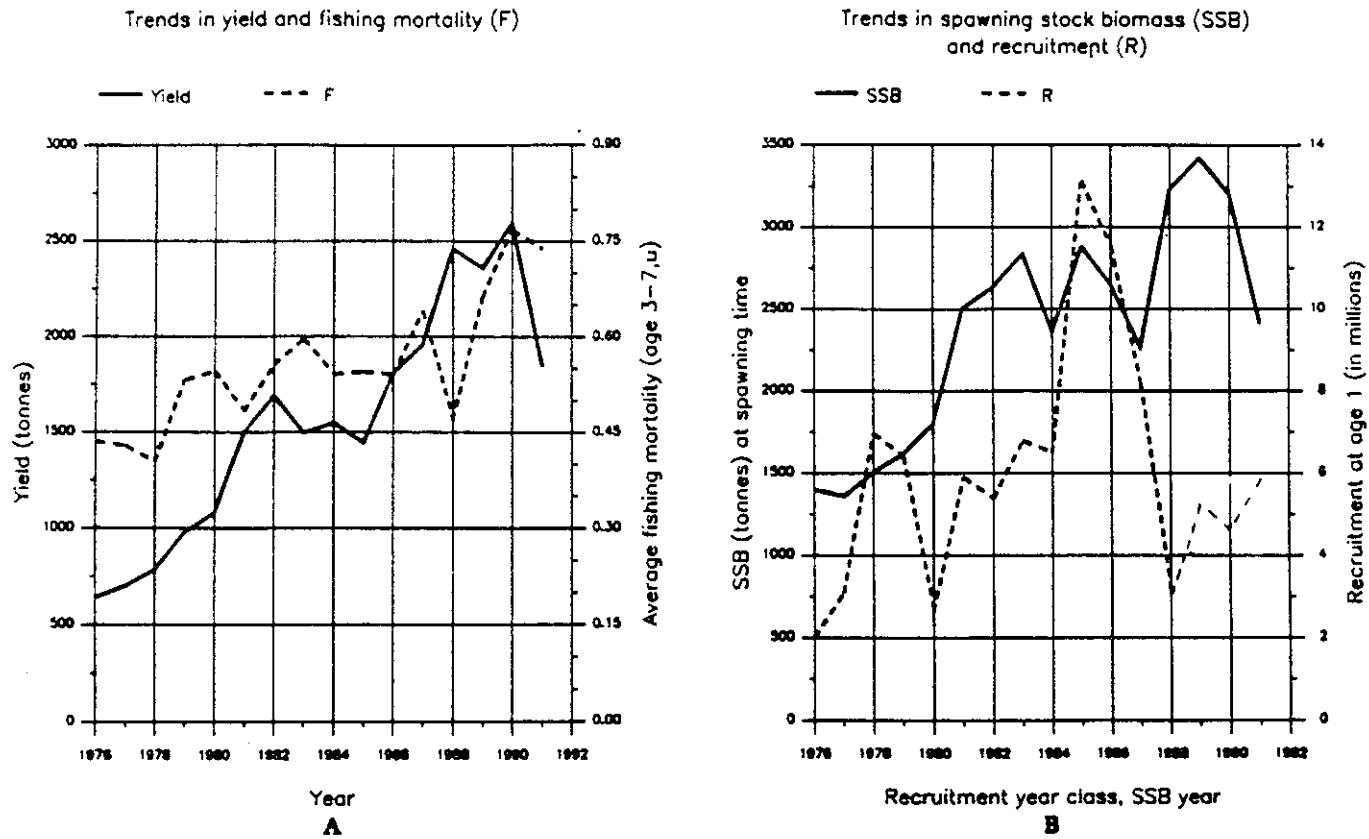


Figure 3.8.7

FISH STOCK SUMMARY  
STOCK: Plaice in the English Channel, Western (Fishing Area VIIe)  
22-9-1992



FISH STOCK SUMMARY  
STOCK: Plaice in the English Channel, Western (Fishing Area VIIe)  
15-9-1992

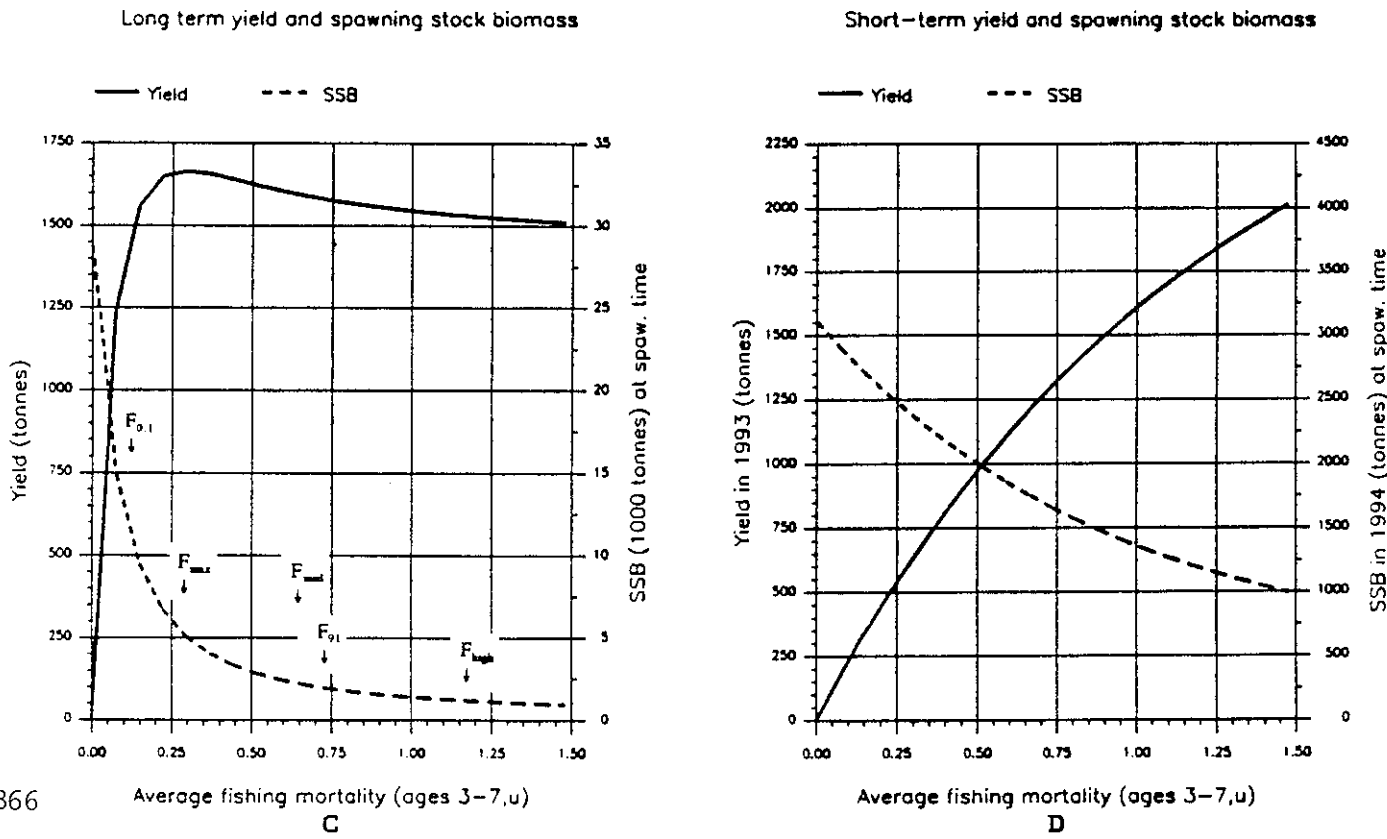
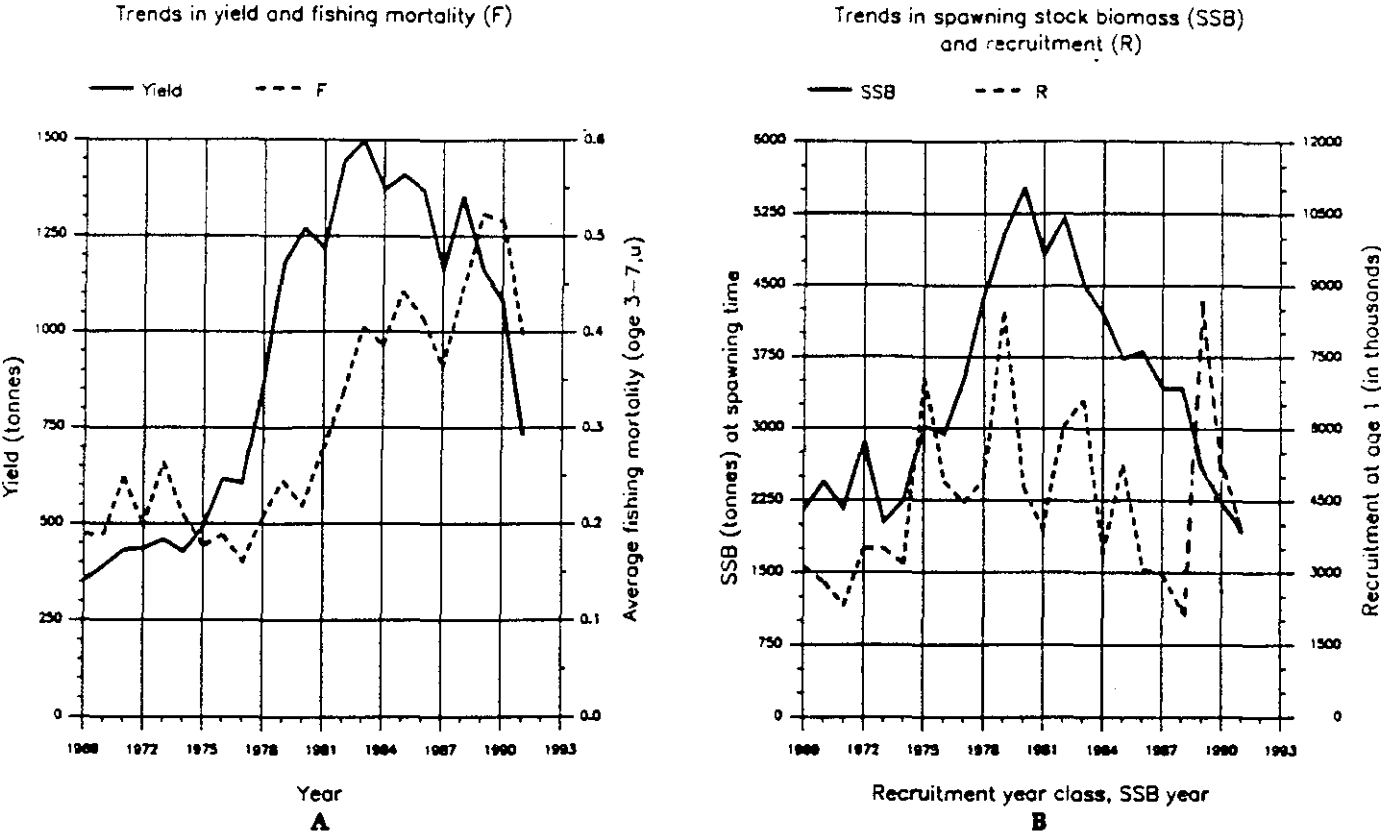


Figure 3.8.8

**FISH STOCK SUMMARY**  
**STOCK: Sole in the Western English Channel (Fishing Area VIIe)**  
**22-9-1992**



**FISH STOCK SUMMARY**  
**STOCK: Sole in the Western English Channel (Fishing Area VIIe)**  
**15-9-1992**

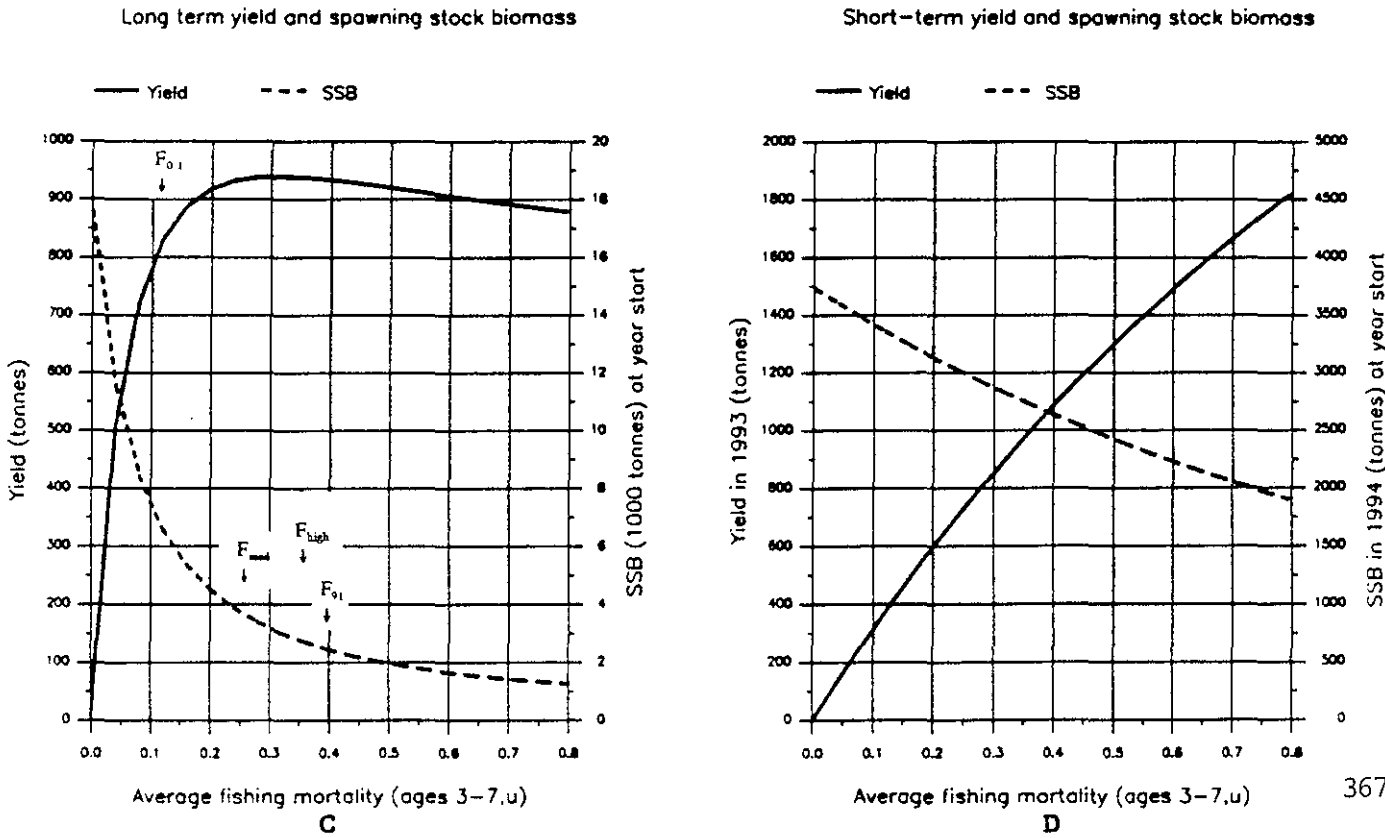
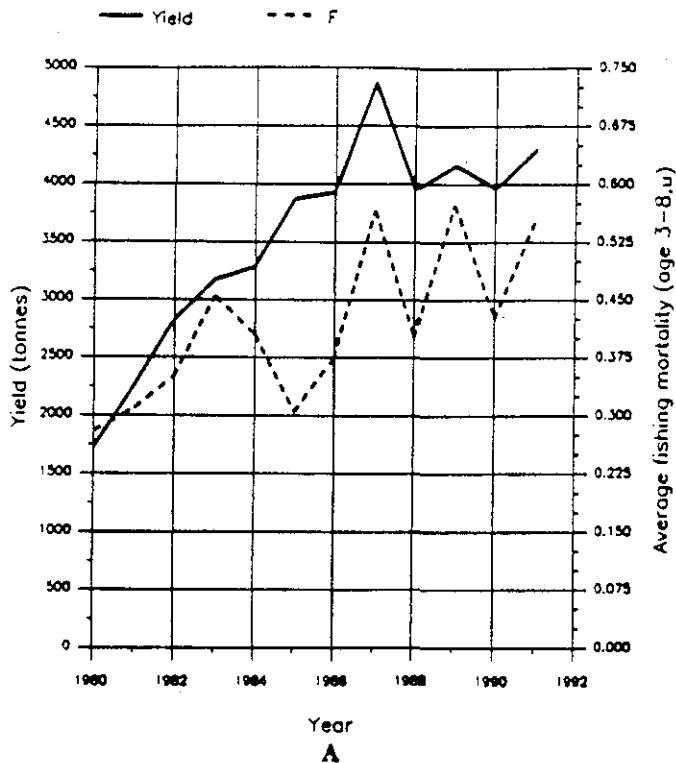


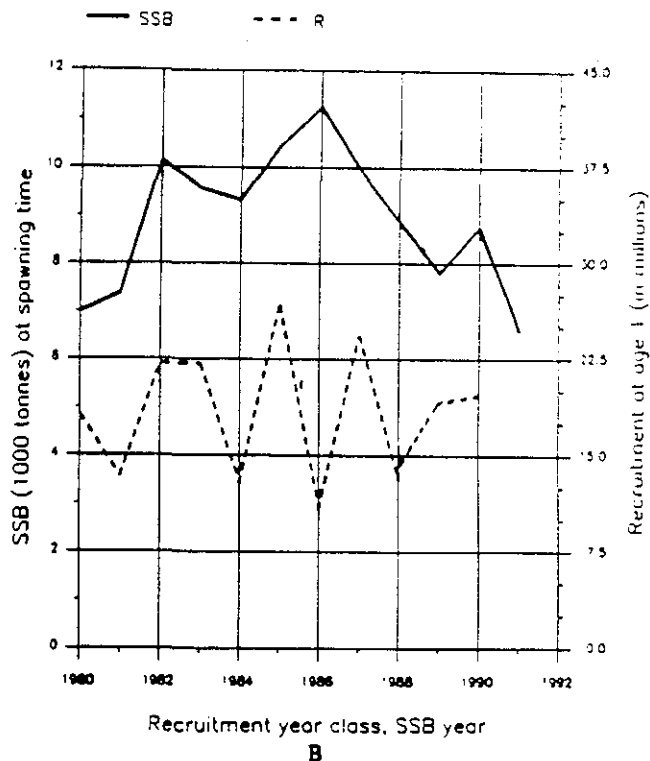
Figure 3.9.5

**FISH STOCK SUMMARY**  
**STOCK: Sole in the Eastern English Channel (Fishing Area VIId)**  
**12-10-1992**

Trends in yield and fishing mortality (F)

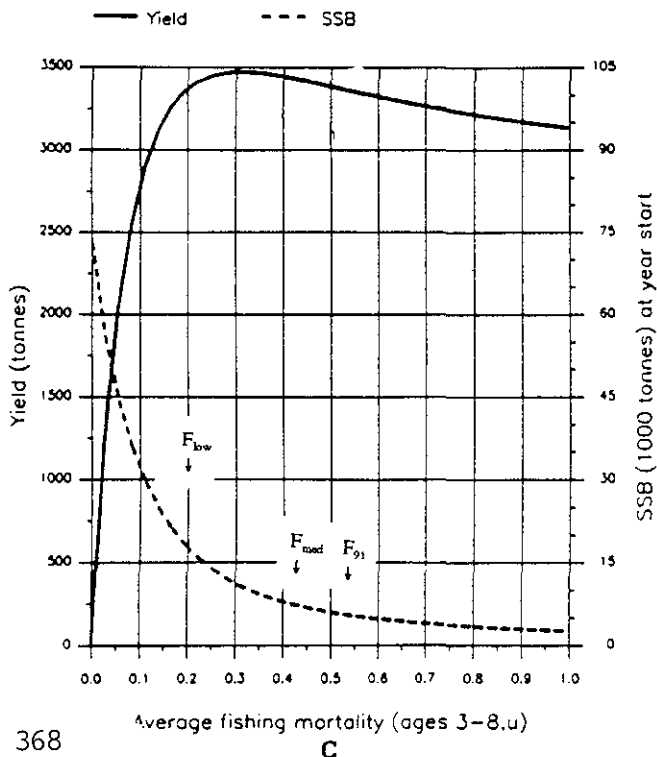


Trends in spawning stock biomass (SSB) and recruitment (R)



**FISH STOCK SUMMARY**  
**STOCK: Sole in the Eastern English Channel (Fishing Area VIId)**  
**20-10-1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

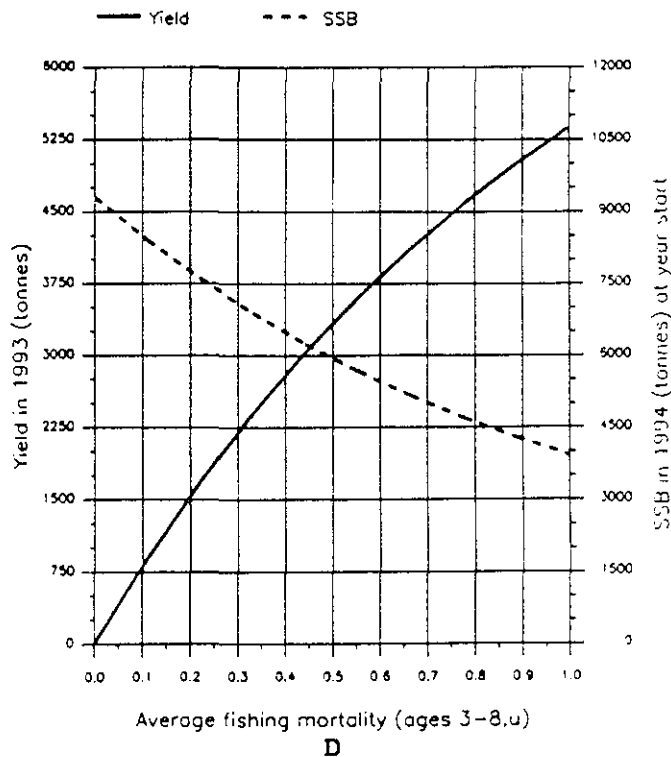
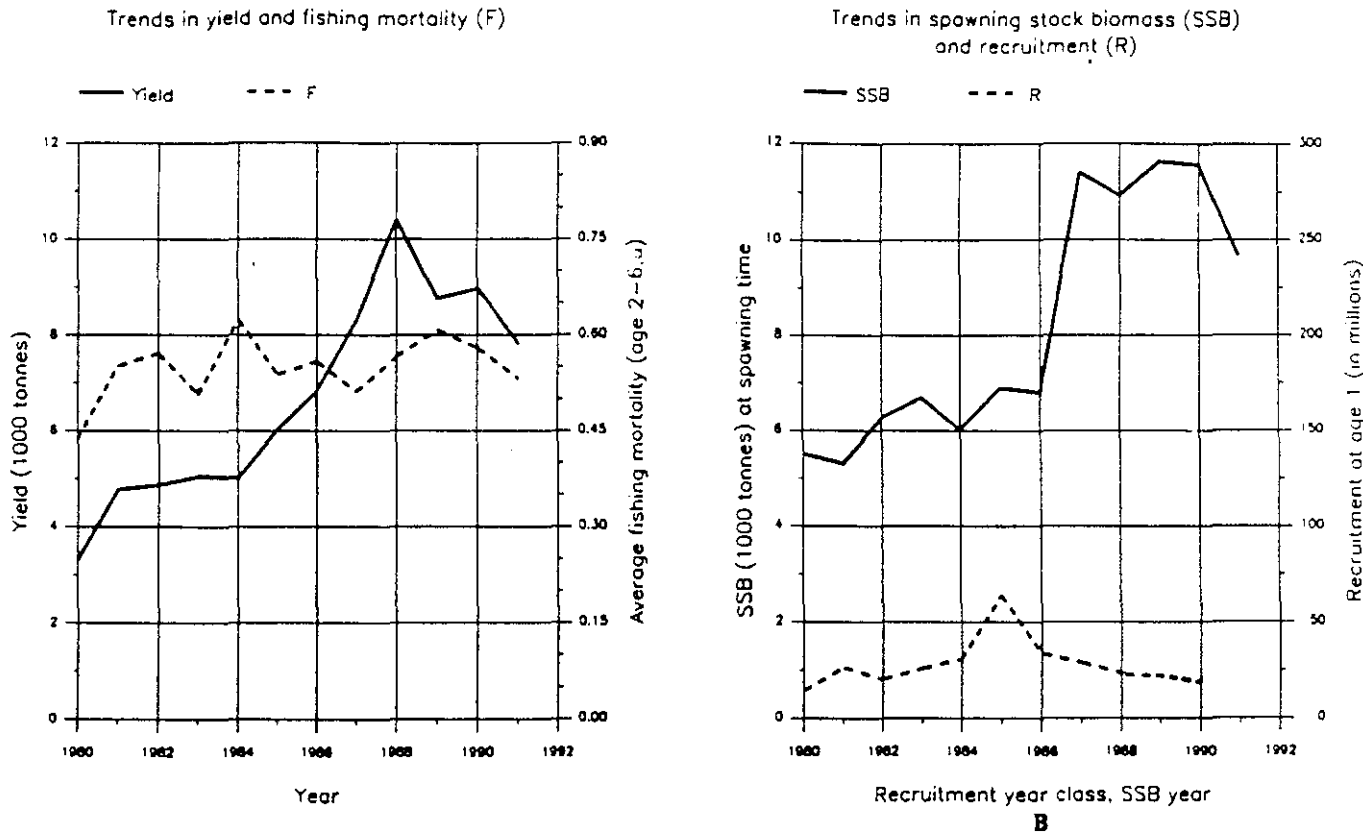
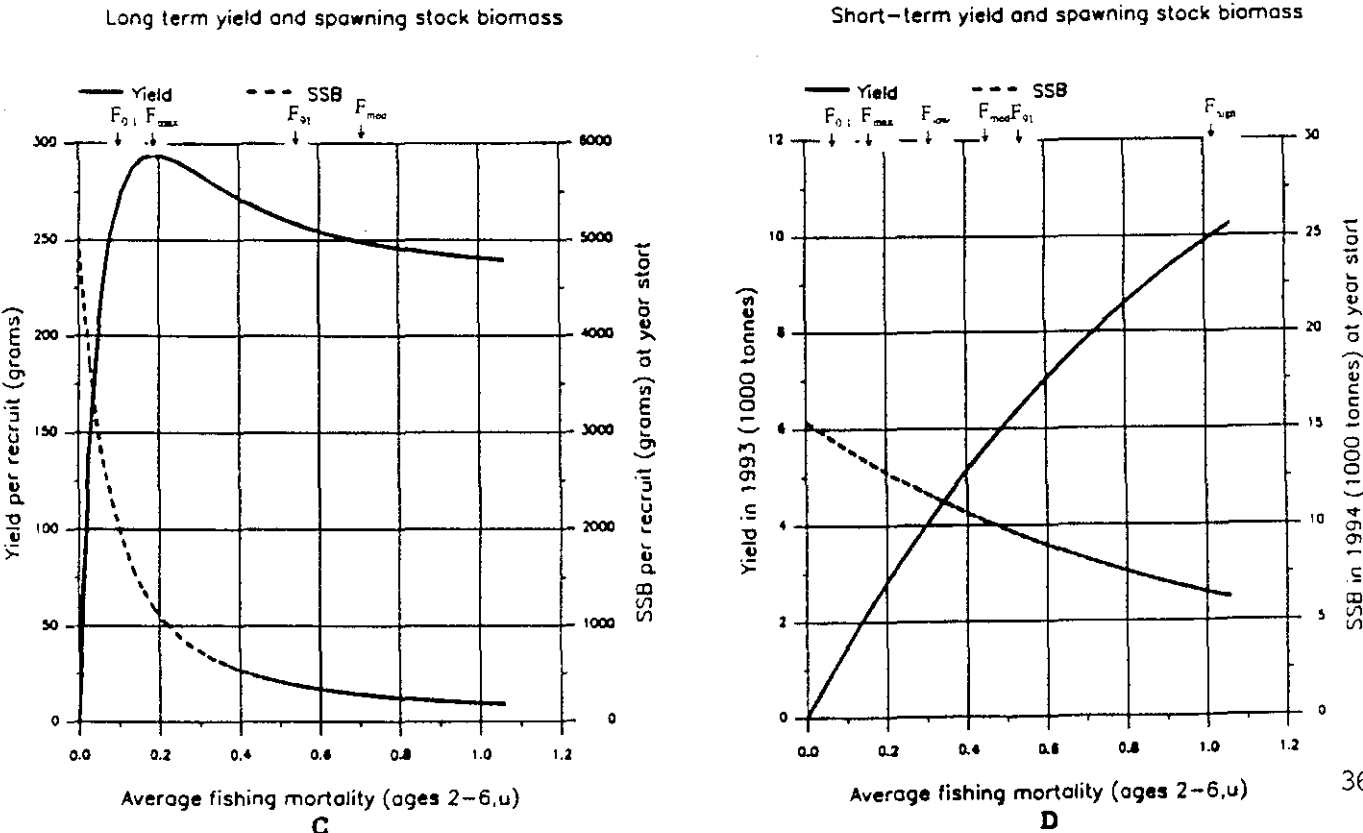


Figure 3.9.6

FISH STOCK SUMMARY  
STOCK: Plaice in the English Channel, Eastern (Fishing Area VIIId)  
9-10-1992

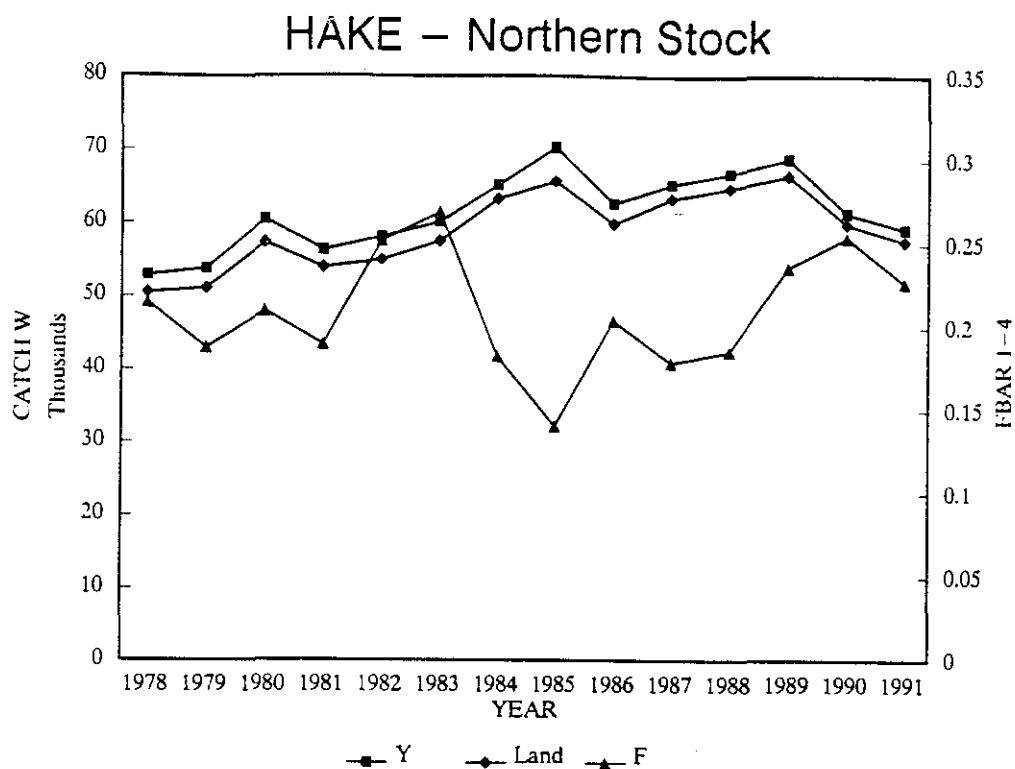


FISH STOCK SUMMARY  
STOCK: Plaice in the English Channel (Fishing Area VIIId)  
12-10-1992



**Figure 4.1.1.** Reported catch and estimated fishing mortality, recruitment and spawning stock biomass of Northern Stock of HAKE.

**A**



**B**

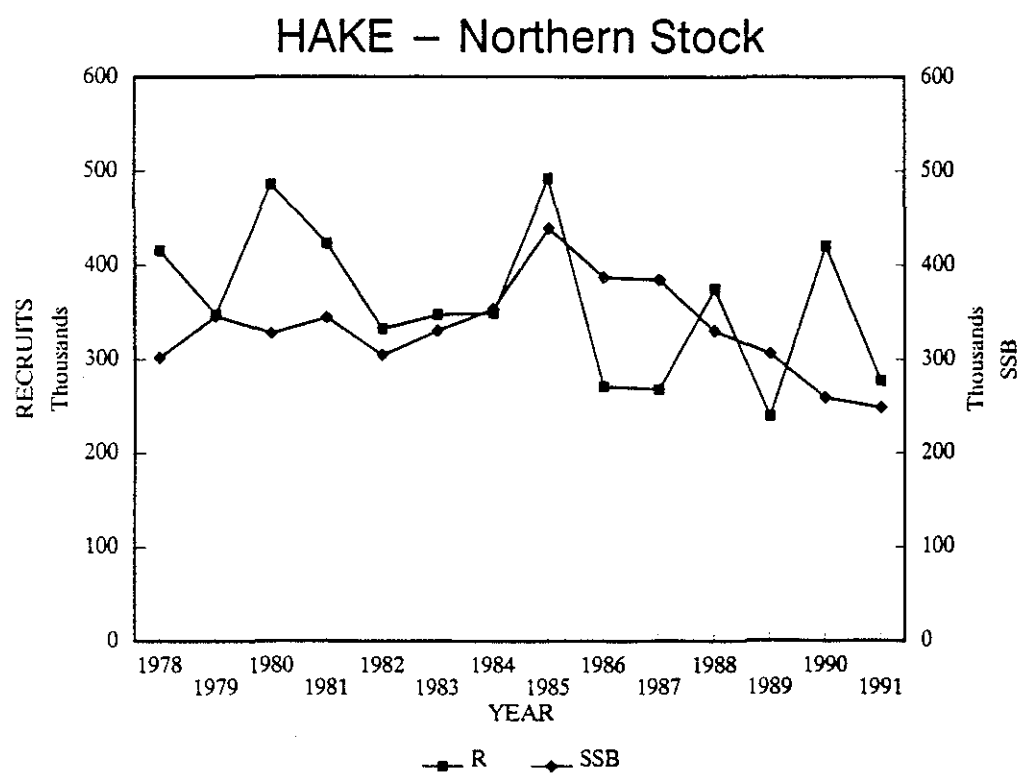


Figure 4.1.2.1A

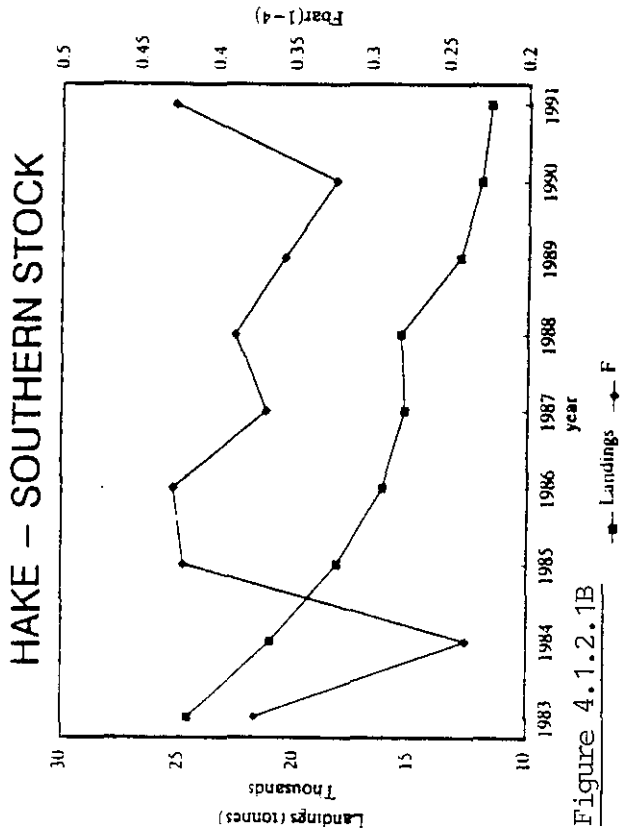


Figure 4.1.2.1B

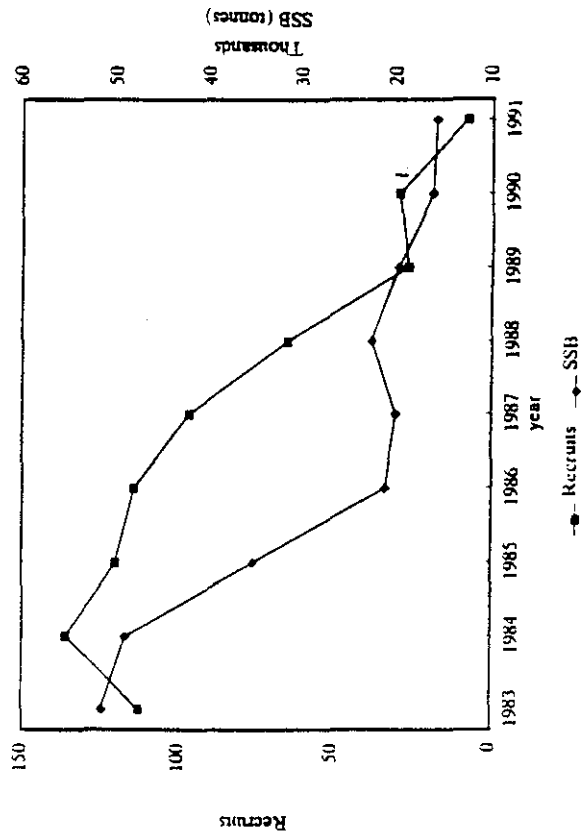


Figure 4.1.2.1C

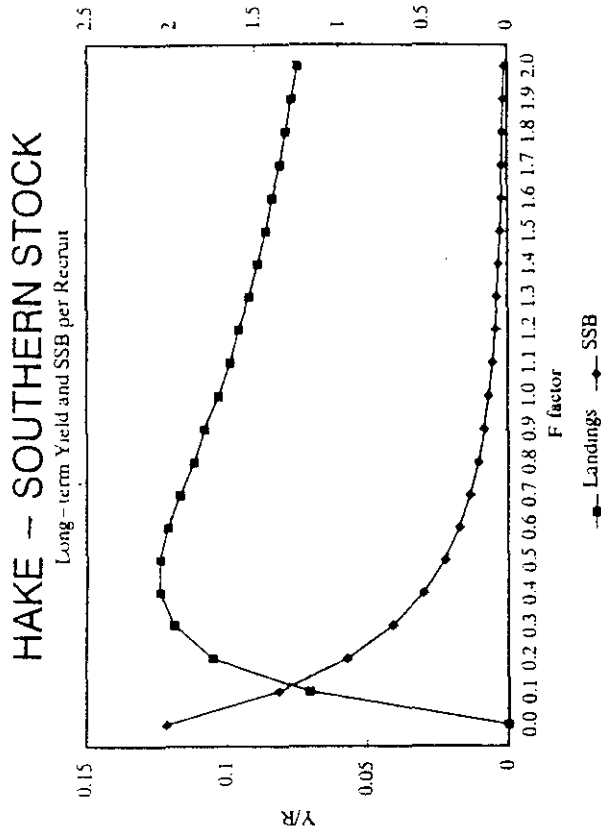
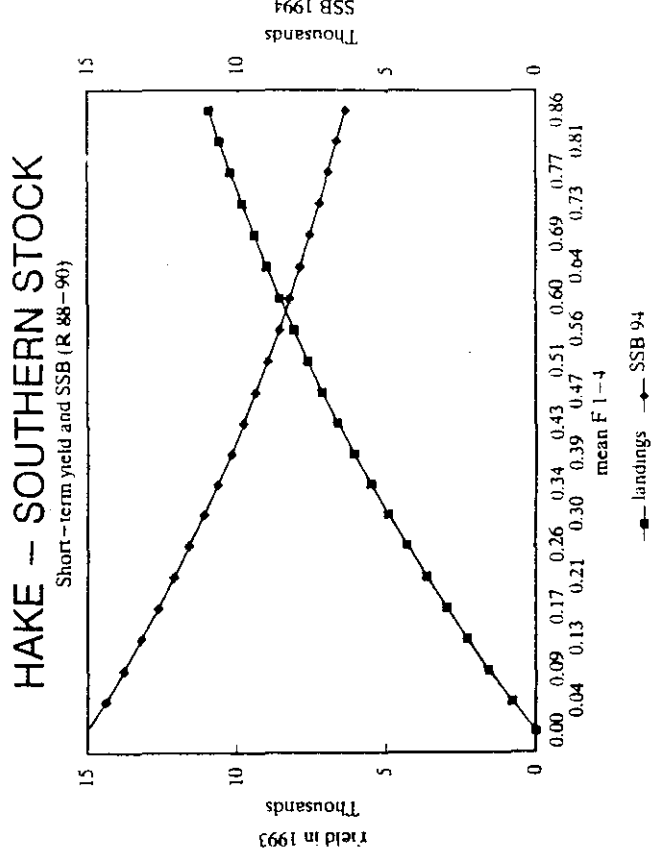


Figure 4.1.2.1D



## HAKE – Southern Stock

Constant F projections of SSB

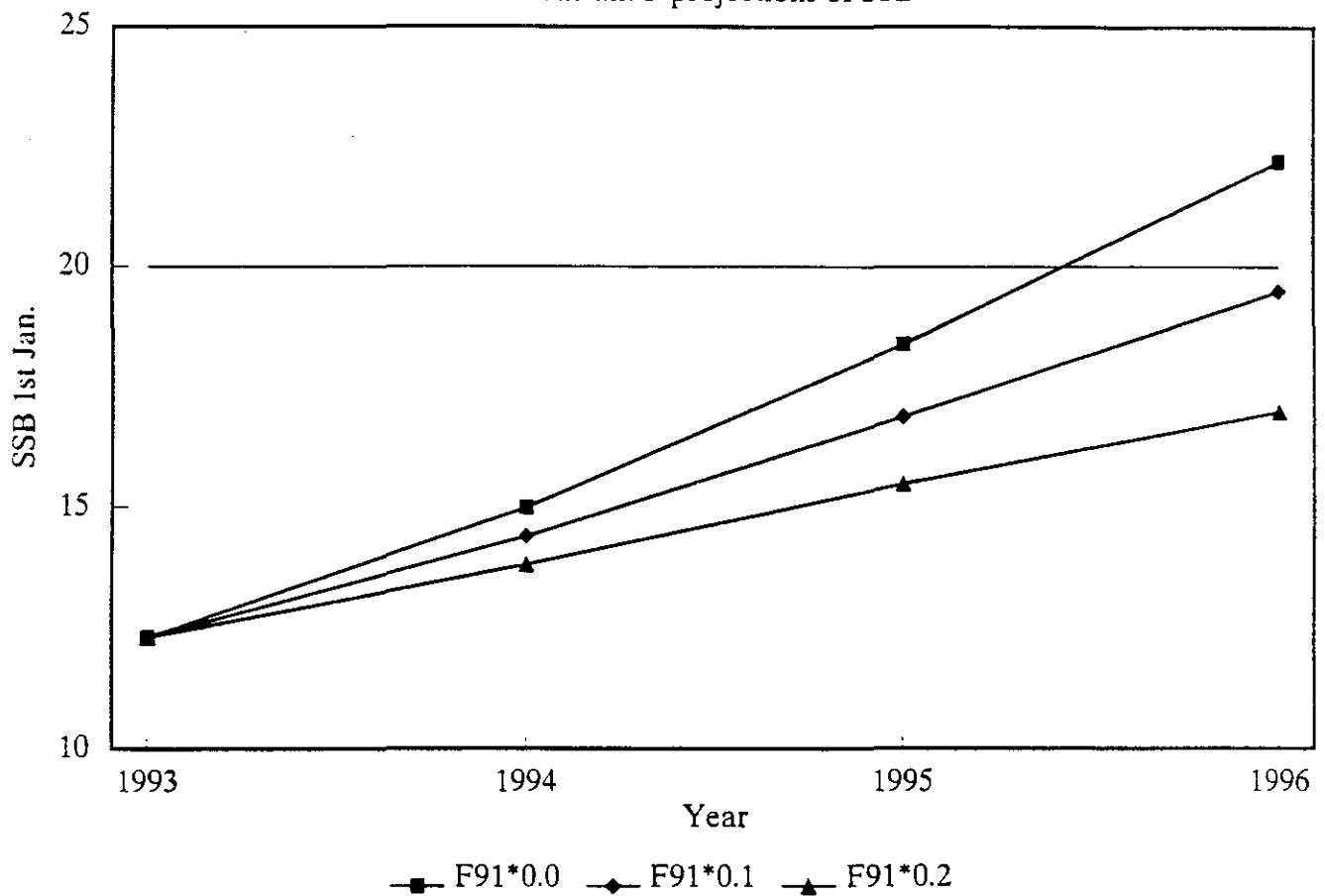


Figure 4.1.2.2 Projections of SSB of Southern HAKE for 1993-1996 assuming no fishing and fishing mortality at 10% and 20% of the 1991 level .



Figure 4.2A

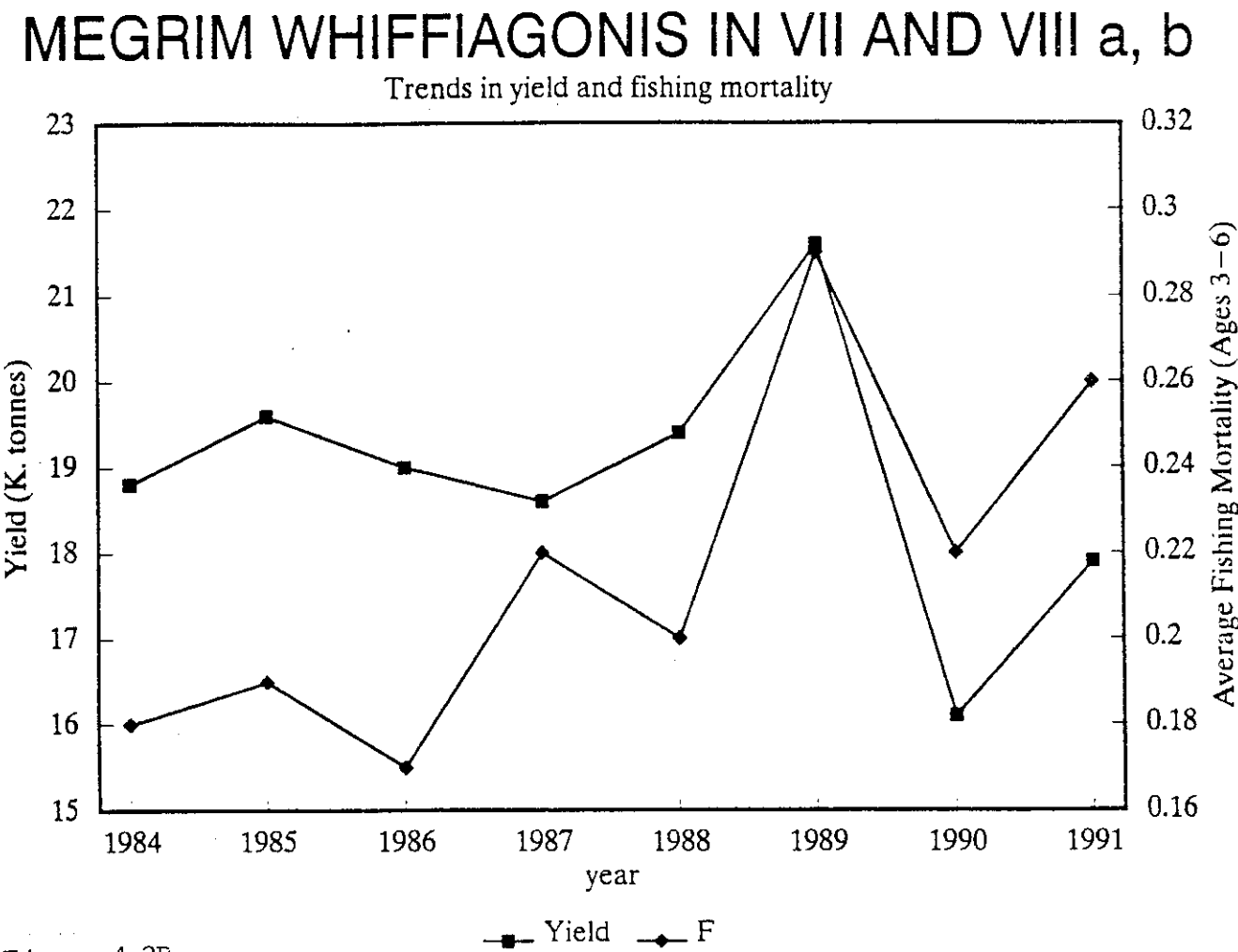


Figure 4.2B

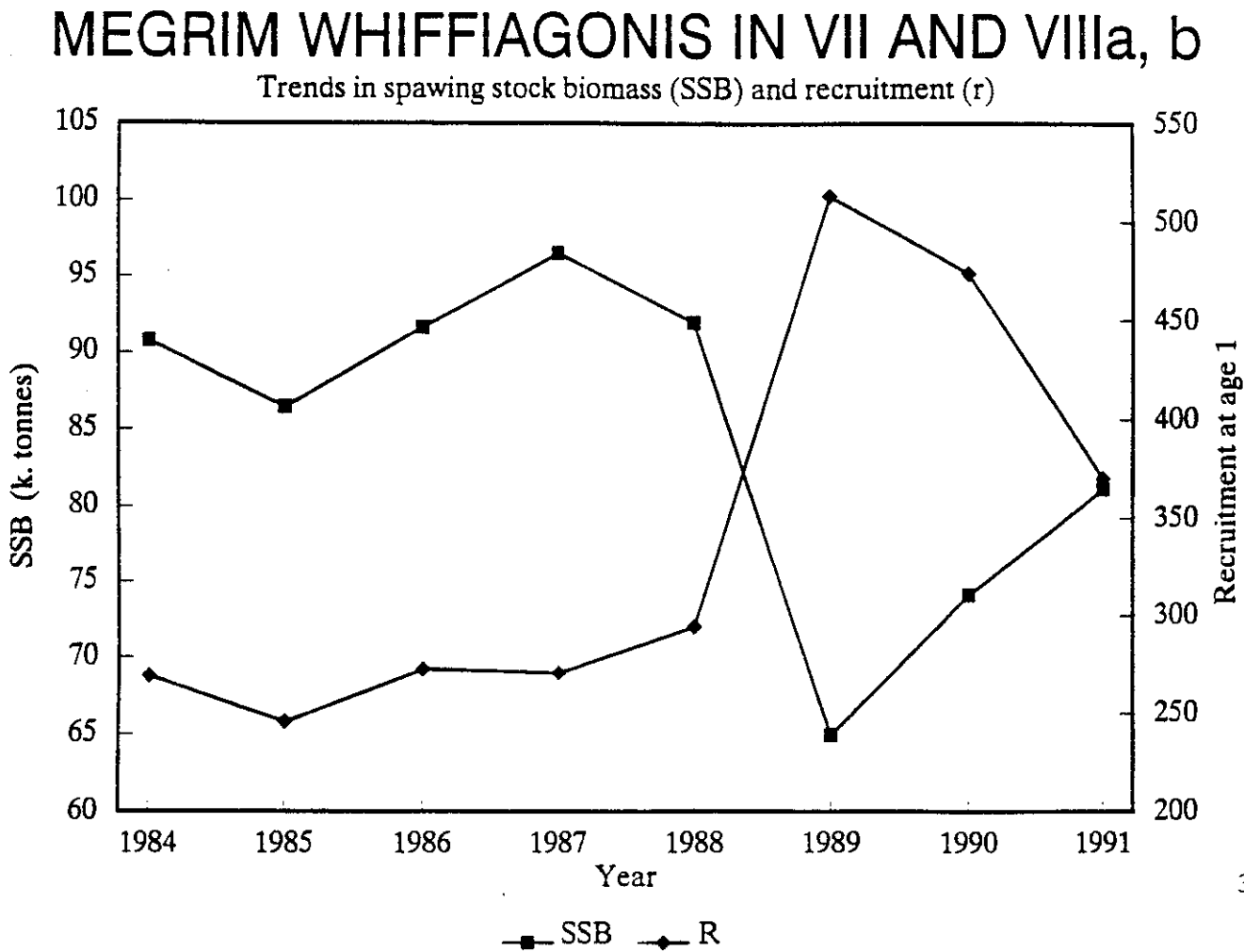


Figure 4.2C Yield and SSB per recruit.

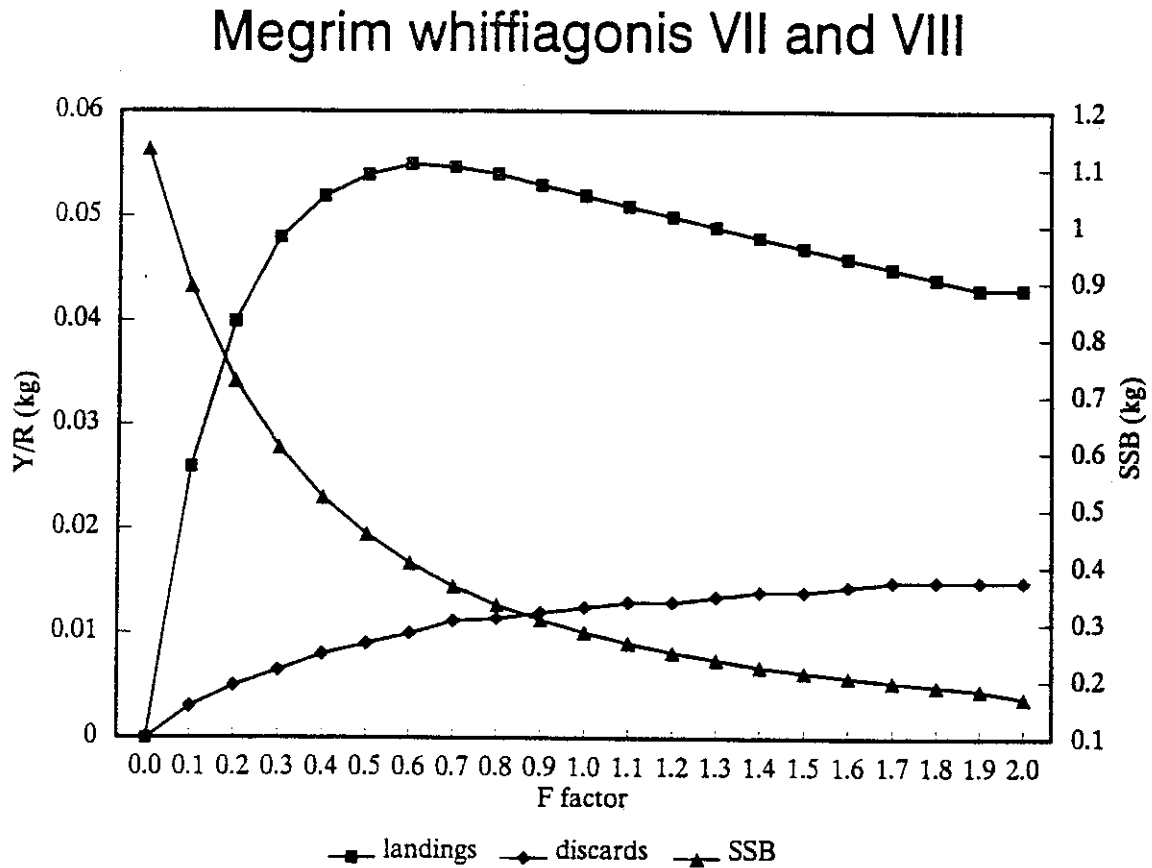


Figure 4.2D

### MEGRIM WHIFFIAGONIS IN VII AND VIIIa, b

Short-term yield and SSB (1000 t)

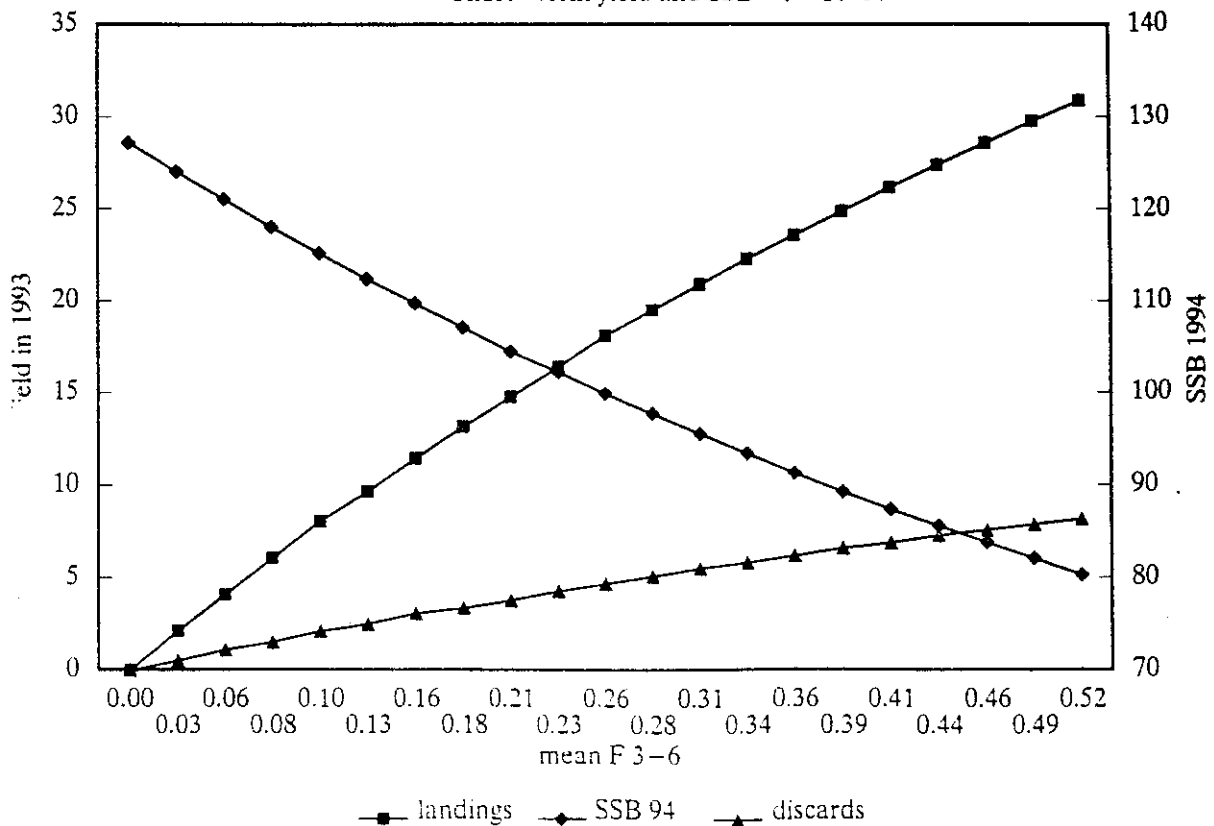


Figure 4.3A

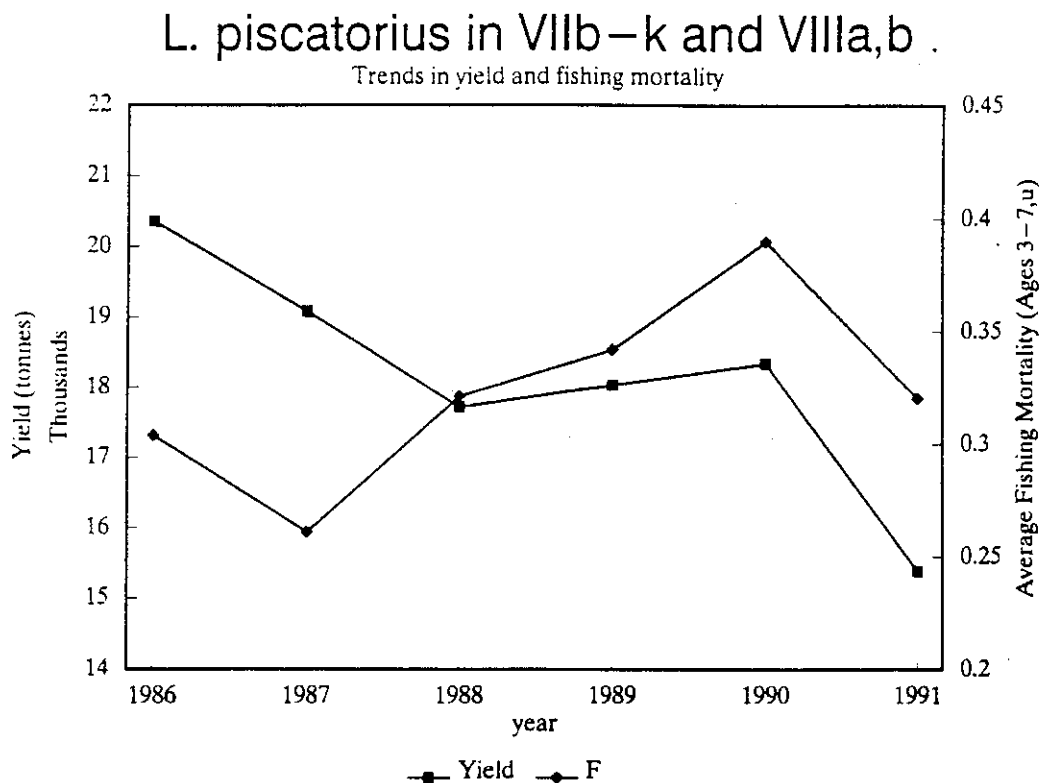


Figure 4.3B

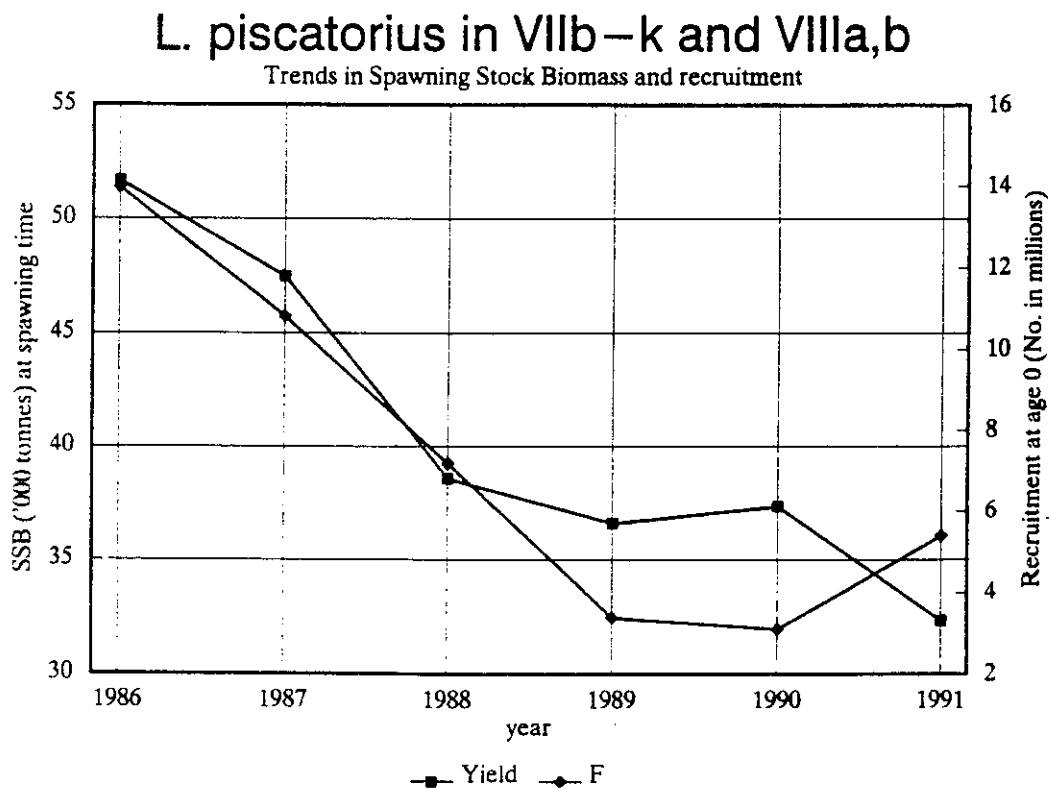


Figure 4.3C

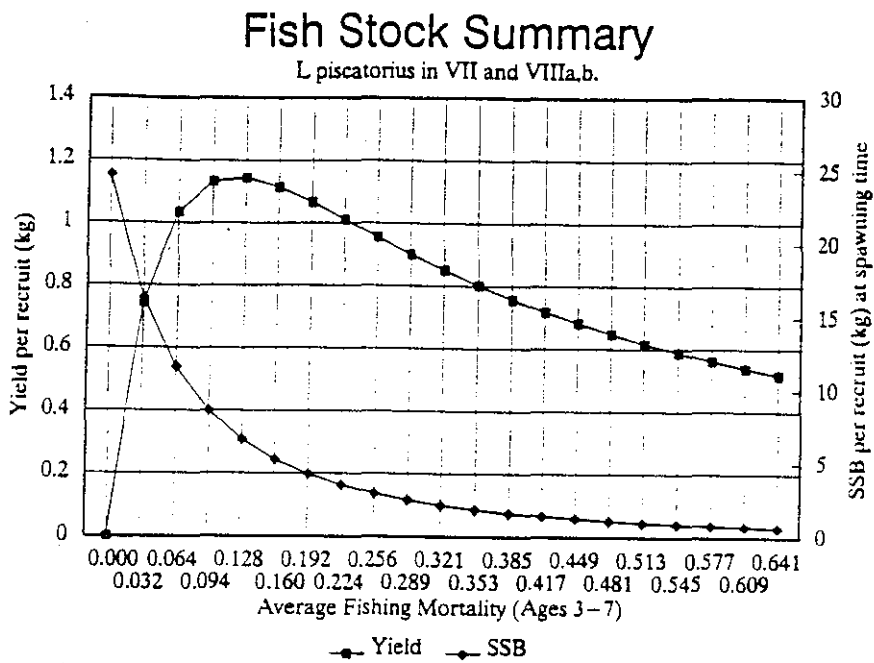


Figure 4.3D

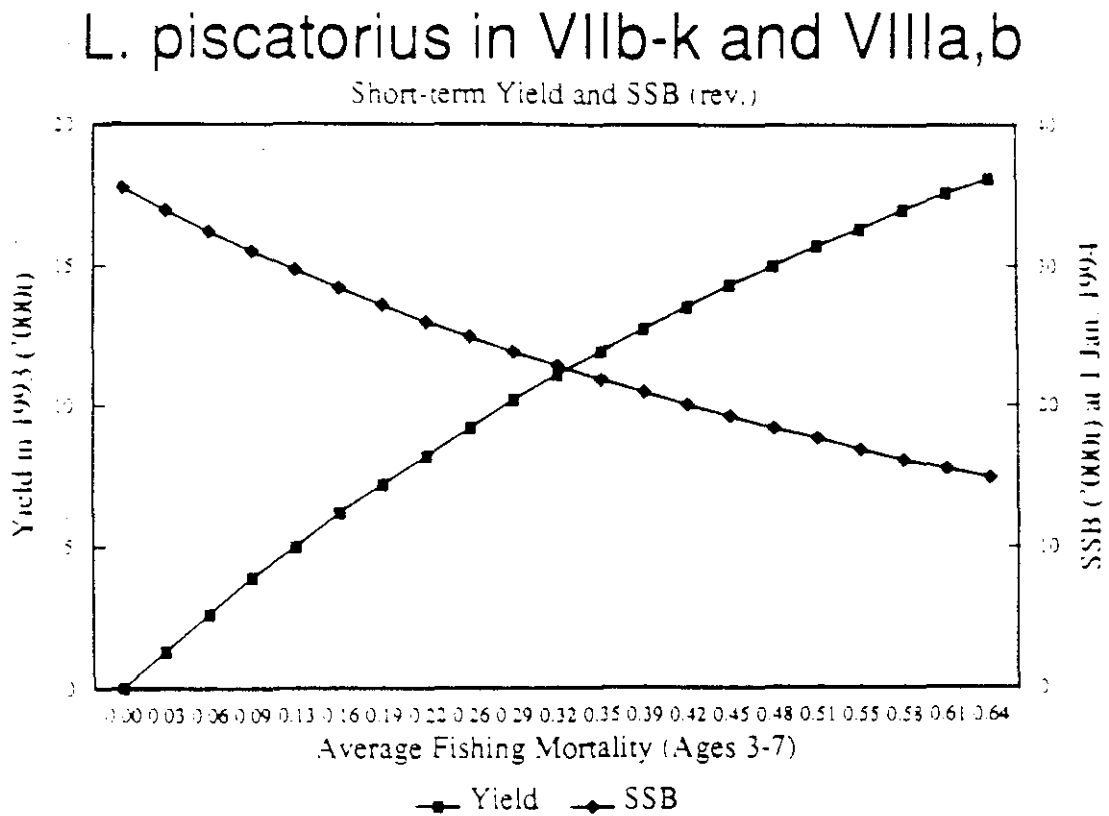
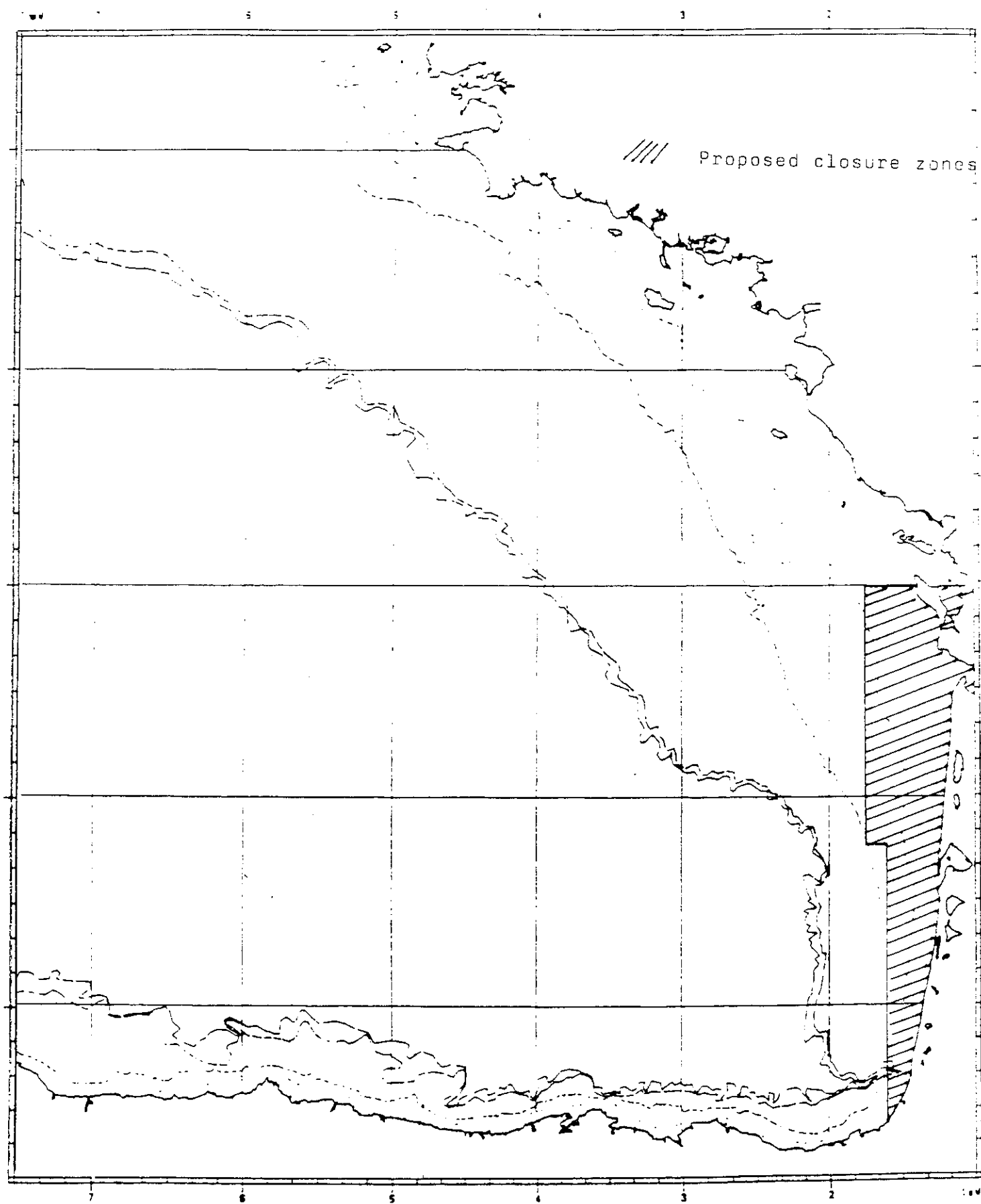


Figure 5.2 Closure areas for anchovy for winter and spring fisheries



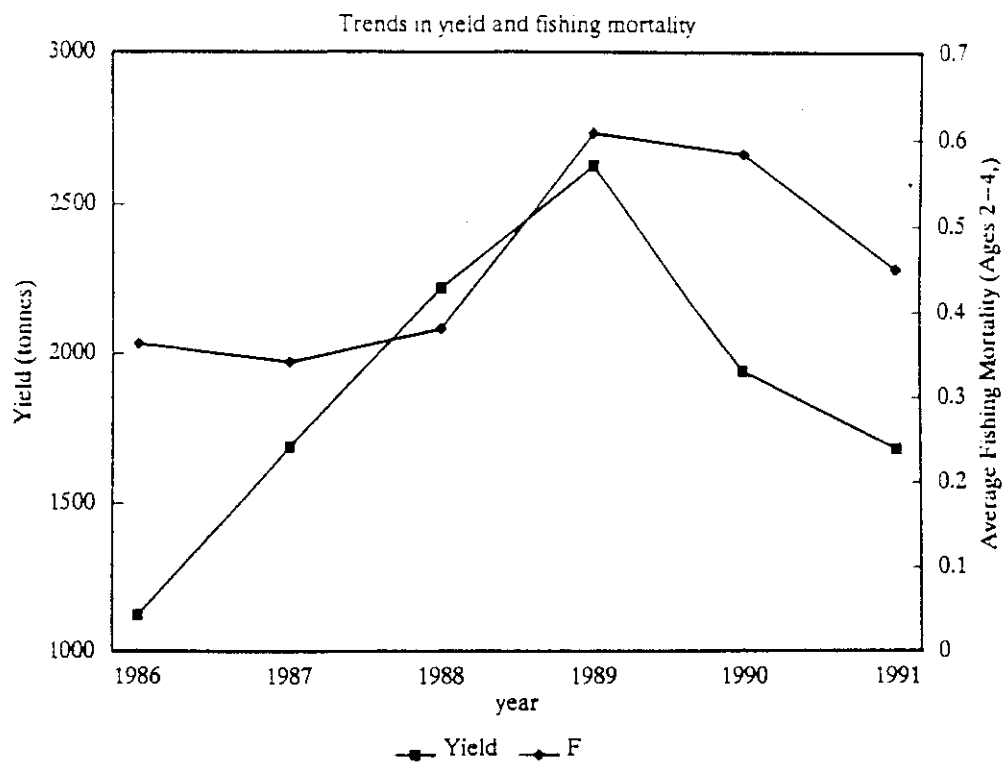


Figure 5.4.1A

Megrim (*L. boschii*) in Divisions VIIIc and IXa. Trends in yield and fishing mortality.

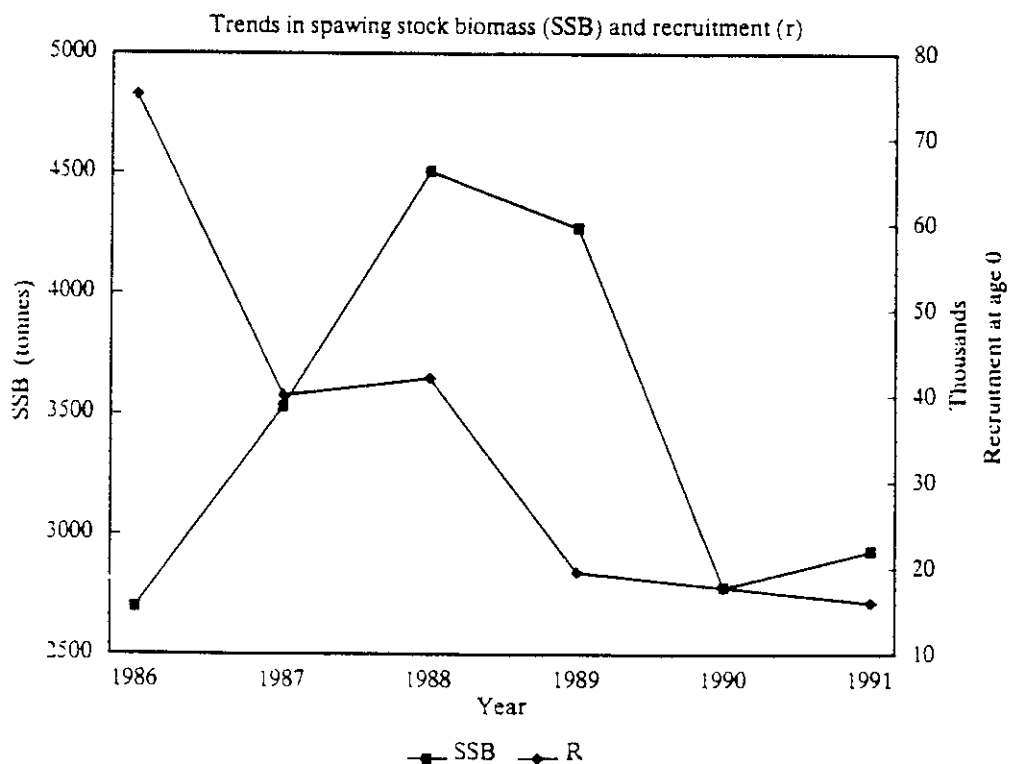


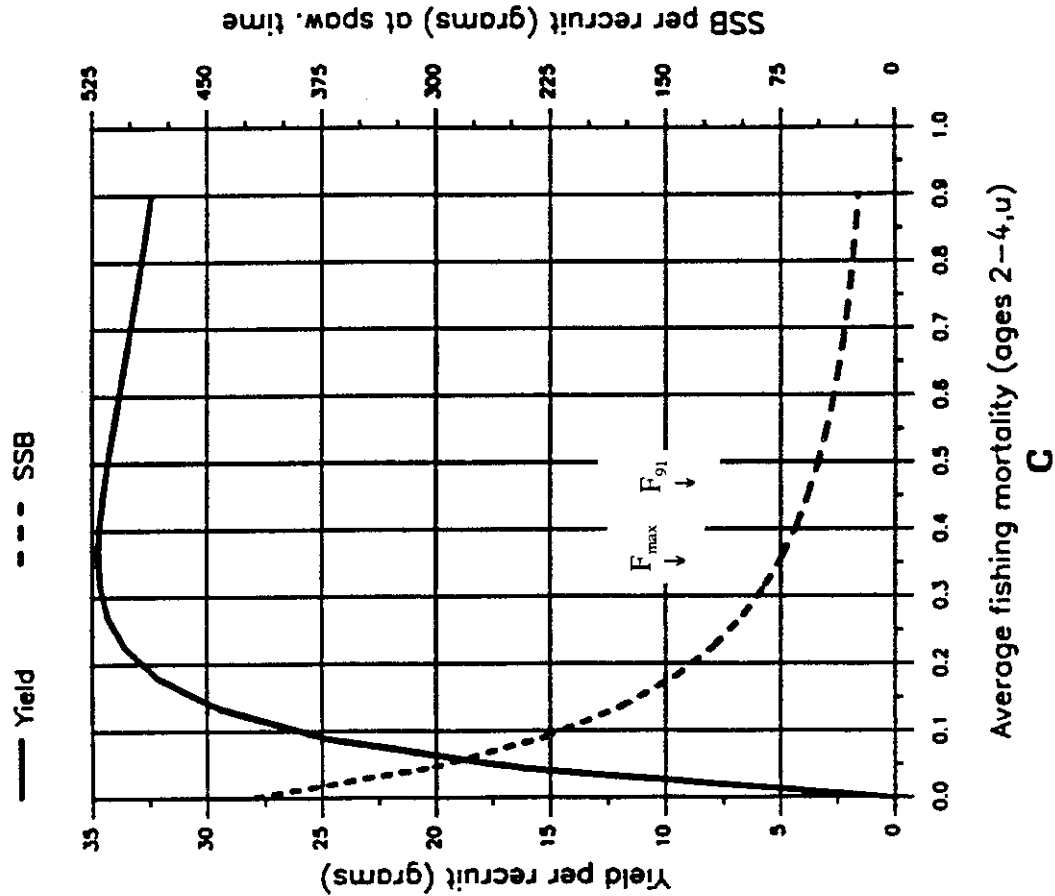
Figure 5.4.1B

Megrim (*L. boschii*) in Divisions VIIIc and IXa. Trends in Spawning Stock Biomass (SSB) and Recruitment (R).

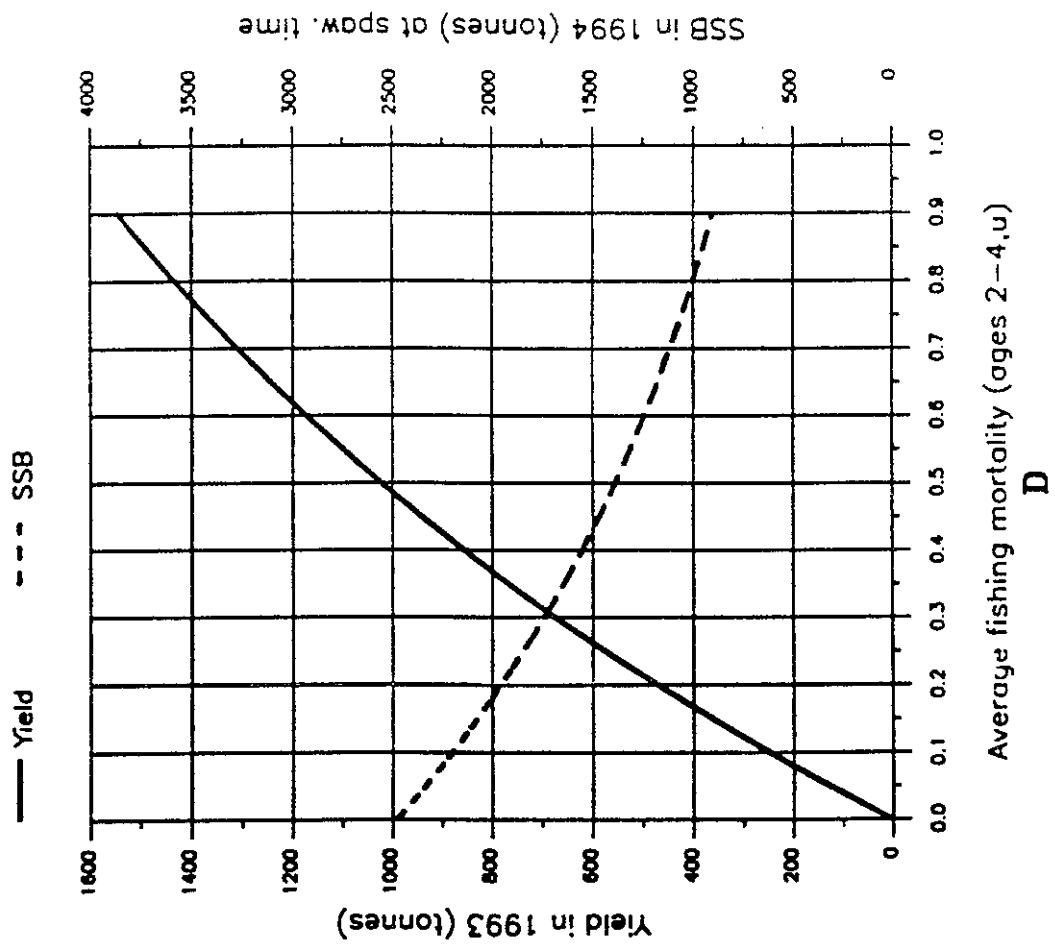
Figure 5.4.1C-D

# **FISH STOCK SUMMARY** **STOCK: Megrim (Boscii) in Fishing Areas VIIIc and IXa** **15 - 9 - 1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass



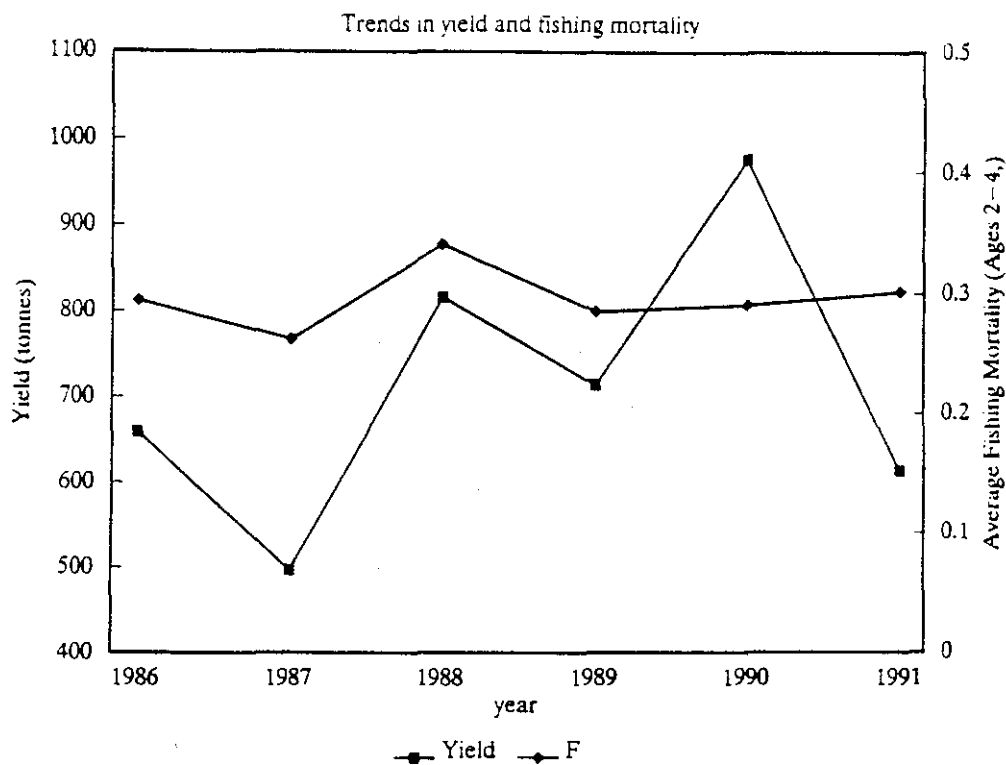


Figure 5.4.2A

Megrim (*whiffiagonis*) in Divisions VIIIC and IXa. Trends in yield and fishing mortality.

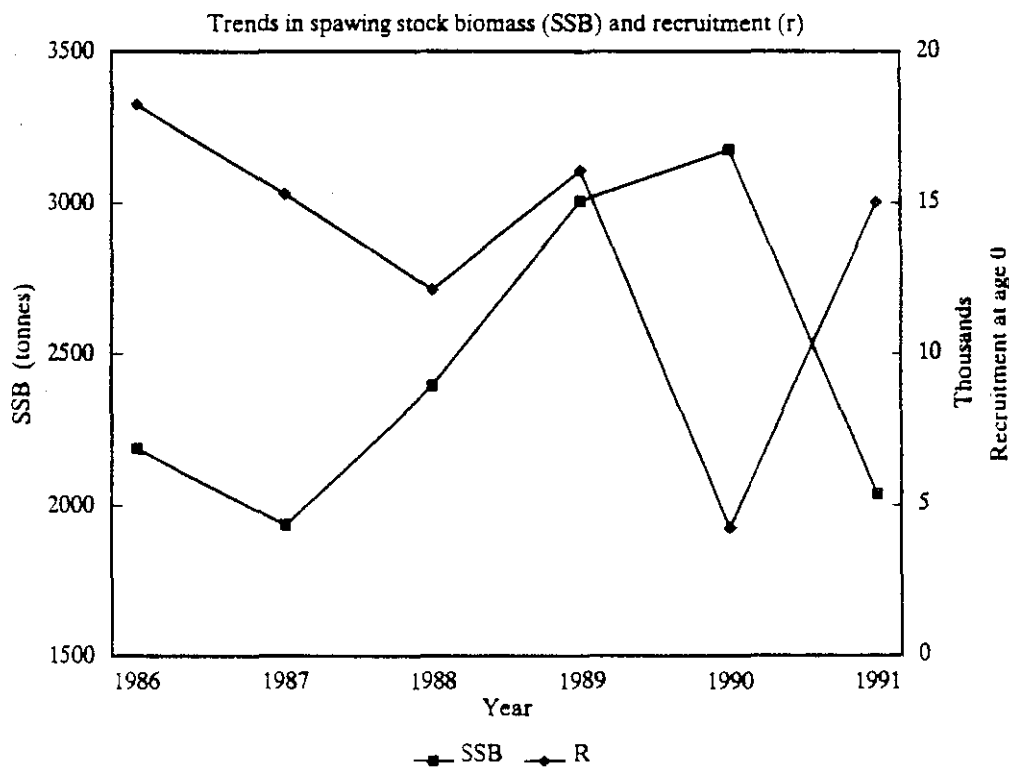


Figure 5.4.2B

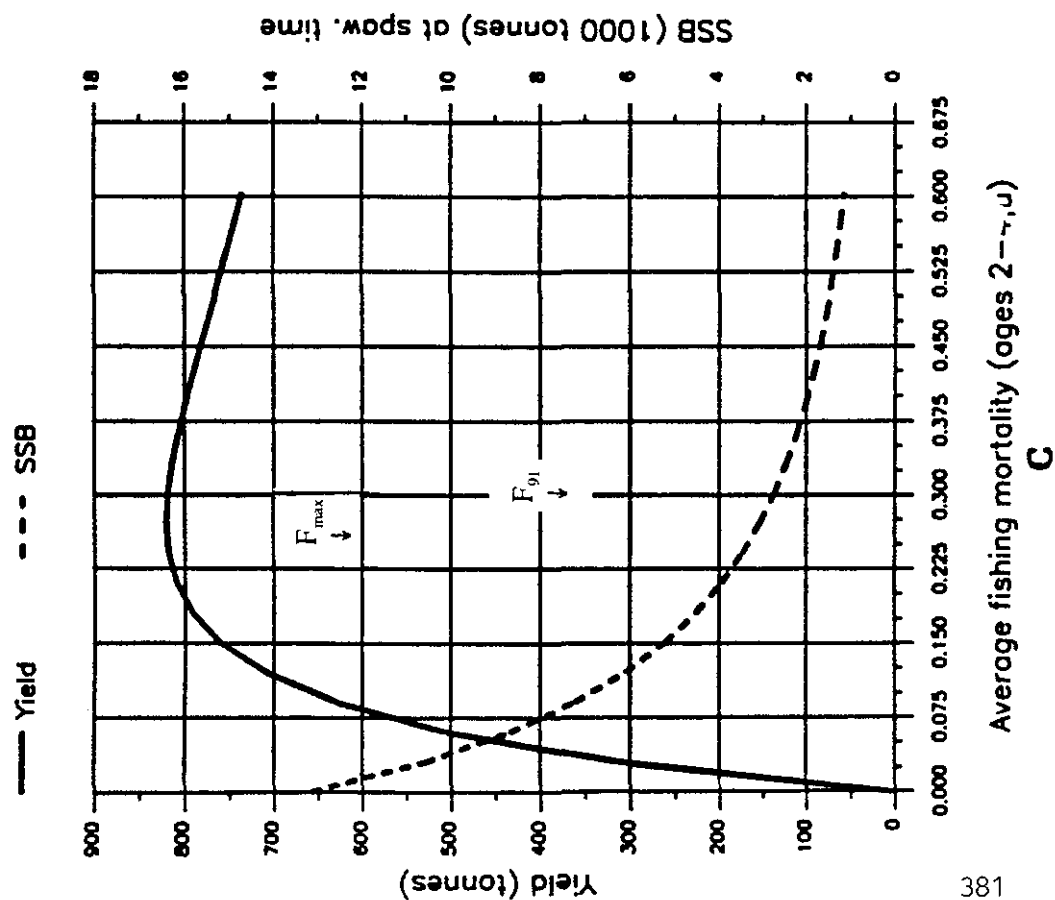
Megrim (*whiffiagonis*) in Divisions VIIIC and IXa. Trends in Spawning Stock Biomass (SSB) and Recruitment (R)



Figure 5.4.2C-D

# **FISH STOCK SUMMARY** **STOCK: Megrim (*Whiffiagonis*) in Fishing Areas VIIIc and IXa** **15--9--1992**

Long term yield and spawning stock biomass



Short-term yield and spawning stock biomass

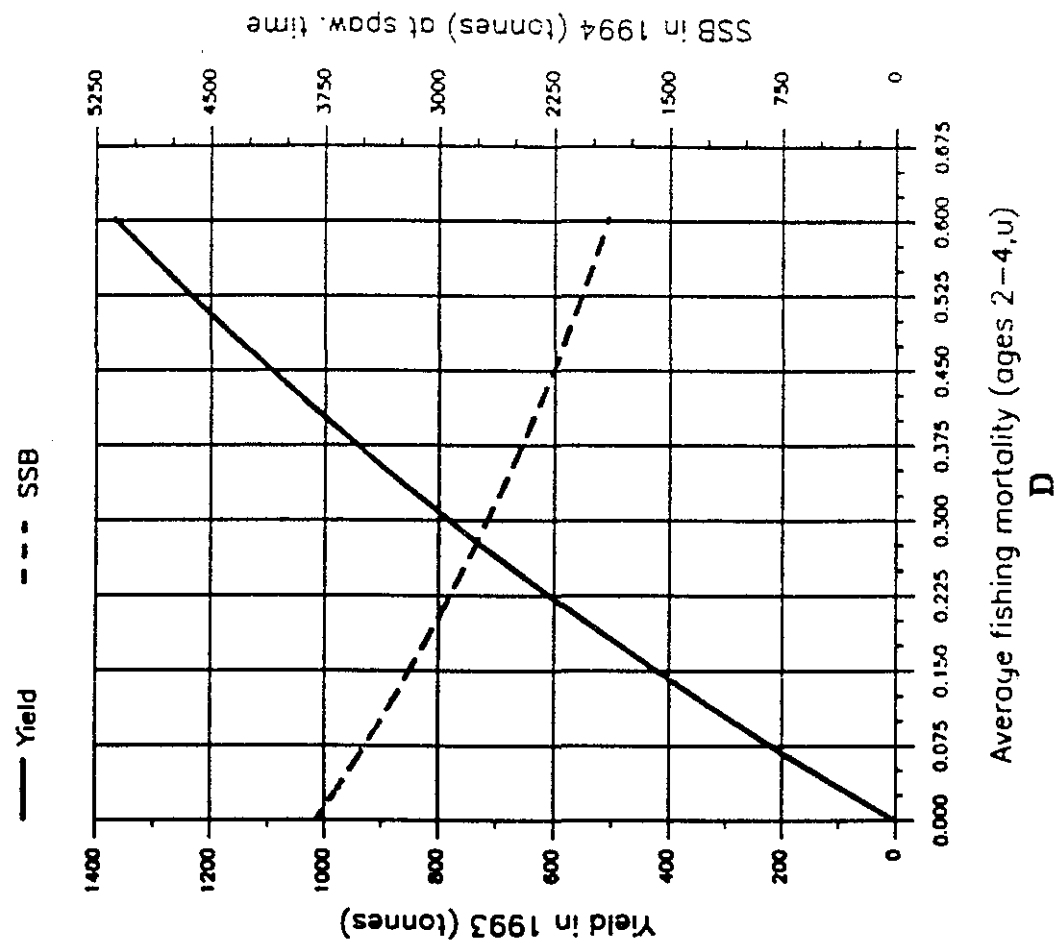


Figure 5.5.1

Long-term equilibrium yield for anglerfish in  
Divisions VIIIc and IXa

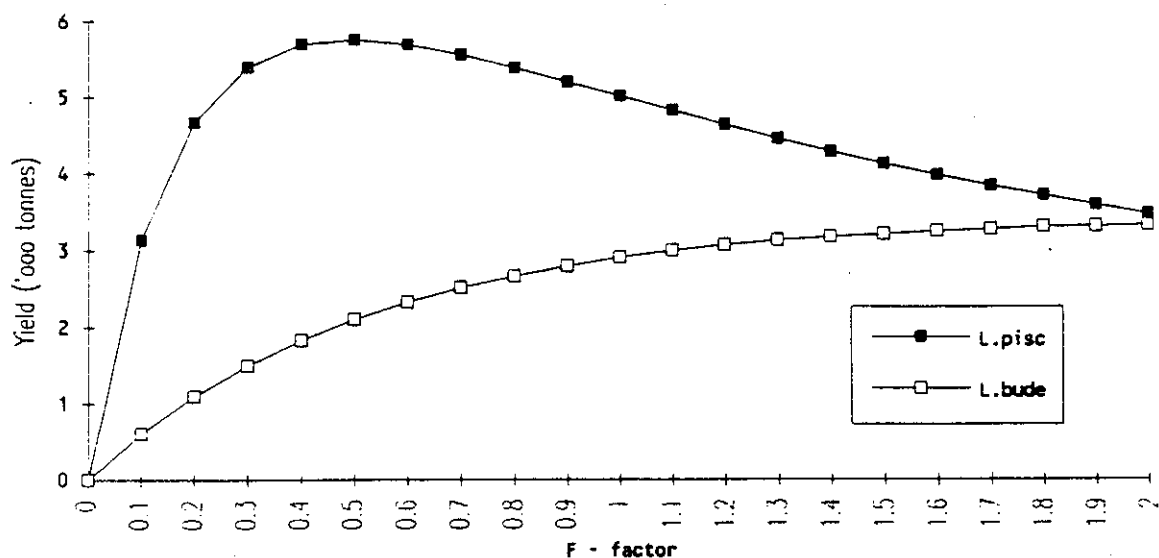


Figure 5.5.2

Anglerfish in divisions VIIIc and IXa: long-term  
equilibrium yield for both species combined

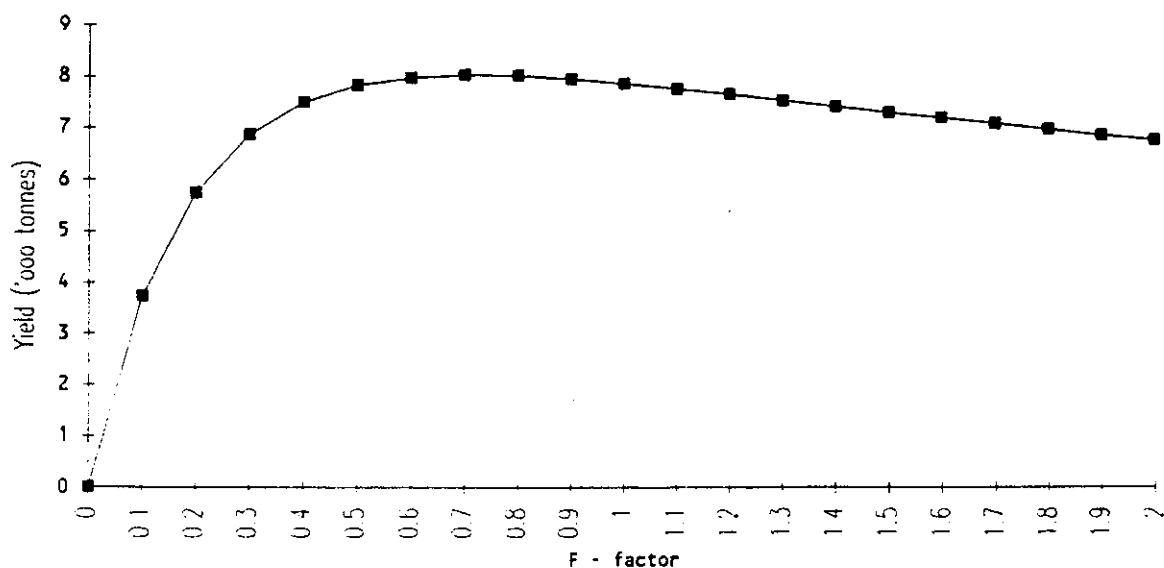


Figure 5.6A

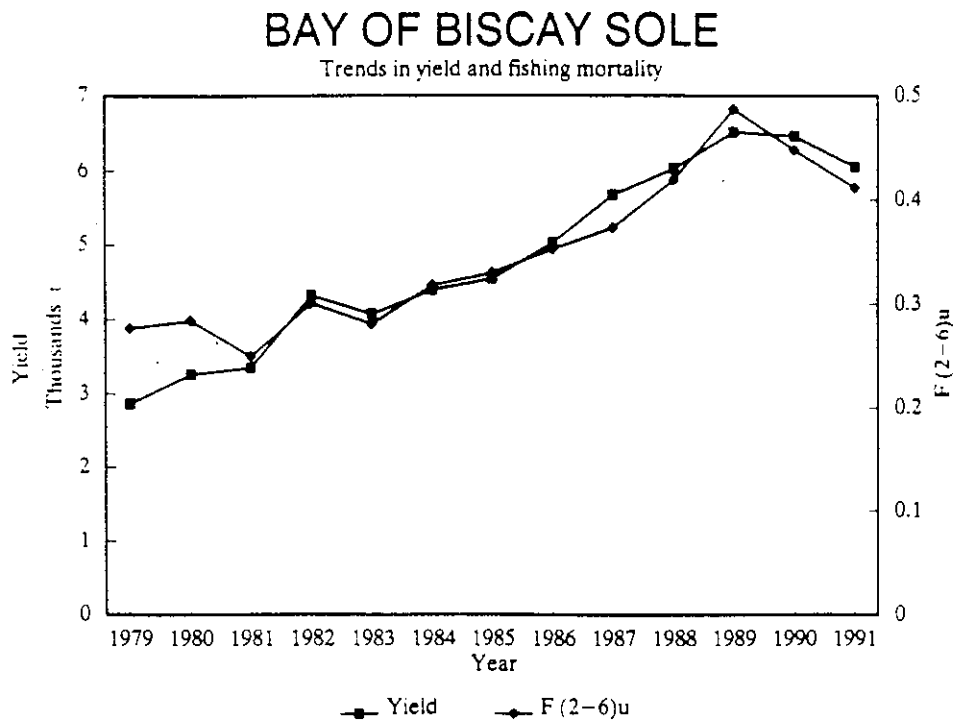


Figure 5.6B

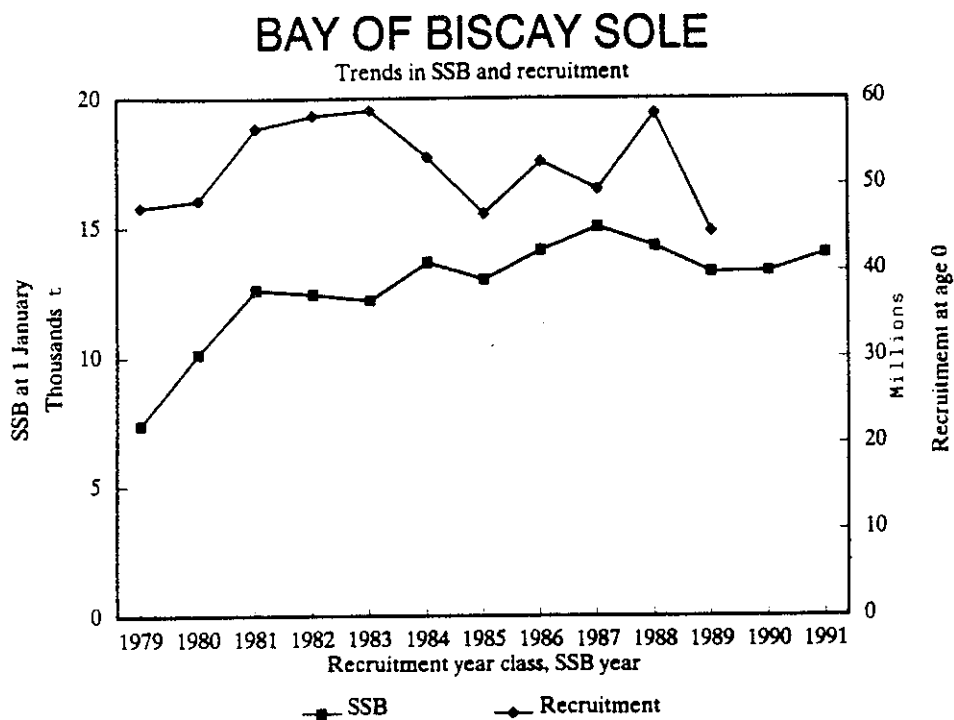


Figure 5.6C

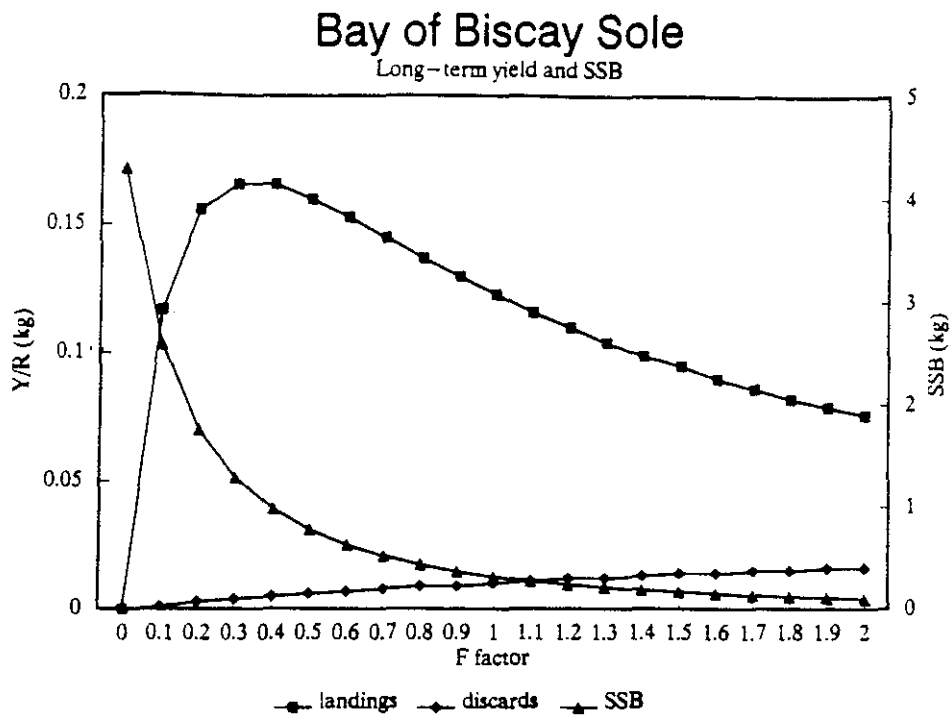
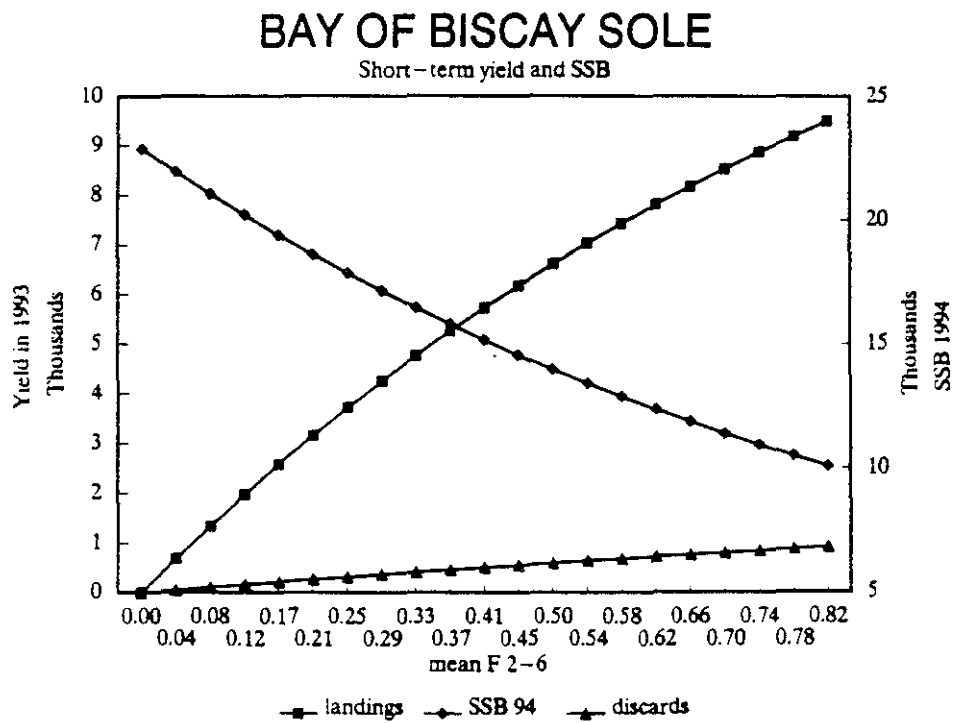


Figure 5.6D



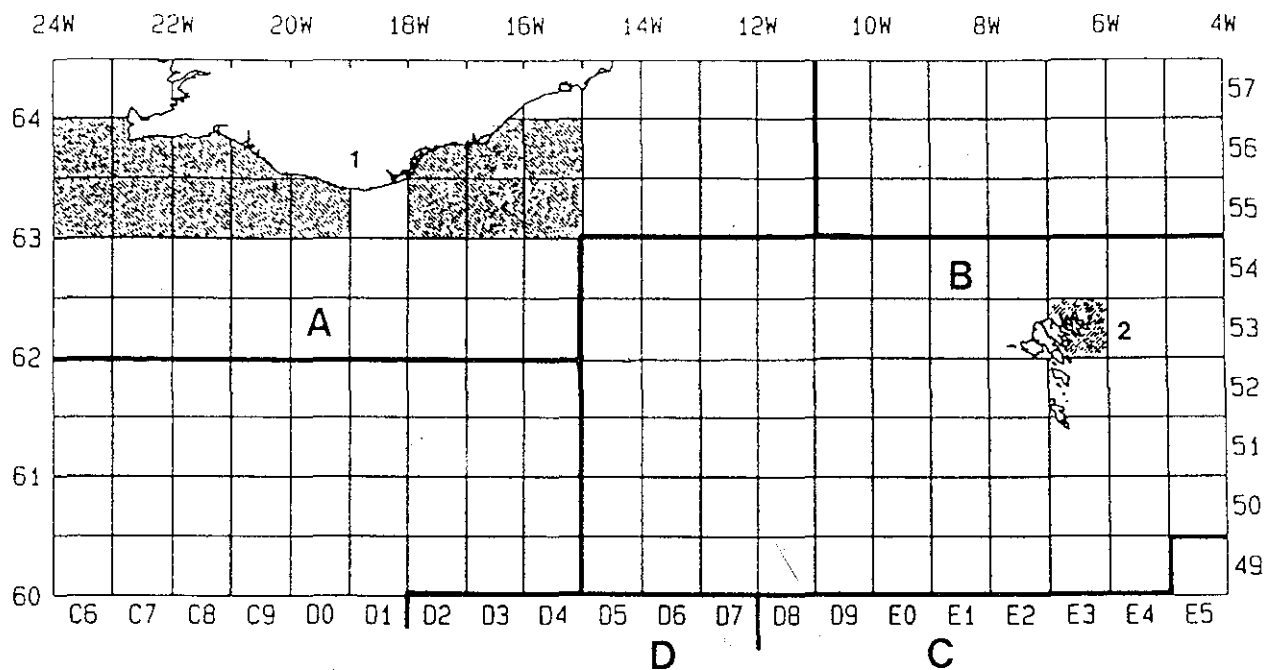


Figure 6.1.1 *Nephrops* functional units and management areas.

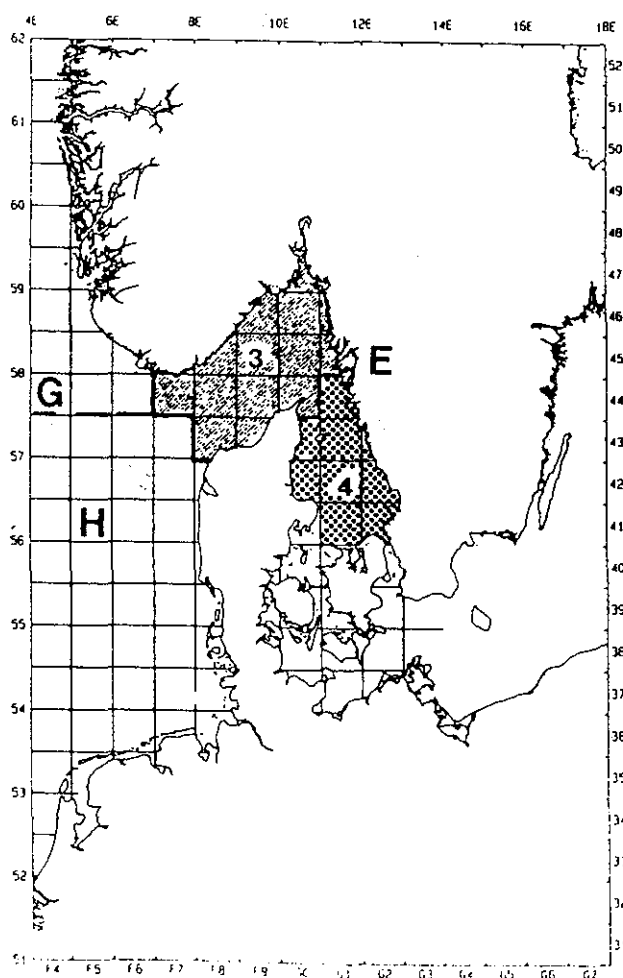


Figure 6.1.2 *Nephrops* functional units and management areas.

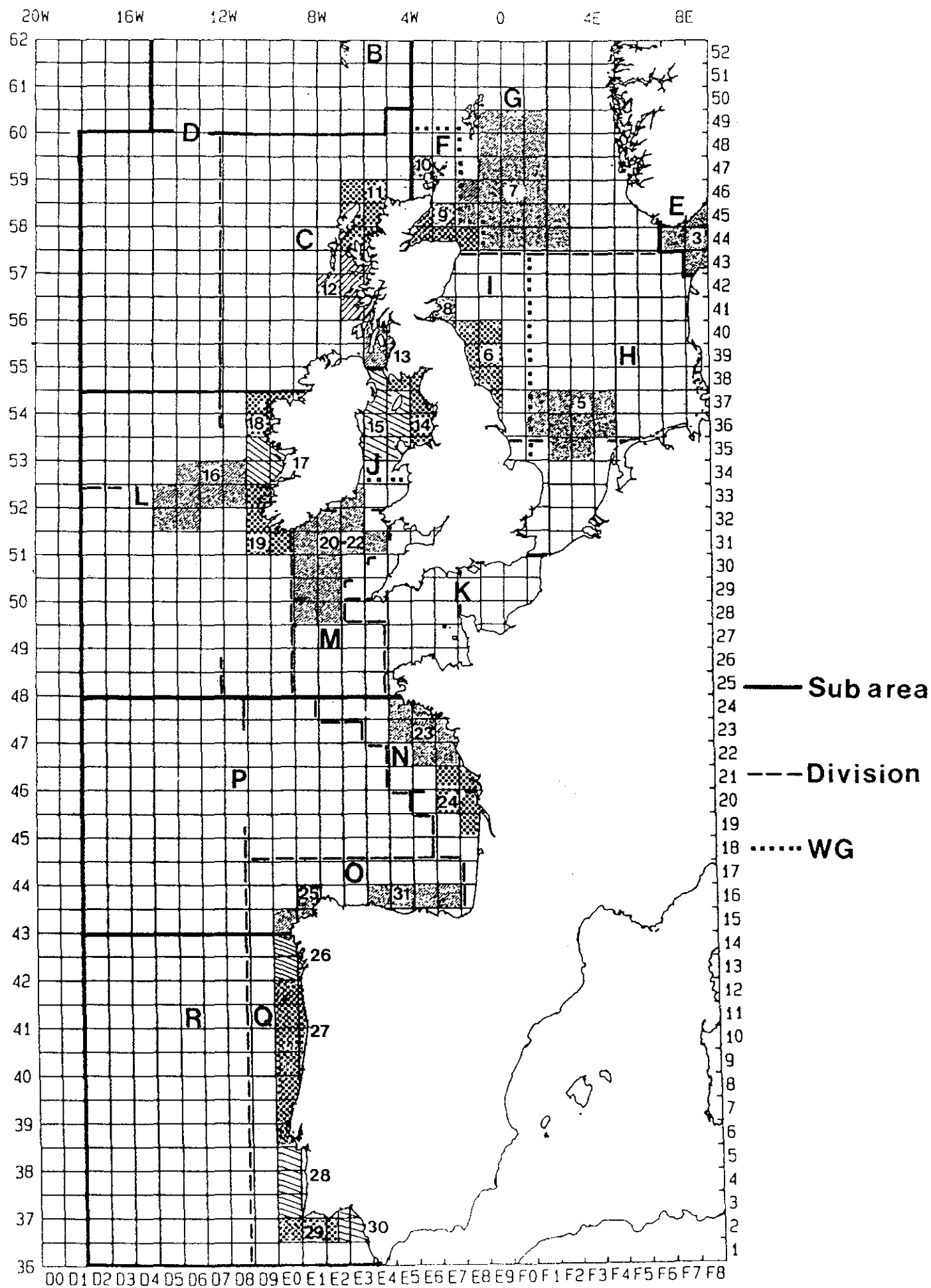
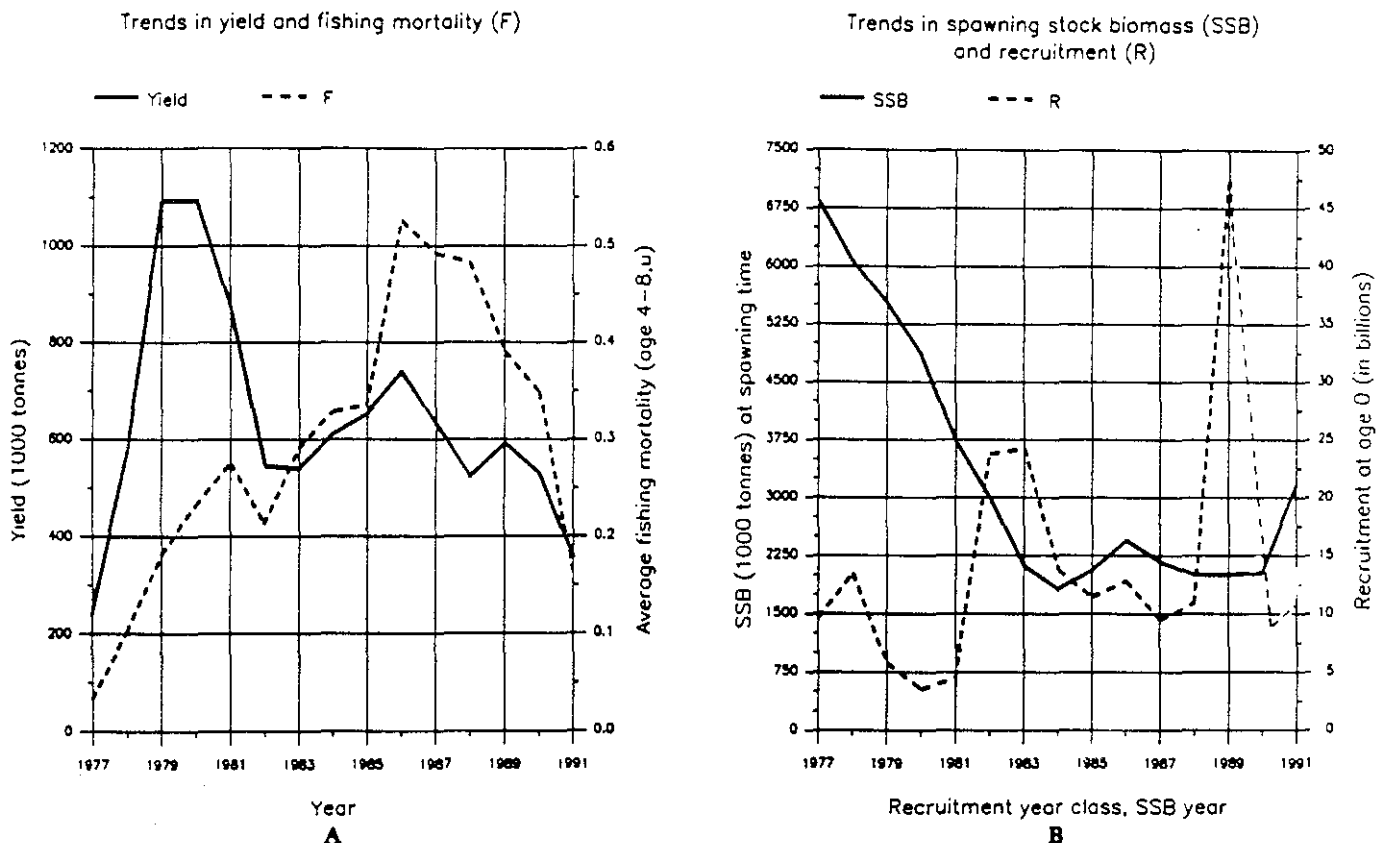


Figure 6.1.3 *Nephrops* functional units and management areas.

Figure 6.4.1.1

**FISH STOCK SUMMARY**  
**STOCK: Blue Whiting in the Northern Area**  
**11-10-1992**



**FISH STOCK SUMMARY**  
**STOCK: Blue Whiting in the Northern Area**  
**12-10-1992**

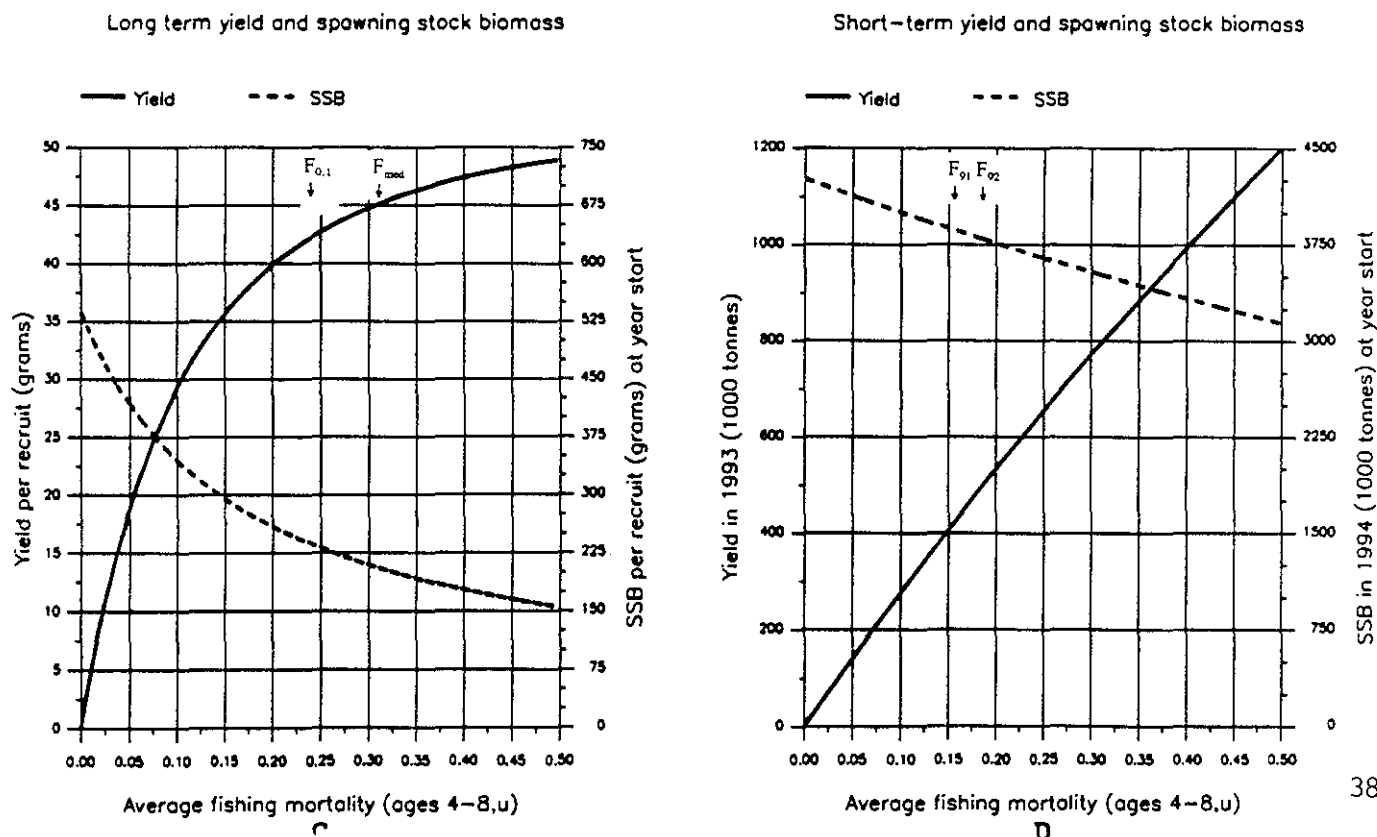


Figure 6.4.1.2A

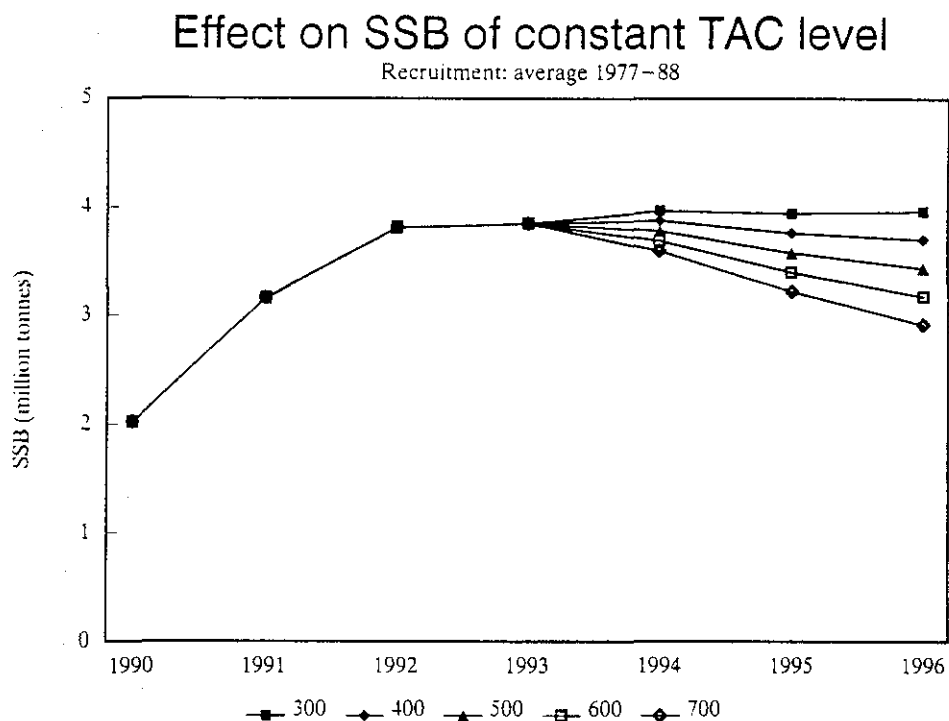
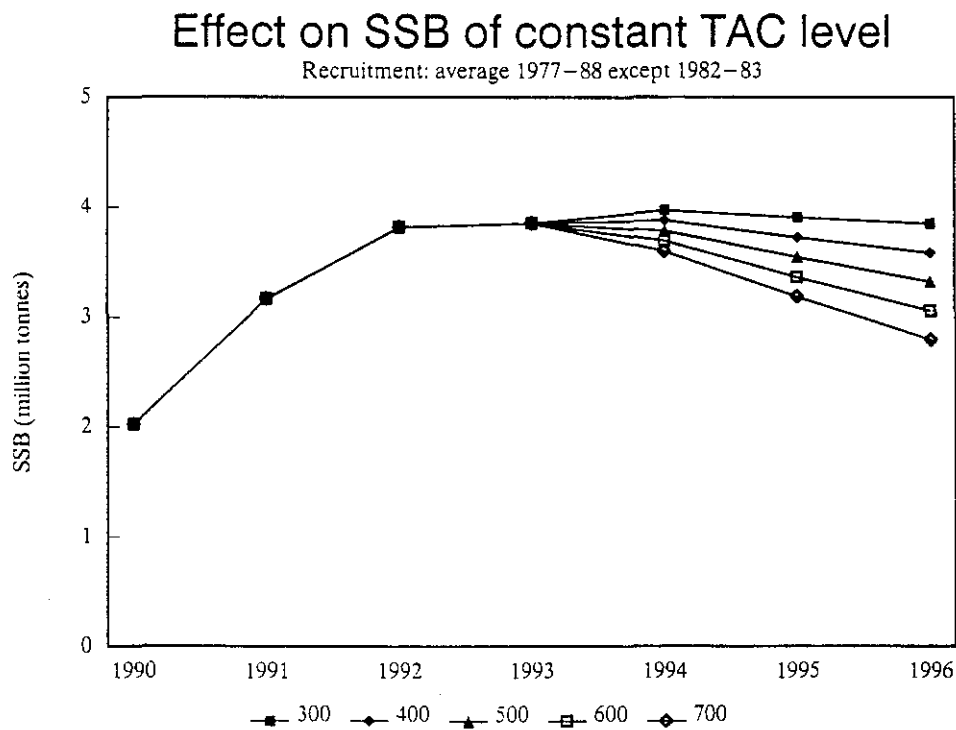


Figure 6.4.1.2B





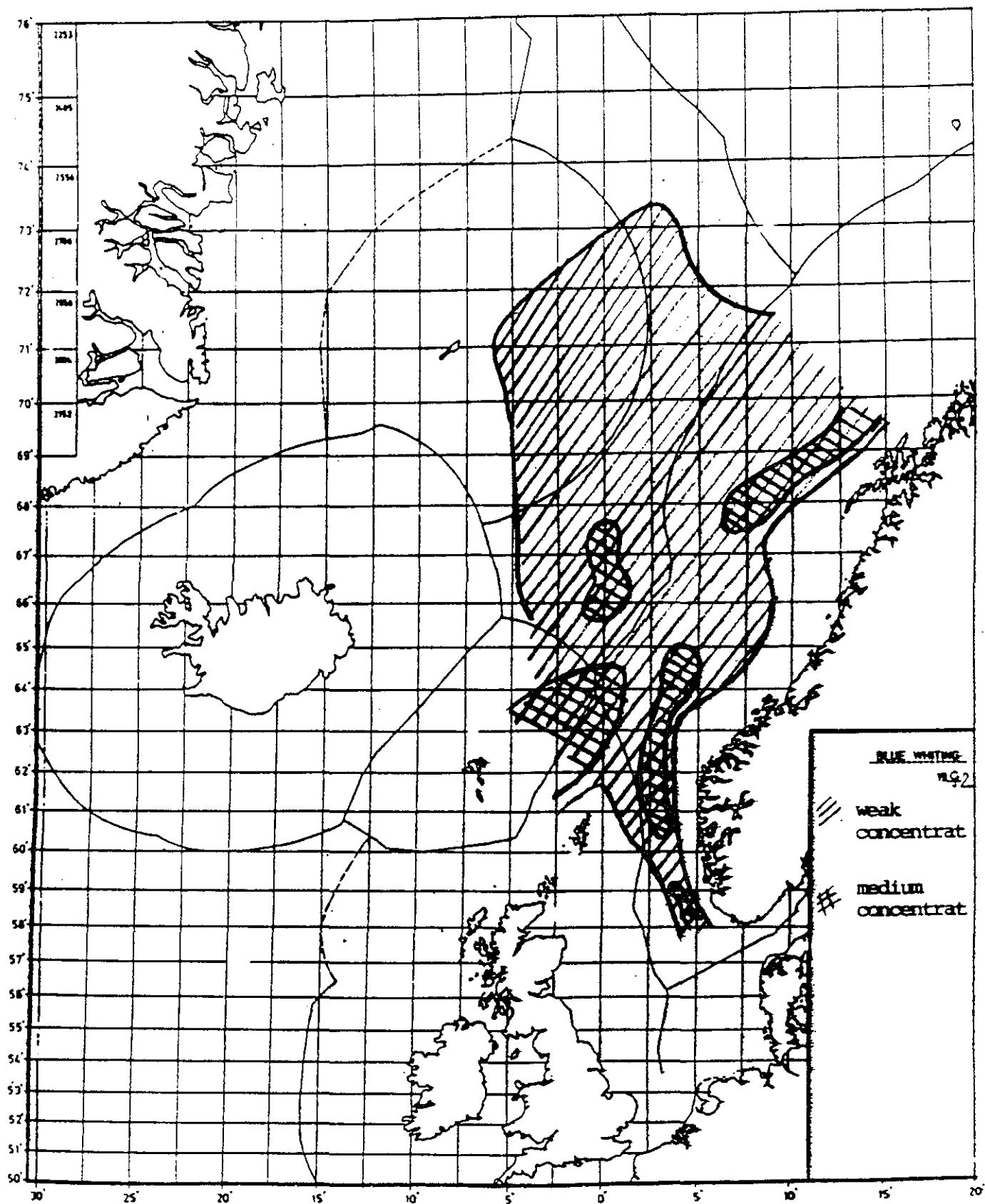


Figure 6.4.3 Area of BLUE WHITING distribution observed during R/V "G.O. Sars" survey, July-August 1992.