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3.8 Stocks in the Irish Sea (Division VIIa)

3.8.1 Overview

Fisheries

The roundfish fisheries in the Irish Sea are conducted primarily by vessels from the bordering countries (UK and Ireland). The majority of vessels are otter-trawlers fishing for cod, whiting and plaice, with by-catches of haddock, anglerfish, hake and sole. The mesh size is 80 mm and 80 mm square mesh panels have been mandatory for UK otter-trawlers since 1993, and for Irish trawlers since 1994. The number of Irish vessels operating in this region has declined in recent years. Fishing effort in the England and Wales fleet of vessels longer than 12.2 m has also declined rapidly since 1989, and in 1995 was about 40% of the effort reported in the 1980s. Since the early 1980s there has been a development of semi-pelagic trawling for cod and whiting, predominantly by vessels from Northern Ireland.

Although some of the otter-trawlers also take part in the fishery for sole, there has been a growing number of beam-trawlers, particularly from southern England and from Belgium, exploiting this stock. The most important by-catches of this fleet are plaice, rays, brill, turbot and anglerfish. The fishing effort of the Belgium beam-trawl fleet varies according to the catch-rates of sole in the Irish Sea compared with other areas in which the fleet operates.

A fleet of vessels, primarily from Ireland and Northern Ireland, takes part in a targeted *Nephrops* fishery using 70 mm nets and 75 mm square-mesh panels. The larger vessels, including some which normally target roundfish, may use twin-rig trawls with 80 mm mesh. Decommissioning has reduced the size of the Northern Ireland fleet by a third over the last four years. All boats take a considerable by-catch of whiting, much of which is discarded. Discards comprise mainly juveniles because the distribution of *Nephrops* coincides with the main nursery grounds for whiting. In this fishery as well as in the roundfish fishery in the western Irish Sea, the by-catch of haddock has increased substantially in recent years because of strong year classes in the 1990s.

The other gears employed to catch demersal species are gill-nets, notably by inshore boats targeting cod, bass, grey mullet, sole and plaice. Longlines are used mainly by Spanish vessels fishing for hake.

The main pelagic fishery in the Irish Sea is for herring. In recent years, it has been predominantly operated by vessels from Northern Ireland.

State of the Stocks

Fishing mortality on cod increased progressively throughout the 1980s. During the early 1990s, the spawning stock declined rapidly and is presently dominated by only a few age classes. As a consequence, it is sensitive to variations in recruitment and in 1995 reached a historical low following entry of the very weak 1992 year class. A combination of reduced fishing effort in the England/Wales fleet and a switch to twin-rig trawling for *Nephrops* by part of the Northern Ireland roundfish fleet in 1995, may have been responsible for a 35% reduction in fishing mortality on cod estimated for that year. This reduction may only be temporary if the predicted short-term growth in stock size attracts effort back into the fishery. A sustained reduction in fishing mortality is required to restore the stock to within safe biological limits in the medium term.

The Irish Sea whiting fishery has been characterised by high levels of fishing mortality throughout the 1980s and 1990s, and the overall level for adult whiting in 1995 is close to the average for this period. The spawning stock in 1995 is estimated to have been similar to the average level observed since the mid-1980s. An increase in spawning stock is expected in the short term due to reduced impact of the weak 1992 year class. This stock has been robust to high levels of fishing mortality because of relatively low variability of recruitment in the past.

A notable phenomenon in the Irish Sea during the 1990s has been a substantial growth in the stock of haddock, particularly following the recruitment of above-average 1991 and 1993 year classes and a very strong 1994 year class. The fish are confined mainly to the western Irish Sea where established roundfish and *Nephrops* fisheries take place. The stock is assessed using research surveys, as the data from commercial catches are of poor quality. A six-fold increase in spawning stock is estimated to have occurred in 1996. Levels of fishing mortality appear to be high, and similar to those estimated for Irish Sea whiting. Whilst the 1995 year class of haddock appears to have been weak, surveys in 1996 suggest that the 1996 year class may be strong and will contribute to landings by the end of 1997.

The landings of plaice declined in the 1990s, and in 1995 were the lowest recorded. This resulted from a combination of declining fishing mortality since 1992 and a succession of below-average year classes recruited since 1987. The spawning stock has been below average for the last 6 years. If fishing mortality remains at the recent level, the stock may increase in the short term and will have a low probability of falling outside safe biological limits in the medium term.

The sole stock has benefited several times since 1970 from very strong year classes, and as a consequence has sustained levels of fishing mortality that are considered high for a stock of this type. The frequency of such year classes has decreased since the mid-1980s, leading to a decline in spawning stock to a historical low level in 1991. Fishing mortality in 1995 was above average and the spawning stock is expected to fall to a new historical low level in 1997. The stock is considered to be close to safe biological limits.

The stocks of *Nephrops* in the Irish Sea are considered to be fully exploited. There is some concern that fishing mortality may rise from the current high level if the use of twin-rig trawls expands. Account should also be taken of the impact of this fishery on the stocks of protected species. There has been no assessment in recent years of the effects on *Nephrops* of predation by cod, but the low abundance of the latter has probably reduced its impact.

The stock of Irish Sea herring is presently subject to low levels of fishing mortality exerted by a small fleet of trawlers from Northern Ireland. The stock has recovered from the collapse which followed high levels of fishing mortality in the 1970s. A further increase in spawning stock may have occurred in 1995 following recruitment of a strong year class spawned in autumn 1992.

3.8.2 Cod in Division VIIa (Irish Sea)

Catch data (Table 3.8.2.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ACFM catch
1987	No increase in F; interaction with *Nephrops*	10.3	15.0	13.2	12.9
1988	No increase in F; interaction with *Nephrops*	10.1	15.0	15.8	14.2
1989	No increase in F	≤13.4	15.0	11.3[1]	12.8
1990	F at F_{med}; TAC	15.3	15.3	9.9[1]	7.4
1991	Stop SSB decline; TAC	6.0	10.0	7.0[1]	7.1[2]
1992	20% of F(90) ~ 10,000 t	10.0	10.0	7.4[1]	7.7[2]
1993	F_{med} ~ 10,200 t	10.2	11.0	5.8[1]	7.6[2]
1994	60% reduction in F	3.7	6.2	4.4[1]	5.4[2]
1995	50% reduction in F	3.9	5.8	4.4[3]	4.6[2]
1996	30% reduction in F	5.4	6.2		

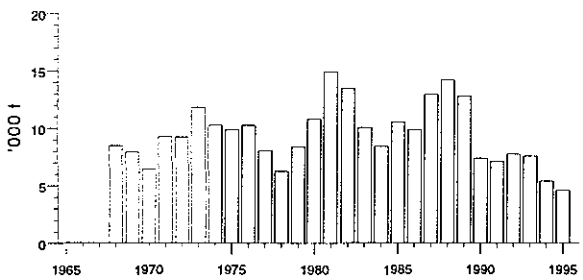
[1]Preliminary. [2]Including estimates of misreporting. [3] Incomplete data. Weights in '000 t.

Historical development of the fishery: The fishery has traditionally been carried out by otter trawlers targeting spawning cod in spring and juvenile cod in autumn and winter. Activities of these vessels have decreased in recent years whilst a fishery for cod and hake using large pelagic trawls increased substantially during the 1980s. In more recent years the pelagic fishery has also targeted cod during the summer period. Cod are also taken as a by-catch in fisheries for *Nephrops*, plaice and sole.

State of stock: ICES considers this stock to be outside safe biological limits.

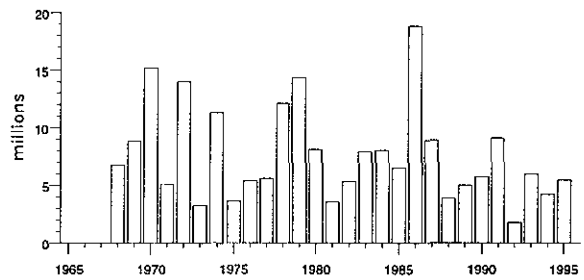
Landings

Mean = 9.42



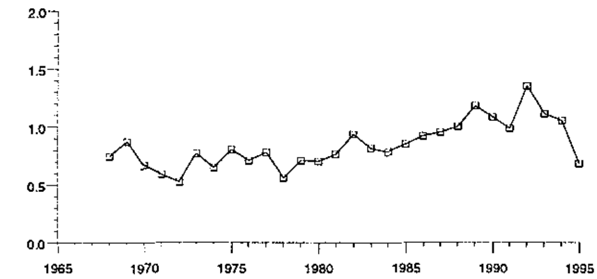
Recruitment (age 0)

Mean = 7.65



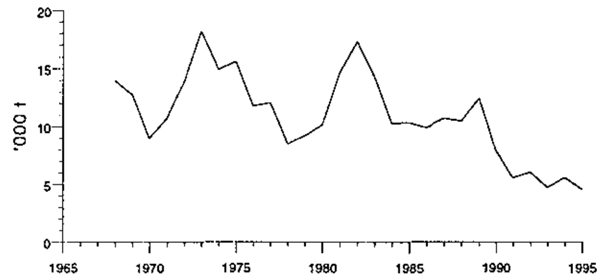
Fishing mortality (ages 2-5)

Mean = 0.844



Spawning stock biomass

Mean = 10.9



The spawning stock biomass decreased to a historically low level in 1995. All year classes since 1987, other than that of 1991, have been below average and the 1992 year class is the lowest recorded. There are indications that recruitment is reduced at low levels of spawning stock biomass. Fishing mortality has decreased in recent years, and in 1995 is estimated to be below average. This reduction is consistent with changes in effort by some major fleets in 1995, but there are uncertainties as to whether it is as large as indicated by the assessment. In addition, there are indications that this low fishing mortality will not be continued in the near future.

Details in Table 3.8.2.2.

Forecast for 1997:

SSB(96)[1] = 7.6, F(96) = 1.06, Basis: F(96)=F(94), Catch(96) = 8.1, Landings (96) = 8.1

Option	Basis	F (97)	SSB[1] (97)	Catch (97)	Lndgs (97)	SSB[1] (98)
A	0.4 F_{94}	0.42	6.0	3.9	3.9	10.5
B	0.6 F_{94}	0.63		5.3	5.3	8.7
C	0.7 F_{94}	0.74		5.9	5.9	7.9
D	0.8 F_{94}	0.85		6.5	6.5	7.2
E	1.0 F_{94}	1.06		7.5	7.5	6.0
F	1.2 F_{94}	1.27		8.3	8.3	5.1

[1] SSB estimate now calculated as at 1 January. Weights in '000 t.

A–C: SSB is expected to increase above that in 1995 and 1996 if fishing mortality does not exceed 70% of the level estimated for 1994.

Management advice: ICES recommends a sustained reduction in fishing effort to about 70% of the level in 1994.

Special comments: There are uncertainties about the 1995 level of fishing mortality. Further, a redirection of fishing effort on cod in 1996 suggests that fishing mortality may revert to levels observed in recent years prior to 1995 (F > 1.0). In this case, there is a high probability that SSB will be reduced to below the level of the late 1980s.

Following the reduction in TAC from 1991 onwards, quotas have proved restrictive for some countries resulting in substantial misreporting in some years. If the quality of data on catches and effort continues to deteriorate, ICES may not be in a position to monitor the development of this stock.

Technical measures or catch controls are unlikely, on their own, to provide the reduction in fishing mortality necessary to increase the biomass to the level of the late 1980s.

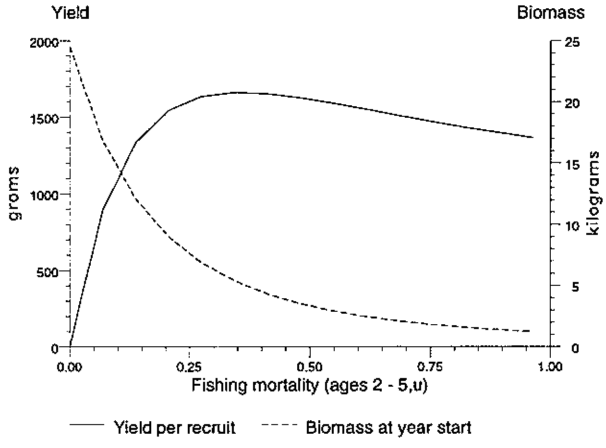
Data and assessment: Analytical assessment based on landings-at-age, commercial CPUE and recruitment indices from surveys in Division VIIa. Estimates of misreported landings included from 1991 onwards.

The series of SSB this year is not directly comparable with last year's because SSBs are now calculated at 1 January, resulting in larger estimates over the entire time series without affecting relative trends.

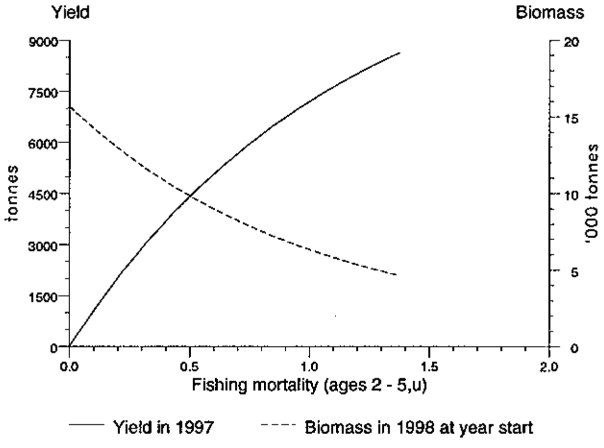
Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June-July 1996 (CM 1997/Assess:2).

Yield and Spawning Stock Biomass

Long term forecast



Short term forecast



3.8.3 Haddock in Division VIIa (Irish Sea)

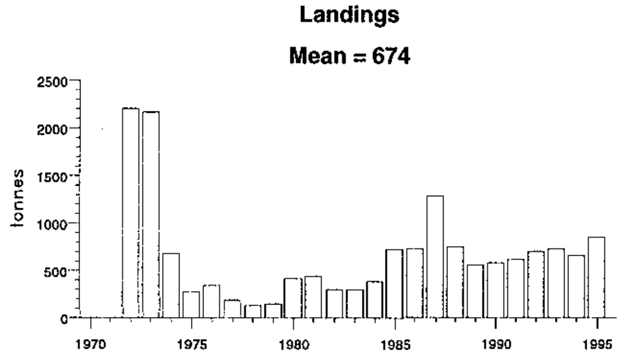
Catch data (Table 3.8.3.1-2):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	Official landings[2]	ACFM catch
1987	Not dealt with			1287	1287
1988	Not dealt with			747	747
1989	Not dealt with			560	560
1990	Not dealt with			582	582
1991	Not dealt with			616	616
1992	Not dealt with			703	703
1993	Not dealt with			730	730[2]
1994	Not dealt with			659	659[2]
1995	Not dealt with		6000	756	855[2]
1996	No advice		7000		

[1]Applies to Sub-areas VII, VIII, IX and X. [2]Possible underestimates due to misreporting. Weights in tonnes.

Historical development of the fishery: Haddock are normally taken as a small by-catch in the trawl fisheries of the Irish Sea. Periodic increases in catches occur, for example in the early 1970s. An increase in catches has occurred since 1992 due to above-average year classes, although landings continue to be reported in line with quotas. Although a large by-catch is taken in the *Nephrops* and roundfish fisheries, some targeting of haddock is now taking place. During the 1990s the stock has been confined mainly to the western Irish Sea.

State of the stock: It is not possible to estimate the state of the stock. Above-average year classes in 1991 and 1993 and a very strong year class in 1994 have resulted in a growth of the stock since 1992. Spawning stock biomass in 1996 is estimated to have increased by a factor of six compared with 1993-1995. Surveys in 1996 have indicated that the 1996 year class may be as strong as the 1994 year class. Levels of fishing mortality appear comparable to those estimated for cod and whiting in the same area. High rates of fishing mortality and a weak 1995 year class are expected to result in a decline in spawning stock biomass in 1997. However, the biomass will remain high compared with years prior to 1995.



Forecast for 1997: From a comparison of trawl survey indices with commercial catches at age between 1993 and 1995, the strong 1994 year class is expected to increase the commercial catches in 1996 and 1997. The 1996 year class may continue this increase into 1998. However, it is not possible to make an adequate forecast of the magnitude of these catches at present.

Management advice: A means of setting appropriate catch limits for haddock taken in the Irish Sea is required to avoid continued large-scale discarding and/or misreporting.

Special comments: The TAC which covers Irish Sea haddock also includes a large number of management areas to the south and west of Division VIIa. As the TAC does not reflect changes in stock size, catches increase during periods of good recruitment in the Irish sea, and this leads to discarding. Mis-reporting the by-catch of haddock in the *Nephrops* fishery increases the problem of the restrictive quota. There is a need to devise a management regime more in line with fishing oportunities and to collect reliable catch statistics.

Any management measure for haddock in the Irish Sea will have to take into consideration the large reduction in effort required in the cod fishery.

Data and assessments: Analysis of catch-rates of different age classes in March, June and September trawl surveys. Estimates of landings at age since 1993 are available, although the true level of landings remains uncertain because of misreporting.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June-July 1996 (CM 1997/Assess:2).

3.8.4 Whiting in Division VIIa (Irish Sea)

Catch data (Table 3.8.4.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official Landings	Disc.[2]	ACFM catch
1987	Reduce F	16.0	18.2	11.7	3.8	14.4
1988	No increase in F; enforce mesh regulations	12.0	18.2	11.5	1.9	11.9
1989	$F=F_{high}$; enforce mesh regulation	≤11.0	18.2	11.3	2.0	13.4
1990	No increase in F; TAC	8.3[1]	15.0	8.2	2.7	10.7
1991	Increase SSB to SSB(89); TAC	6.4[1]	10.0	7.4	2.7	9.9
1992	80% of F(90)	9.7[1]	10.0	7.1	4.2	12.8[3]
1993	70% of F(91) ~ 6,500 t	6.5	8.5	6.0	2.7	9.2[3]
1994	Within safe biological limits	-	9.9	5.8	1.2	7.9[3]
1995	No increase in F	8.3[4]	8.0	5.4	2.2	7.0[3]
1996	No increase in F	9.8[4]	9.0			

[1]Not including discards from the *Nephrops* fishery. [2]From *Nephrops* fishery. [3]Including estimates of misreporting. [4]Not including discards. Weights in '000 t.

Historical development of the fishery: Whiting is taken mainly as a by-catch in mixed species otter trawl fisheries for *Nephrops*, cod and other demersal species, and in the pelagic fishery for cod. Fishing effort in the *Nephrops* and pelagic fisheries has increased steadily. Substantial discarding of juvenile whiting occurs, mainly in the *Nephrops* fisheries. Square mesh panels have been mandatory for all UK trawlers (excluding beam trawlers) in the Irish Sea since 1993 and for Irish trawlers since 1994.

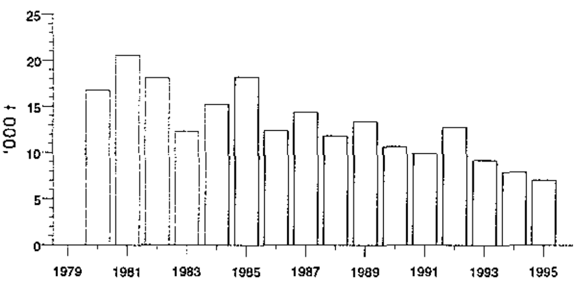
State of stock: The stock is considered to be within safe biological limits.

SSB appears to be stable, as is fishing mortality which is at high levels. There is no trend in recruitment and no indication of low recruitment at the lowest levels of SSB recorded.

Details in Table 3.8.4.2.

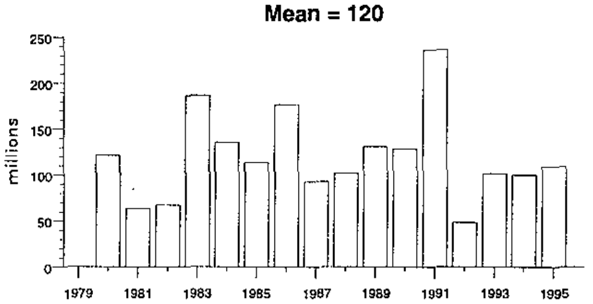
Landings

Mean = 13.2



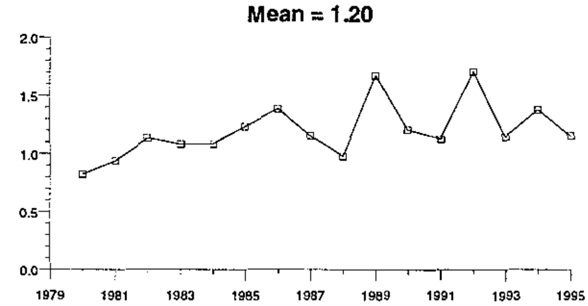
Recruitment (age 0)

Mean = 120



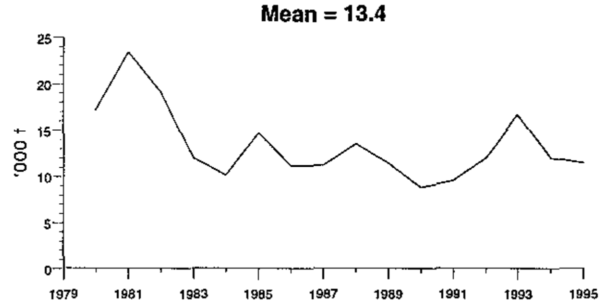
Fishing mortality (ages 2-4)

Mean = 1.20



Spawning stock biomass

Mean = 13.4



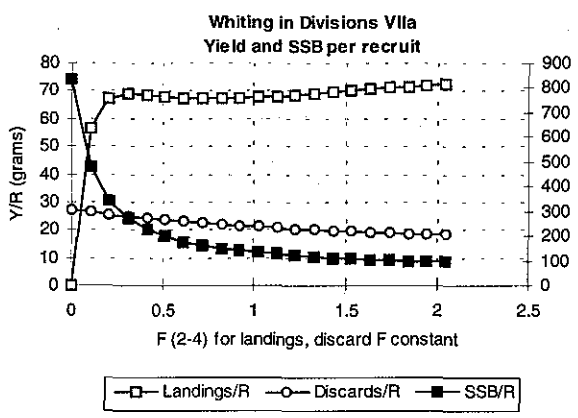
Forecast for 1997:

SSB(96)[1] = 14.4, F(96)[2] = 1.02, Basis: F(96)= F(95)
Catch(96) = 9.6, Landings (96) = 7.2

Option	Basis	F[2] (97)	SSB[1] (97)	Catch (97)	Lndgs. (97)	SSB[1] (98)
A	0.4 F_{95}	0.41	14.8	6.3	3.7	19.3
B	0.6 F_{95}	0.61		7.7	5.2	17.6
C	0.8 F_{95}	0.82		8.8	6.4	16.1
D	1.0 F_{95}	1.02		9.9	7.5	14.9
E	1.2 F_{95}	1.23		10.7	8.5	13.9

[1] SSB estimate now calculated as at 1 January. Weights in '000 t.
[2] F corresponding to landings only; total F is obtained by adding a constant F(2-4) of 0.135 corresponding to discards in the *Nephrops* fishery.

A–D: SSB increases above 1996 level.
E: SSB decreases in 1998 but remains above average.



8% of the predicted 1997 landings and 50% of the predicted 1998 SSB depend on year classes assumed to be average.

Special comments: There is a low probability that the spawning stock biomass will decrease below the lowest recorded level in the medium term at the current level of fishing mortality.

Data and assessment: Analytical assessment based on catch-at-age, commercial CPUE and indices from surveys in Division VIIa. Estimates of discards in the *Nephrops* fisheries are included in the assessment, and estimates of misreported landings have been included since 1991.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June-July 1996 (CM 1997/Assess:2). Revised assessment based on ACFM Working Paper.

3.8.5 Plaice in Division VIIa (Irish Sea)

Catch data (Table 3.8.5.1):

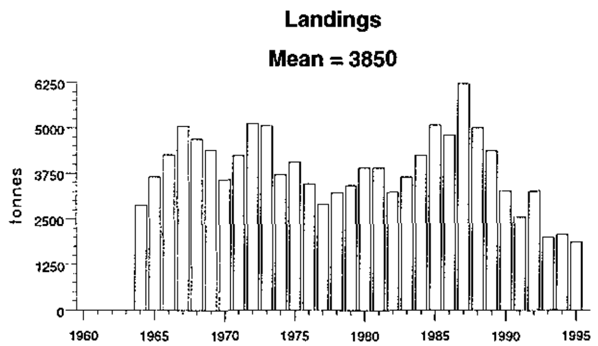
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	Discards	ACFM catch
1987	F high; no long-term gains in increasing F	5.0	5.0	5.6	0.3	6.2
1988	No increase in F	4.8	5.0	4.4	0.2	5.0
1989	80% of F(87); TAC	5.8	5.8	4.2	-	4.4
1990	Halt decline in SSB; TAC	5.1	5.1	4.0	-	3.3
1991	Rebuild SSB to SSB(90); TAC	3.3	4.5	2.8	-	2.6
1992	70% of F(90)	3.0	3.8	3.2	-	3.3
1993	F = 0.55 ~ 2,800 t	2.8	2.8	2.0	-	2.0
1994	Long-term gains in decreasing F	<3.7	3.1	2.0	-	2.1
1995	Long-term gains in decreasing F	2.4[1]	2.8	2.0	-	1.9
1996	No long-term gain in increasing F	2.5	2.45			

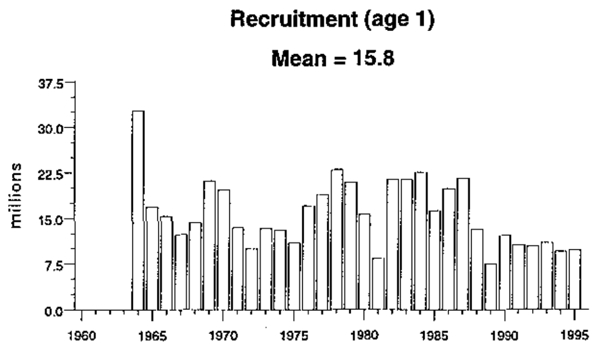
[1]Catch at *status quo* F. Weights in '000 t.

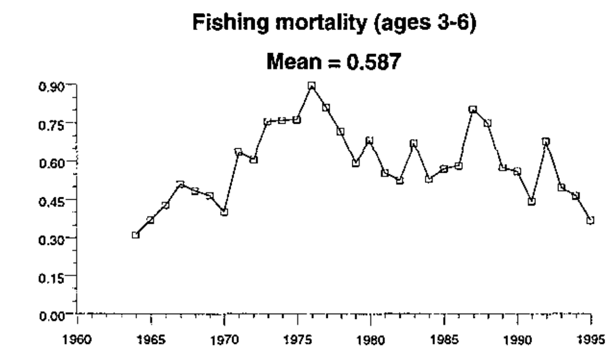
Historical development of the fishery: Plaice are taken mainly in long-established UK and Irish otter trawl fisheries for demersal fish. They are also taken as a by-catch in the beam trawl fishery for sole. Effort in the UK and Belgian beam trawl fleets increased in the late 1980s, but declined in the early 1990s.

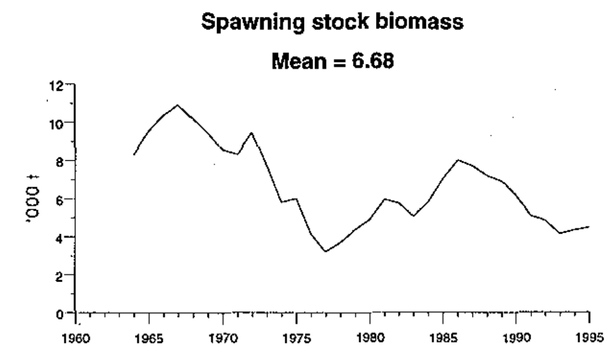
State of stock: ICES considers the stock to be close to safe biological limits. SSB has been below average during 1990-1995. Fishing mortality appears to have decreased in recent years and to be below F_{med} (0.46) in 1995. However, there is uncertainty in this estimate and F may well be higher. Recruitment since 1988 has been below the long-term average. There is no evidence that recruitment is reduced at the lowest observed SSB levels.

Details in Table 3.8.5.2.









Forecast for 1997:

SSB(96) = 4.9, F(96) = 0.37, Basis: F(96) = F(95),
Catch(96) = 1.9, Landings (96) = 1.9

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs. (97)	SSB (98)
A	0.4 F_{95}	0.15	5.4	0.9	0.9	7.3
B	0.6 F_{95}	0.22		1.4	1.4	6.9
C	0.8 F_{95}	0.29		1.8	1.8	6.5
D	1.0 F_{95}	0.37		2.1	2.1	6.1
E	1.2 F_{95}	0.44		2.5	2.5	5.8

Weights in '000 t.

A,B,C: SSB is forecast to increase through 1997 to around the long-term average level.

D,E: SSB is expected to increase to just below the long-term average level.

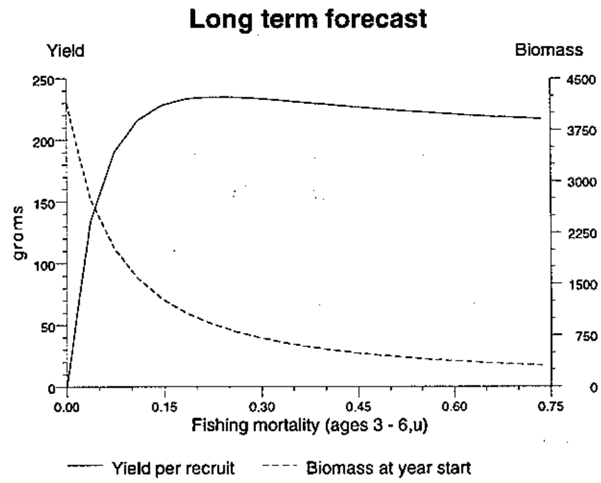
About 15% of the predicted 1997 landings and 30% of the predicted 1998 SSB depend on year classes assumed to be of average recruitment.

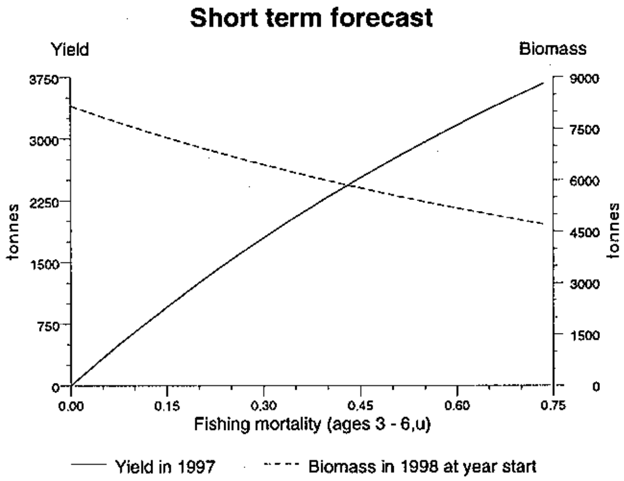
Special comments: The fishing mortality estimated for 1995 and used in the forecasts is likely to be an underestimate.

Data and assessment: Analytical assessment based on catch-at-age, commercial CPUE and survey CPUE data. SSB calculated at 1 January, implying that values over the whole time series have been rescaled upwards.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June-July 1996 (CM 1997/Assess:2).

Yield and Spawning Stock Biomass





3.8.6 Sole in Division VIIa (Irish Sea)

Catch data (Table 3.8.6.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ACFM catch[2]
1987	No increase in F	1.9	2.1	2.0	2.8
1988	80% of F(86); TAC	1.6	1.75	1.9	2.0
1989	80% of F(87); TAC	<1.48	1.48	1.8	1.8
1990	Interim advice	1.05[3]	1.5	1.6	1.6
1991	90% of F(89); TAC	1.3	1.5	1.2	1.2
1992	No long-term gains in increased F	1.2[1]	1.35	1.2	1.3
1993	F=F(91) ~ 920 t	0.92	1.0	1.0	1.0
1994	No long-term gains in increased F	1.51[1]	1.5	1.4	1.4
1995	20% reduction in F, equal 800 t	0.8	1.3	1.3	1.3
1996	20% reduction in F, equal 800 t	0.8	1.0		

[1]Catch at *Status quo* F. [2] Not including misreporting. [3]Revised in 1990 to 1.5. Weights in '000 t.

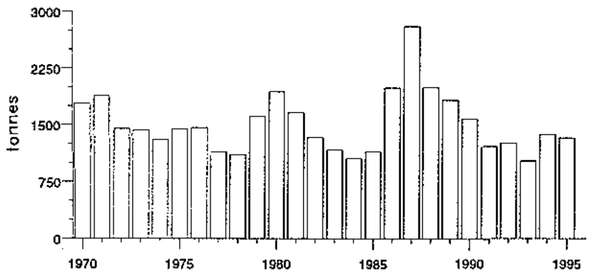
Historical development of the fishery: Sole are taken mainly in a beam trawl fishery that commenced in the 1960s and are also taken as a by-catch in the longer established otter trawl fisheries. Effort in the Belgian beam trawl fleet increased in the late 1980s as vessels normally operating in the North Sea were attracted into the Irish Sea by better fishing opportunities. Beam trawling by UK vessels increased substantially from 1986, reaching a peak in 1990 and decreased thereafter.

State of stock: The stock is considered to be close to safe biological limits. The SSB is in the region of its lowest level, and likely to remain so at current fishing mortality. In the last 10 years, only one year class has been above average, whereas in the 10 years prior to 1985, 4 good year classes have been noted. Fishing mortality is well above F_{med} (0.26) .

Details in Table 3.8.6.2.

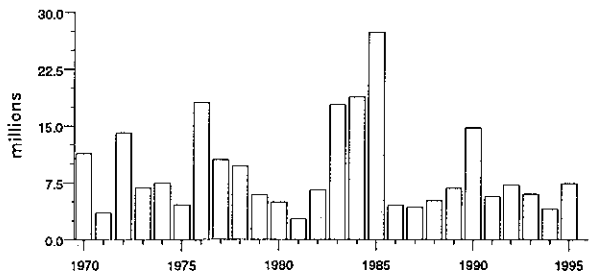
Landings

Mean = 1514



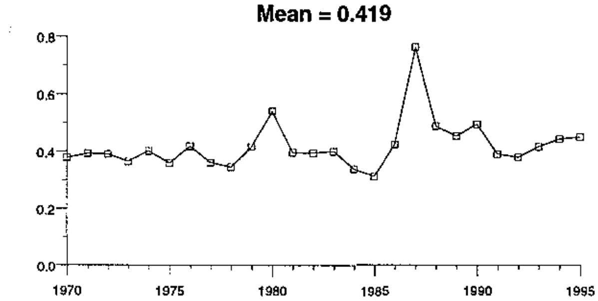
Recruitment (age 1)

Mean = 9.08



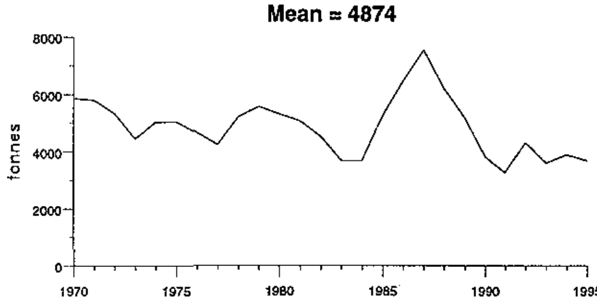
Fishing mortality (ages 4-7)

Mean = 0.419



Spawning stock biomass

Mean = 4874



Forecast for 1997:

SSB(96) = 3.0 , F(96) = 0.45, Basis: F(96) = F(95), Catch(96) = 1.1, Landings (96) = 1.1

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs. (97)	SSB (98)
A	0.4 F_{95}	0.18	3.1	0.4	0.4	3.9
B	0.6 F_{95}	0.27	3.1	0.6	0.6	3.6
C	0.8 F_{95}	0.36	3.1	0.8	0.8	3.4
D	1.0 F_{95}	0.45	3.0	1.0	1.0	3.2
E	1.2 F_{95}	0.54	3.0	1.2	1.2	3.0

Weights in '000 t.

A–D: SSB will increase to above the historical minimum (3.0 in 1996).

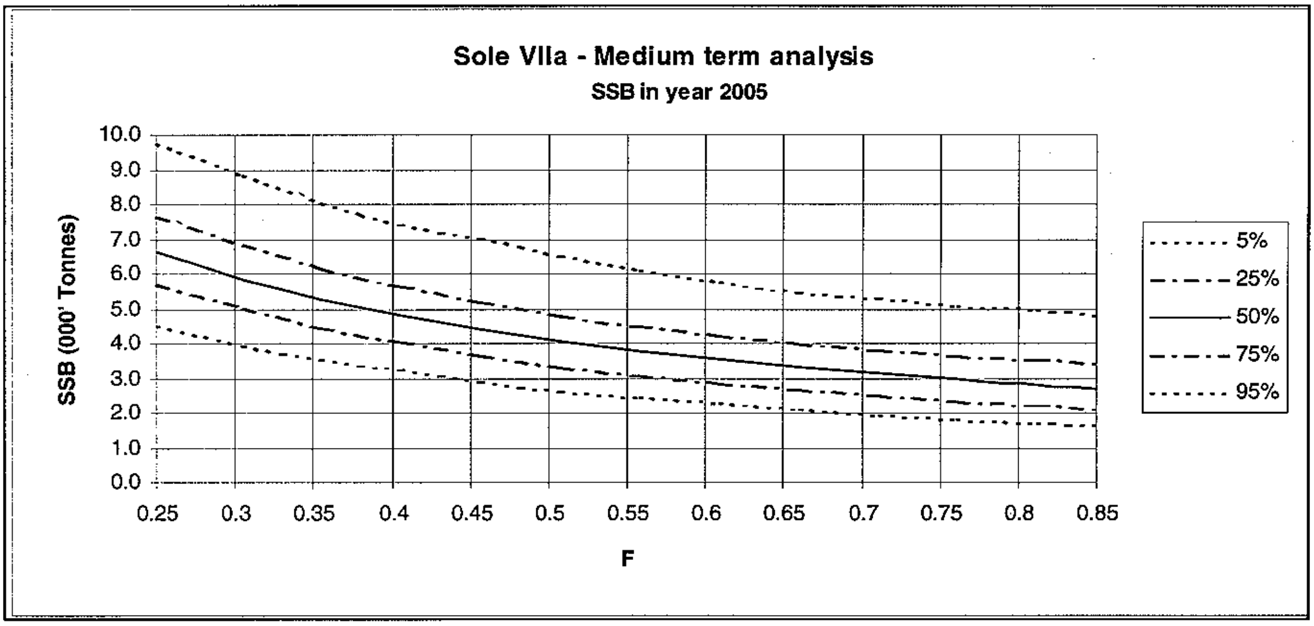
E: SSB will be close to or decrease below the historical minimum level.

Management advice: To allow the SSB to increase above the historical minimum level observed prior to 1996 (3,300 t in 1991), **ICES recommends for 1997 a 20% reduction in fishing mortality from the 1995 level, corresponding to a catch of 800 t in 1997.**

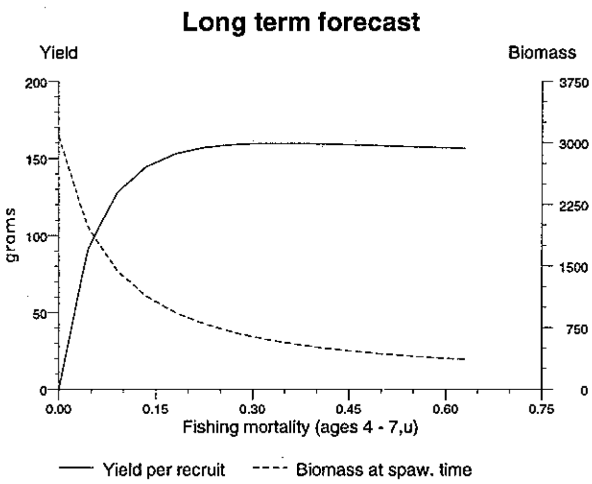
Special comments: A medium-term forecast shows that SSB is in the region of its lowest observed level and is likely to stay there at current fishing mortality.

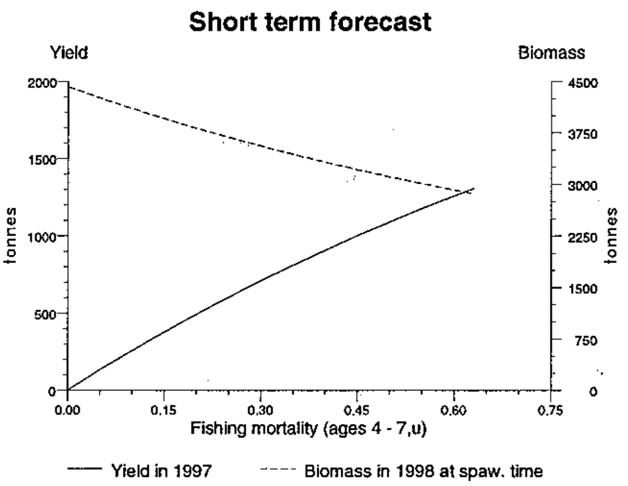
Data and assessment: Analytical assessment based on landings-at-age, commercial CPUE data and survey indices.

Source of information: Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks, June–July 1996 (CM 1997/Assess:2).



Yield and Spawning Stock Biomass





3.8.7 Irish Sea herring (Division VIIa)

Catch data (Table 3.8.7.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	TAC	4.3	4.5	5.8
1988	TAC (Revised advice in 1988)	10.5 (5.6)	10.5	10.2
1989	TAC	5.5	6.0	5.0
1990	Precautionary TAC	5.7	7.0	6.3
1991	TAC	5.6	6.0	4.4
1992	TAC	~6.6	7.0	5.3
1993	TAC	4.9-7.4	7.0	4.4
1994	Precautionary TAC	~5.3	7.0	4.8
1995	Precautionary TAC	5.1	7.0	5.1
1996	If required, precautionary TAC	~5.0	7.0	

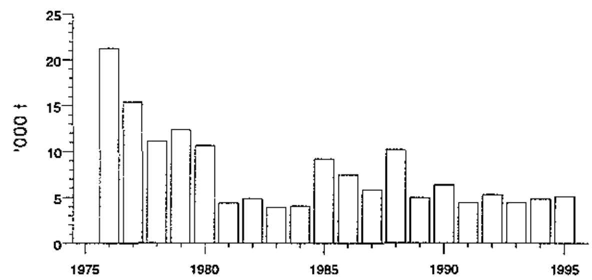
Weights in '000 t

Historical development of the fishery: There are two spawning stocks of herring in the Irish Sea (Manx and Mourne). Presently these are treated as one stock for assessment and management purposes. During the 1970s a large fleet of vessels fished herring in the Irish Sea and landings attained 39,000t in 1974. During this period an industrial fishery also operated in the western region. A transfer of fishing effort into the Irish Sea followed the closure of the North Sea and west of Scotland fisheries in the late 1970s.

The high levels of fishing mortality caused a substantial decline in the stock resulting in the introduction of low TACs from 1981. Closures of spawning and nursery areas were also introduced. The industrial fishery closed in 1979. Since the mid-1980s fleet size has progressively declined. From 1991 to the present, withdrawal of the Irish fleet from the fishery has resulted in a further reduction in fishing effort.

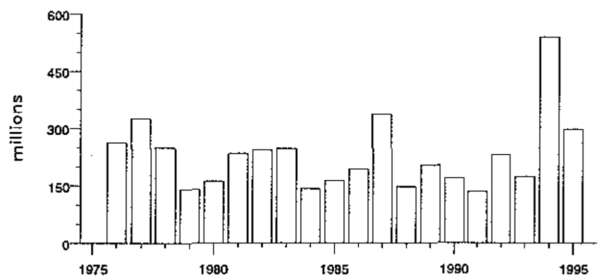
Landings

Mean = 7.79



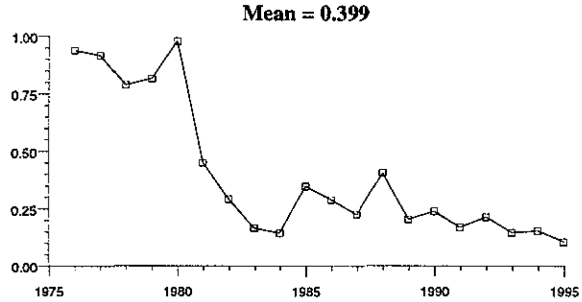
Recruitment (age 1)

Mean = 230



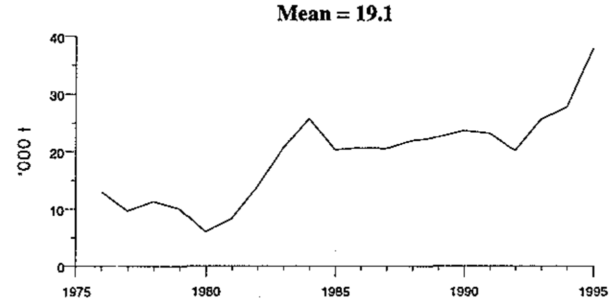
Fishing mortality (ages 2-6)

Mean = 0.399



Spawning stock biomass

Mean = 19.1



State of stock: The stock is considered to be within safe biological limits. Although the precision of the scientific assessment of this stock is comparatively low because of the short time series of catch-independent data, it appears that the stock has recovered substantially from the low levels observed in the late 1970s. The stock is probably only lightly exploited at present. An apparent increase in spawning stock in 1995 followed the recruitment of a relatively strong 1992 year class to the spawning stock. Details in Table 3.8.7.2.

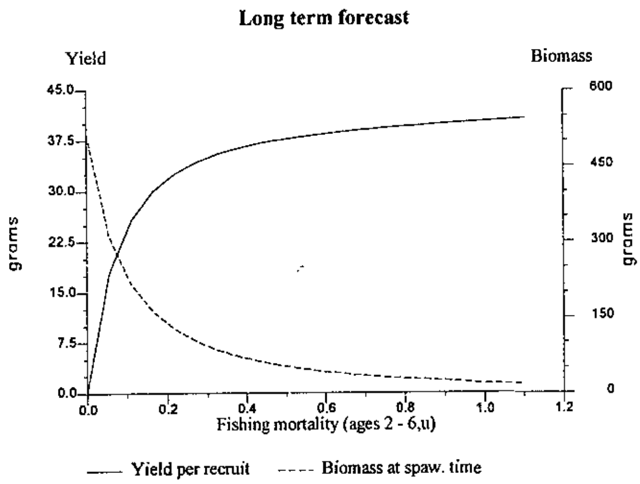
Forecast for 1997: F(96) =0.16. Basis TAC; Catch(96) = 7, geometric mean recruitment in 1996–1997: 222 million, SSB(96) =38.1

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	1.0F(95)	0.107	41	4.8	42

Weights in '000 t.

Management advice: The current assessment indicates that continued exploitation at 7,000 t will not be detrimental to the stock, with a low risk of the spawning stock falling outside safe biological limits in the medium term (see figure on next page).

Yield and Spawning Stock Biomass



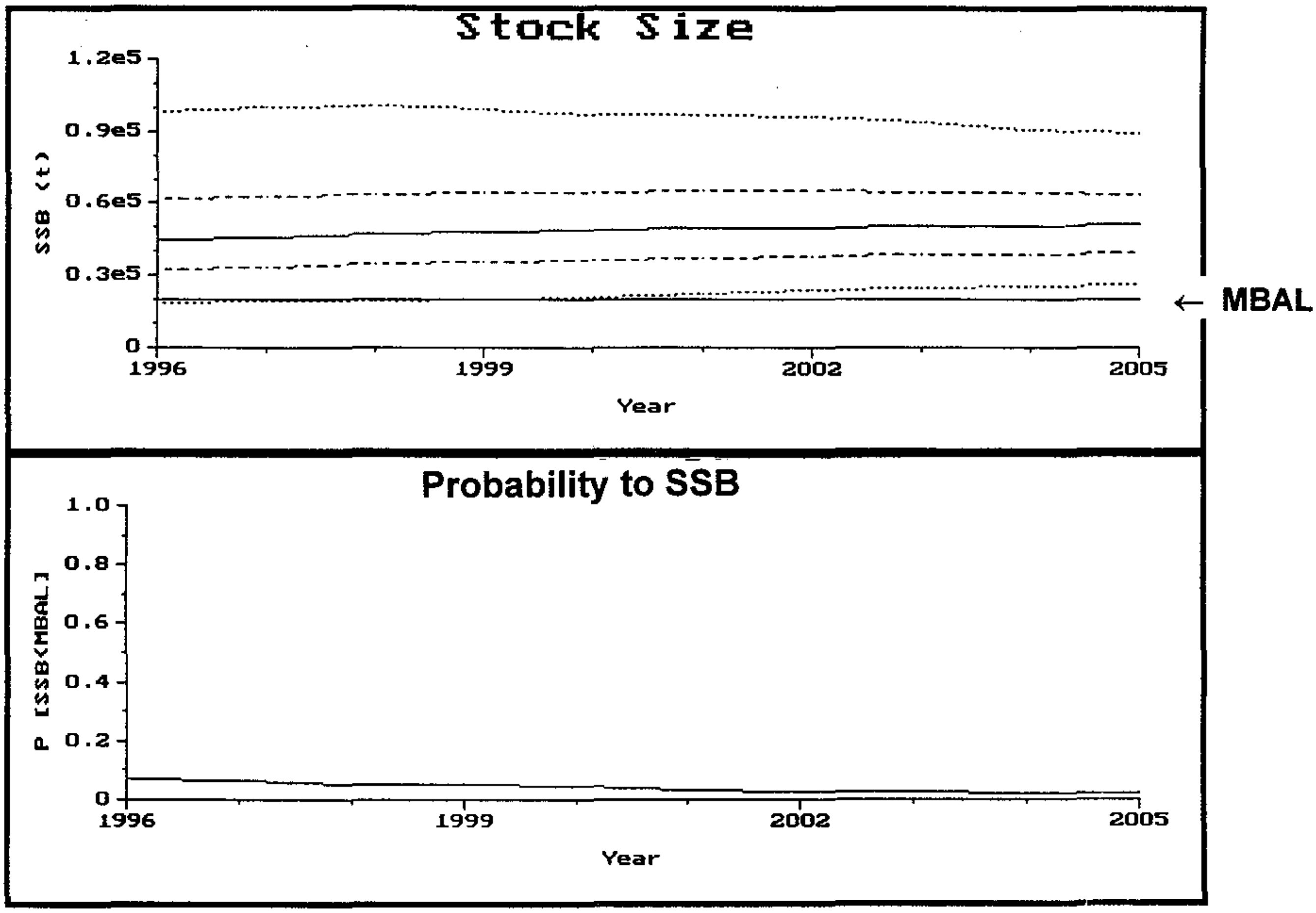
Data and assessment: Time series of landings and catches at age (1972–1995); acoustic surveys of spawning stocks (1989–1995); time series of larvae production estimates (1989–1995); trawl survey estimates of recruitment (1991–1996). Assessment based on all available catch and survey data. For this stock, age refers to number of rings, which is one year less than the true age.

Closed areas: The areas closed to herring fishing around the eastern Irish coast and west coast of Britain were put in place to protect juveniles of each stock during a time of an industrial fishery in the Irish Sea. Protection of all spawning grounds should be maintained. However, the spatial extent and/or duration of the closures could be reconsidered, provided adequate information on the recent distribution of juvenile and spawning populations is available.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (C.M.1996/Assess:10).

Irish Sea herring (Division VIIa)

Summary results of medium-term projections assuming a catch constraint of 7,000 t in each year up to 2005. **Upper panel:** Solid line, 50th percentile; dashed lines, 25th and 75th percentiles; dotted line, 5th and 95th percentiles; horizontal line, MBAL of 20,000 t. **Lower panel:** The probability that the stock may fall below MBAL.



3.9 Stocks in the Celtic Sea (Divisions VIIf-k), Western Channel (Division VIIe) and Northern parts of the Bay of Biscay (Divisions VIIIa,b,d, and e)

3.9.1 Overview

Fleets and fisheries

Most of the demersal fisheries in this area have a mixed catch. Although it is possible to associate specific target species with particular fleets, various quantities of cod, whiting, hake, anglerfish, megrim, sole, plaice and *Nephrops* are taken together, depending on gear type.

In the Celtic Sea and Western Channel, fisheries for demersal species, mainly cod, whiting, sole and plaice, are conducted by Belgium, France, Ireland and the UK. The principal gears used are otter trawls and beam trawls. The targeting of sole and plaice using beam trawls became prevalent during the mid 1970s leading to an increase in the landings of these two species. The gradual replacement of otter trawls by beam trawls has occurred in the Belgian and UK fleets. In the Bay of Biscay there has been a substantial increase in the coastal gill-net fishery targeting sole.

A trawl fishery for anglerfish by Spanish and French vessels developed in the Celtic Sea and Bay of Biscay in the 1970s and expanded until 1990. The fishery has become dependent on small juvenile fish for which there is no minimum landing size. In addition, a gill net fishery has developed in the Celtic Sea in the last decade.

Nephrops are an important component of the fisheries in this area. These fisheries developed in the 1970s and 1980s and effort increased continuously until recent years. Landings increased initially as effort increased but these have tended to stabilise or decline at continuing high effort levels. The mesh size when fishing for *Nephrops* can lead to a significant by-catch of juvenile fish, notably hake.

There are separate trawl fisheries targeting herring in the Celtic Sea and mackerel and horse mackerel in the whole area. The herring fishery is principally a "roe" fishery and discard rates have at times reached very high levels. There is also a small directed fishery for sprat in the Channel.

Management measures

The assessment units used for demersal stocks in this area are small and catches deriving from them are generally in the region of 10 thousand t or less. However, the TACs set for the stocks often cover many assessment units. In addition, for a number of units, there are insufficient data for adequate assessments. This means that TACs which cover a number of heavily exploited stocks comprise a summation across units of analytical forecasts and average catches which offer no effective management control of the exploitation rate. Since a number of stocks affected by this problem are regarded as being close to or outside safe biological limits, there is a need to reconsider the areas on which TACs are set if management is to improve. This year, the assessment areas for cod and whiting have been expanded to include Division VIIe.

A notable feature of the demersal fisheries in this area is their mixed nature. The effectiveness of single species TACs is likely to be diminished unless this is taken into account. Use of measures to reduce fishing mortality directly, such as effort reductions in fleets, is likely to avoid a number of the disadvantages of catch controls in regulating the exploitation rate.

The fisheries in the Celtic Sea are essentially a continuation of the fisheries in the Bay of Biscay and some of the same fleets operate in both areas. However, the technical measures in the two areas differ. The minimum mesh sizes in the Celtic Sea are often different from those in the Bay of Biscay. This difference makes enforcement more difficult since vessels can carry multiple mesh sizes and may fish in the Celtic Sea using the lower mesh sizes without being detected. It is noted, however, that the recent European Commission proposal to revise the existing conditions on technical measures attempts to eliminate this problem.

The problems associated with the lack of French data for 1994 have now been resolved and the 1994 landings data for Celtic Sea cod and whiting have been revised in this year's assessments.

State of the stocks

The majority of fish stocks which are assessed in this area are considered to be outside or close to being outside safe biological limits. They are characterised by declining spawning stock biomass and high fishing mortality rates. Of particular concern are Bay of Biscay (Divisions VIIIab) and Celtic Sea (VIIf,g) sole and Celtic Sea (Divisions VIIe,f,g,h) cod. These stocks exhibit high F, low SSB level and low recruitments in recent years.

The Northern hake stock is discussed fully in Section 3.12.2. It is important to note that it is nevertheless taken by most of the demersal fleets in this area. This hake stock is regarded as being close to safe biological limits which means that any management of the fisheries in the area needs to consider its protection.

Although the *Nephrops* stocks were not assessed this year there are no major concerns about the *Nephrops* stocks in this area though most stock units are fully exploited in terms of yield per recruit. Management of these fisheries, however, needs to be sensitive to by-catches of stocks requiring protection such as Celtic Sea cod and Northern hake.

The Celtic Sea herring SSB has been stable in the last ten years and increased in 1994 and 1995. The recruitment has been above average in three of the last four years.

The mackerel caught in the area belong to the Southern and Western spawning components which at present are at historically low levels. The Western horse mackerel is declining rapidly due to one extremely strong year class being fished down and at present F will continue to decline.

For many of the stocks in this area there are insufficient data for an assessment. It is not, therefore, possible to evaluate their status. It would be unwise to assume that these stocks are not already heavily exploited and conclude that catch controls can be relaxed.

3.9.2 Celtic Sea and Western Channel cod (Divisions VIIe, VIIf, VIIg and VIIh)

Catch data (Table 3.9.2.1):

Year	ICES advice	Catch corresp. to advice[2]	Agreed TAC[1]	ACFM catch
1987	Reduce F	<6.4		9.9
1988	No increase in F; TAC	7.0[4]		16.4
1989	No increase in F; TAC	8.6[4]		18.9
1990	No increase in F; TAC	9.2[4]		11.4
1991	TAC; SSB ≥ mean	4.5[4]		7.6
1992	Appropriate to reduce F	-		8.3
1993	20% reduction in F	6.5[4]	17.5	9.6
1994	20% reduction in F	5.6[4]	17.0	9.4
1995	20% reduction in F	4.7[3]	17.0	10.0
1996	20% reduction in F	4.7[3]	20.0	

[1]TAC covers Sub-areas VII (except Division VIIa) and VIII. [2]Excludes VIIe. [3] For the VIIf-h stock component. [4] For the VIIf+g stock component. Weights in '000 t.

Historical development of the fishery: Cod in Divisions VIIe, VIIf, VIIg, VIIh are taken as a component of mixed trawl fisheries. Landings are made predominantly by French gadoid trawlers which prior to 1980 devoted their activity in the Celtic Sea to fishing mainly hake. The landings of cod by French *Nephrops* trawlers have increased in recent years.

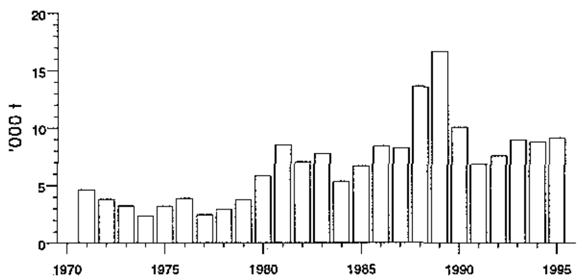
State of stock: The stock is considered to be close to safe biological limits. SSB fluctuates widely, depending on recruitment, and after a temporary increase in 1994, SSB in 1995 is below the long-term average. There is evidence of reduced recruitment at SSB levels below a 7,000 t threshold. Fishing mortality is high and good year classes are fished out rapidly.

(Details in Tables 3.9.2.2 and 3.9.2.3)

Summary graphs for Divisions VIIf,g and h

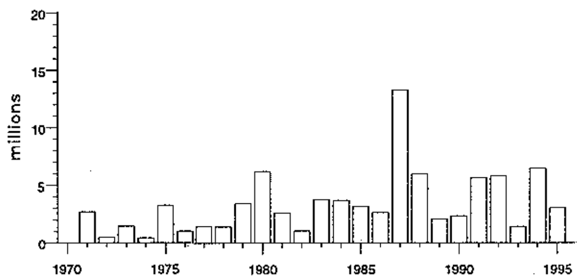
Landings

Mean = 6.79



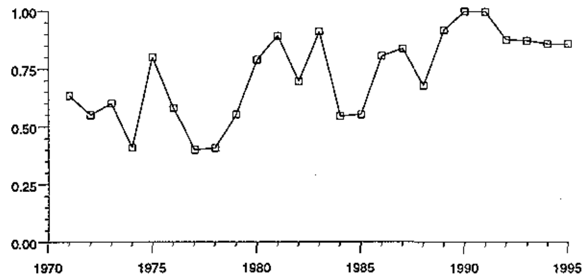
Recruitment (age 1)

Mean = 3.40



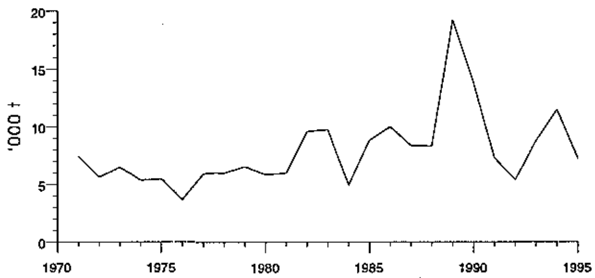
Fishing mortality (ages 2-5)

Mean = 0.720



Spawning stock biomass

Mean = 7.90



Forecast for 1997:

SSB(96) = 11.8, F(96) = 0.82, Basis: F(96) = F(95), Catch(96) = Landings (96) = 10.3.
Recruitment of the 1995 year class set equal to the geometric mean for the period 1971-1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.33	11.0		4.3	14.4
B	$0.6F_{95}$	0.49			6.0	12.2
C	$0.8F_{95}$	0.66			7.4	10.3
D	$1.0F_{95}$	0.82			8.6	8.7
E	$1.2F_{95}$	0.99			9.6	7.4

Weights in '000 t.

The SSB in 1998 is predicted to be equal to the average (8.7) of the years 1988-1995 at *status quo* F, 26 % higher than the threshold (7,000 t). For options A,B, and C, SSB in 1998 remains above the average; with option E, SSB decreases to close to the threshold.

The medium-term projections indicate that the median SSB will remain close to the 7,000 t threshold, and that a reduction in F of 20-25 % is required to ensure a high probability that SSB will be above the threshold in 10 years. (See figure on next page).

A combined forecast for cod and whiting is given in Section 3.9.3.

Management advice: In order to prevent a decline in SSB below the 1988-1995 average, **ICES recommends a 20 % reduction of fishing mortality in 1997 compared to that in 1995.**

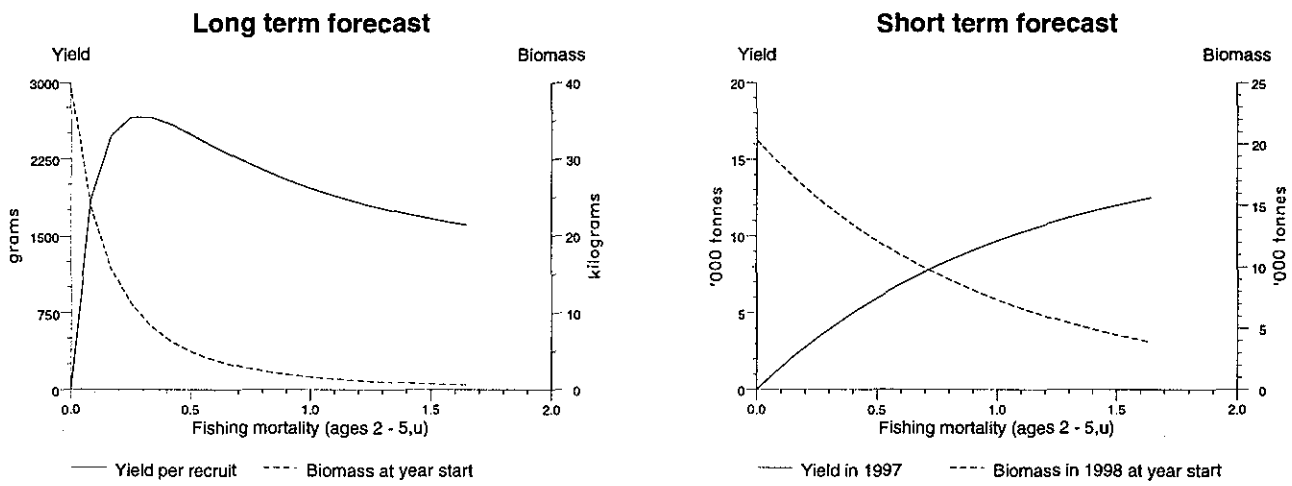
Special comments: This year, cod in Division VIIe have been included in this assessment which, though lacking Division VIId, now covers the major part of the TAC area (all of Sub-area VII except Division VIIa). Due to data limitations it has been possible to consider only the period 1988-1995 (Table 3.9.2.3). The assessment is, however, consistent with that for Divisions VIIe-h for which a longer time series is available (Table 3.9.2.2). The summary graphs on the previous page are for a longer period which does not include Division VIIe. The forecast depends heavily on the strength of recruiting year classes which have not been measured and are assumed to be of average abundance.

Because the forecast is dominated by an assumption of average recruiting year classes and because the TAC for this stock includes other management areas, a TAC is not likely to be successful in reducing F on this stock. Other measures, such as effort control should be considered.

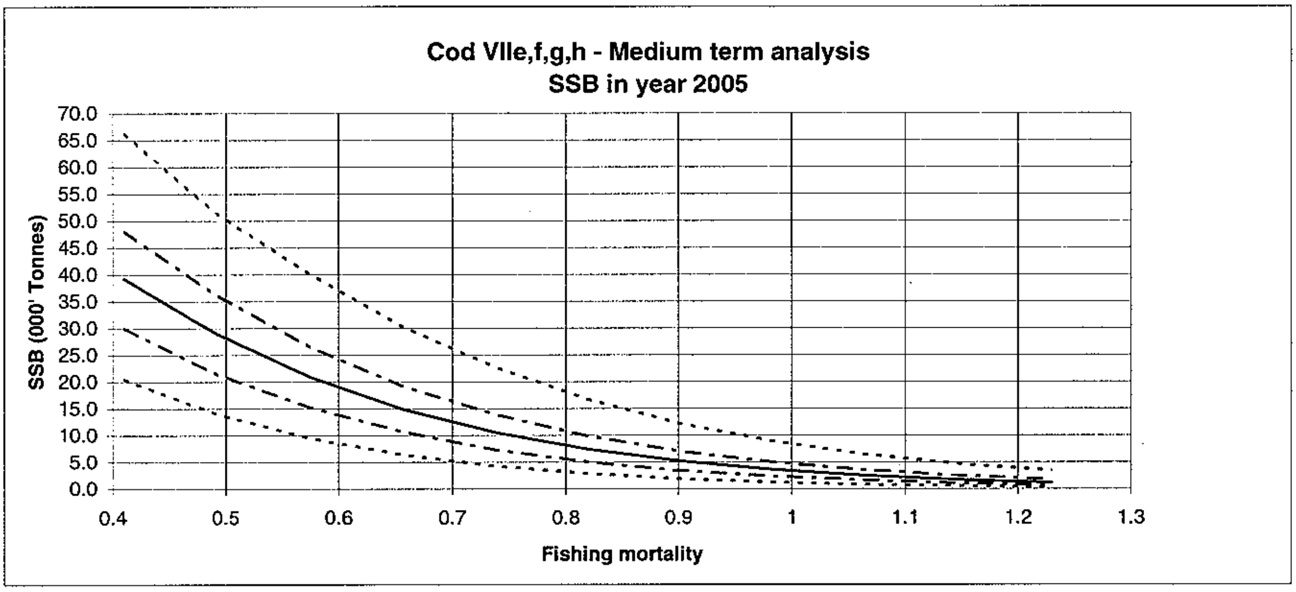
Data and assessment: Analytical assessment based on landings and commercial CPUE data for three commercial fleets for a short series (1988-1995) where age data were both available in Division VIIe and in Divisions VIIf,g,h. Sensitivity analysis and medium-term predictions used the long series of recruitments and SSBs in Divisions VIIf,g,h scaled to the new assessment. No recruitment indices are available for this stock.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

Yield and Spawning Stock Biomass



Cod VII e,f,g,h - Medium term predictions showing 5th,25th,50th,75th and 95th percentiles
of SSB in tenth year (2005) for different F-factors applied to estimated 1995 F
Ricker stock-recruitment relationship
500 simulations



3.9.3 Celtic Sea and Western Channel whiting (Divisions VIIe, VIIf, VIIg and VIIh)

Catch data (Table 3.9.3.1):

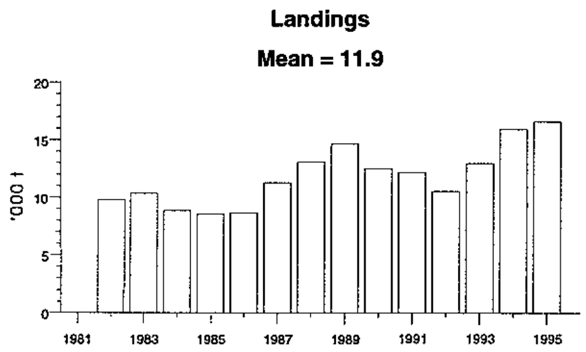
Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM catch
1987	*Status quo* F; TAC	7.1[3]		11.3
1988	Precautionary TAC	7.0[3]		13.1
1989	Precautionary TAC	7.9[3]		14.7
1990	No increase in F; TAC	8.4[3]		12.5
1991	Precautionary TAC	8.0[3]		12.2
1992	If required, precautionary TAC	8.0[3]		. 10.6
1993	Within safe biological limits	6.6[3]	22.0	13.0
1994	Within safe biological limits	<9.4[3]	22.0	15.9
1995	20% reduction in F	8.2[2]	25.0	16.6
1996	20% reduction in F	8.6[2]	26.0	

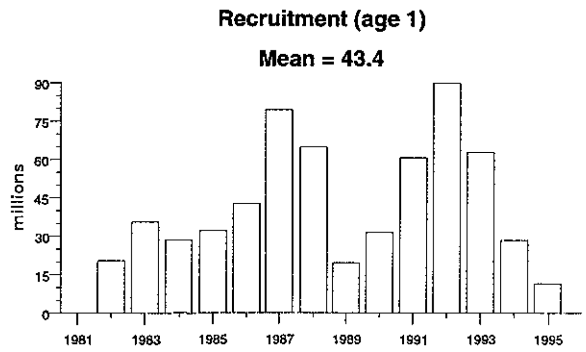
[1] TAC covers Sub-area VII (except Division VIIa).[2]For the VIIf-h stock component [3]For the VII f+g stock component Weights in '000 t.

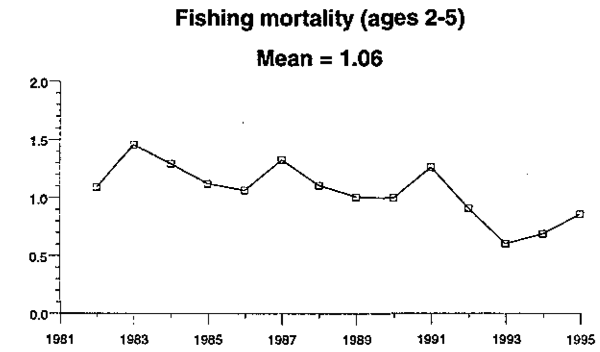
Historical development of the fishery: Celtic Sea whiting is taken as a component of mixed (cod, whiting, *Nephrops*, hake) fisheries. Landings are taken predominantly by French gadoid trawlers. UK landings in the 1950s were 4-5 times their present level. Landings in 1995 were the highest in the period since 1982.

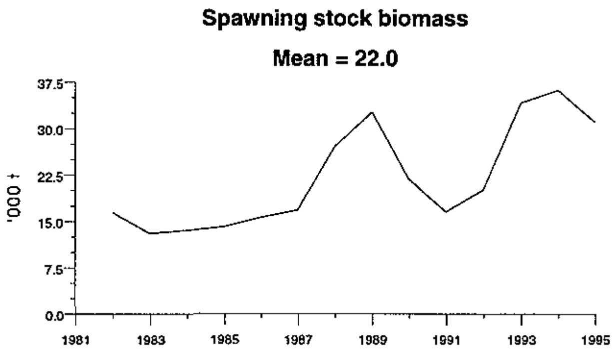
State of stock: The stock is considered to be within safe biological limits. SSB fluctuates depending on recruitment. While the 1990-1992 year classes are above average, the 1993 and 1994 year classes are below average. Fishing mortality remains high.

(Details in Table 3.9.3.2.)









Forecast for 1997:

SSB(96) = 18.3, F(96) = 0.86 , Basis: F(96) = F (95), Catch(96) = Landings (96) = 11.0.
Recruitment of the 1995 and 1996 year classes set equal to the geometric mean for the period 1982-1992.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.34	16.8		4.2	23.4
B	$0.6F_{95}$	0.52			5.9	21.6
C	$0.8F_{95}$	0.68			7.3	20.0
D	$1.0F_{95}$	0.86			8.6	18.6
	$1.2F_{95}$	1.03			9.6	17.5

Weights in '000 t.

With options A-D: SSB in 1998 is expected to increase.

The forecast is not of high precision, mainly due to the high level of F resulting in few year classes being taken in the fishery.

A combined forecast for cod and whiting is given in the figure on the next page

Management advice: Whiting are taken in a mixed fishery with cod. In order to protect cod, **ICES recommends a significant reduction in fishing mortality in 1997 by at least 20% of the fishing mortality in 1995.**

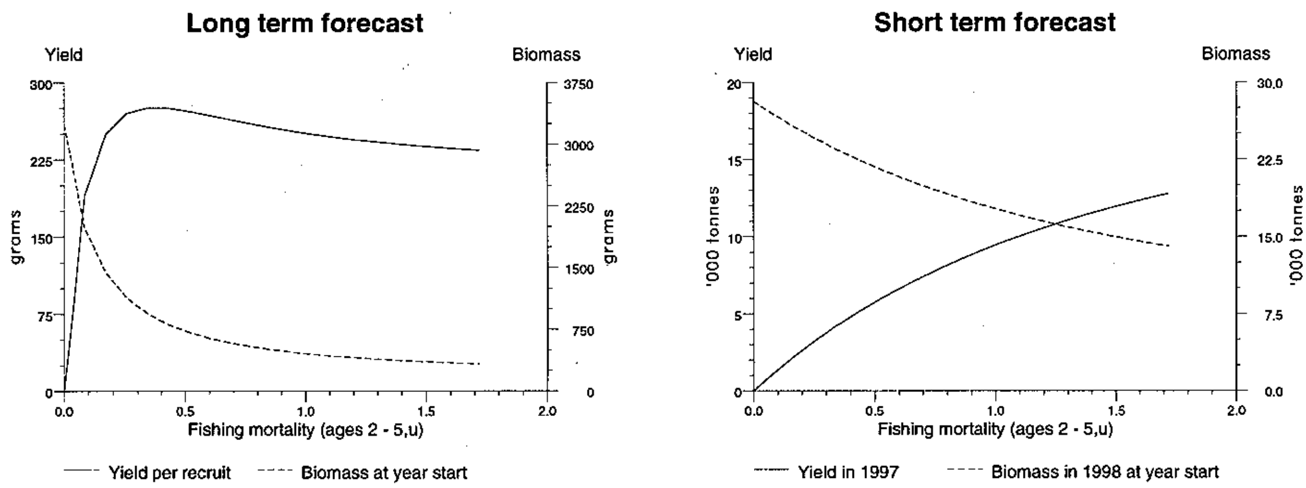
Special comments: This assessment now includes Division VIIe. Data have been raised to account for catches in Division VIIe for which no age data are available.

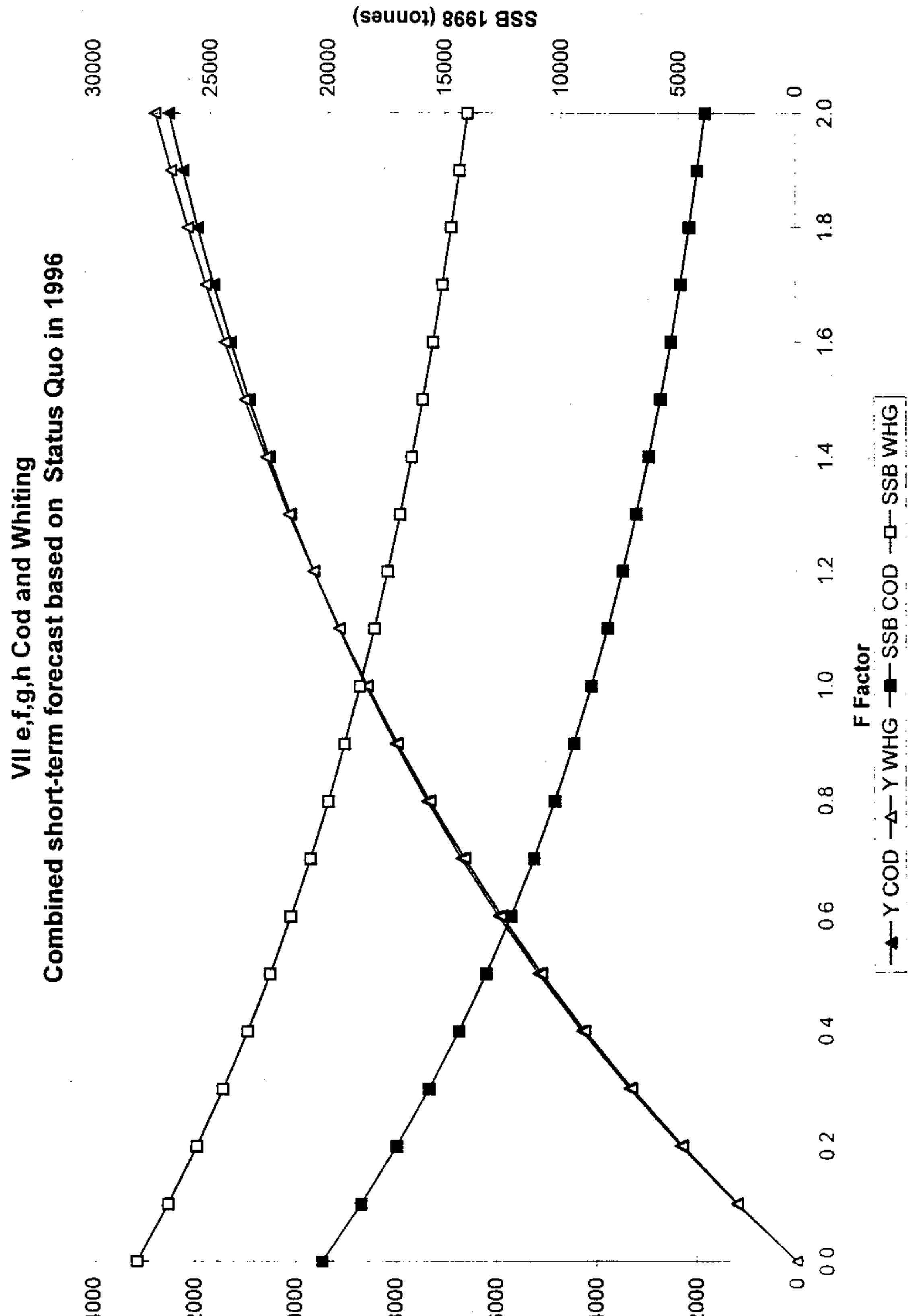
Because the forecast is dominated by an assumption of average recruiting year classes and because the TAC for this stock includes other management areas, a TAC is not likely to be successful in reducing F on this stock. Other measures, such as effort control should be considered.

Data and assessment: Analytical assessment based on landings and commercial CPUE data. Problems with missing 1994 French data have been resolved. No recruitment indices are available for this stock.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

Yield and Spawning Stock Biomass




VII e,f,g,h Cod and Whiting
Combined short-term forecast based on Status Quo in 1996
Yield 1997 (tonnes)
SSB 1998 (tonnes)
F Factor
Y COD
Y WHG
SSB COD
SSB WHG

3.9.4 Celtic Sea plaice (Divisions VIIf and g)

Catch data (Table 3.9.4.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings.	ACFM catch
1987	TAC not to be restrictive on other species	-	1.8	1.9	1.9
1988	TAC not to be restrictive on other species	-	2.5	2.1	2.1
1989	TAC not to be restrictive on other species	-	2.5	2.2	2.2
1990	F likely to be F(88)	~1.9	1.9	2.1	2.1
1991	F likely to be F(89)	~1.7	1.9	1.5	1.5
1992	No long-term gains in increasing F	-	1.5	1.2	1.2
1993	No long-term gains in increasing F	-	1.4	1.1	1.1
1994	No long-term gains in increasing F	-	1.4	1.1	1.1
1995	No increase in F	1.29	1.4	1.0	1.0
1996	20% reduction in F	0.93	1.1		

Weights in '000 t.

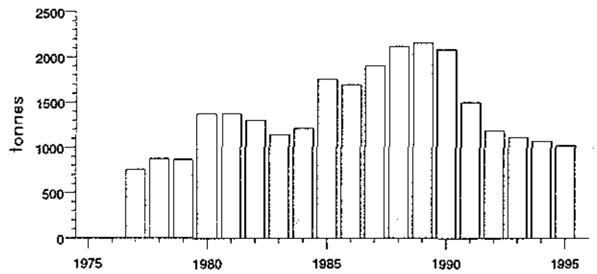
Historical development of the fishery: In the 1970s the fishery was mainly carried out by Belgian beam trawlers and Belgian and UK otter trawlers. In recent years the otter trawlers have been almost entirely replaced by beam trawlers, which have sole as their target species. Both countries together have always taken approximately 85% of the catches.

State of stock: The stock is considered to be close to safe biological limits. SSB rose to a peak in the late 1980s, but has since declined. Fishing mortality has remained high throughout the time series. Recruitment since 1989 has been poor, and it is unlikely that SSB will increase in the short and medium term at the current level of F.

(Further details in Table 3.9.4.2.)

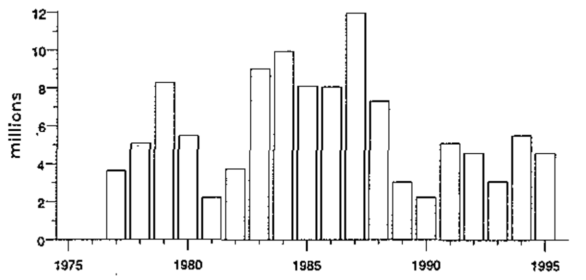
Landings

Mean = 1394



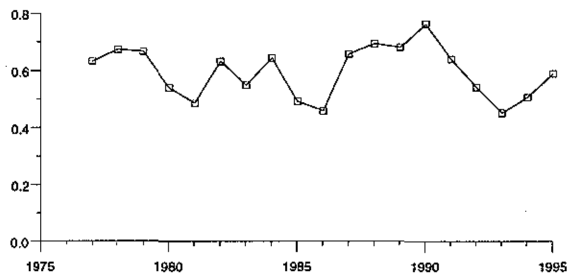
Recruitment (age 1)

Mean = 5.84



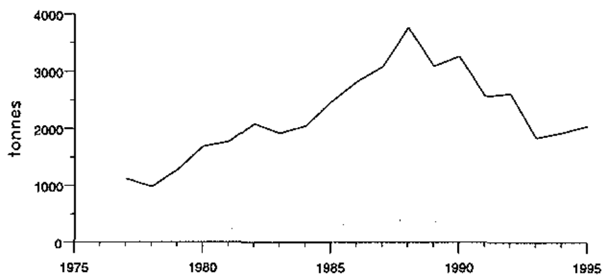
Fishing mortality (ages 3-6)

Mean = 0.595



Spawning stock biomass

Mean = 2228



Forecast for 1997:
SSB(96) = 2.08, F(96) = 0.59, Basis: F(96)=F(95), Catch(96) = Landings (96) = 1.34
Recruitment of the 1995 and 1996 year classes was set equal to the geometric mean for the period 1977-1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.24	2.05		0.61	2.65
B	$0.6F_{95}$	0.35			0.87	2.41
C	$0.8F_{95}$	0.47			1.10	2.19
D	$1.0F_{95}$	0.59			1.31	2.00
E	$1.2F_{95}$	0.71			1.50	1.83

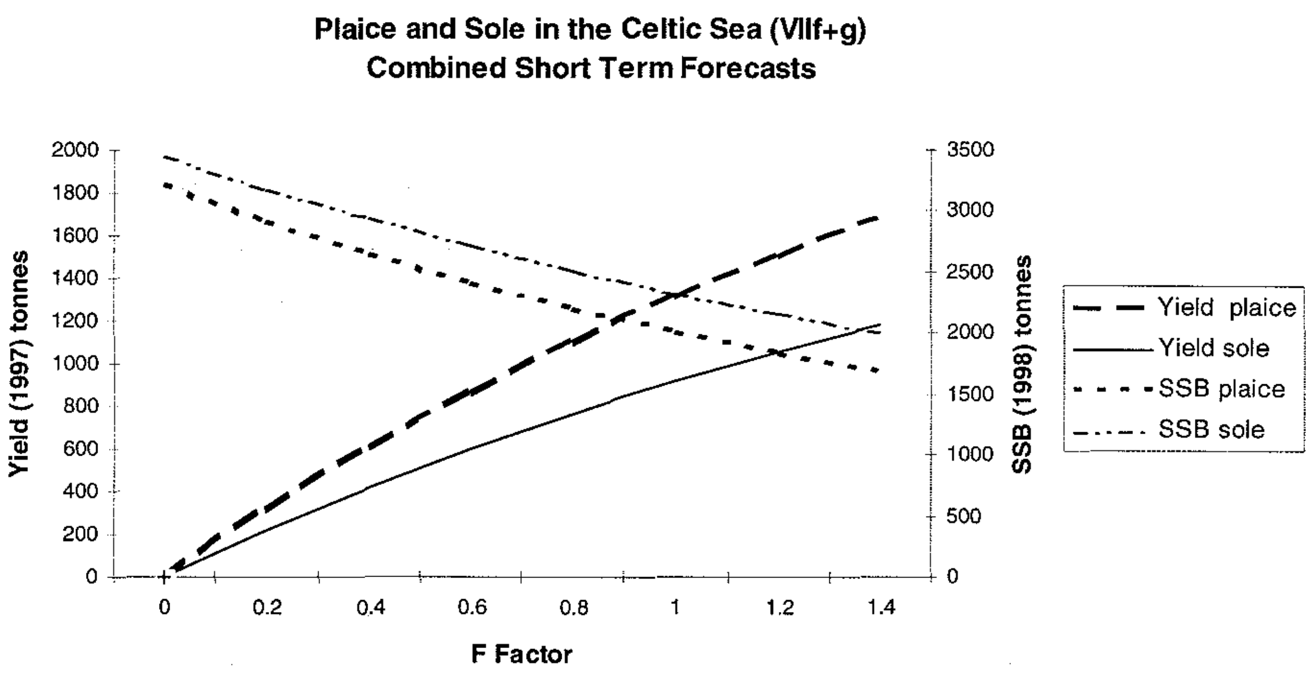
Weights in '000 t.
For options A-C: SSB increases in 1998 compared to 1996.
For options D,E: SSB in 1998 will fall below SSB(96)

Management advice: To prevent further reductions in SSB for this stock and in the Celtic Sea sole, **ICES recommends that fishing mortality in 1997 should be reduced by 20 % compared to that in 1995.**

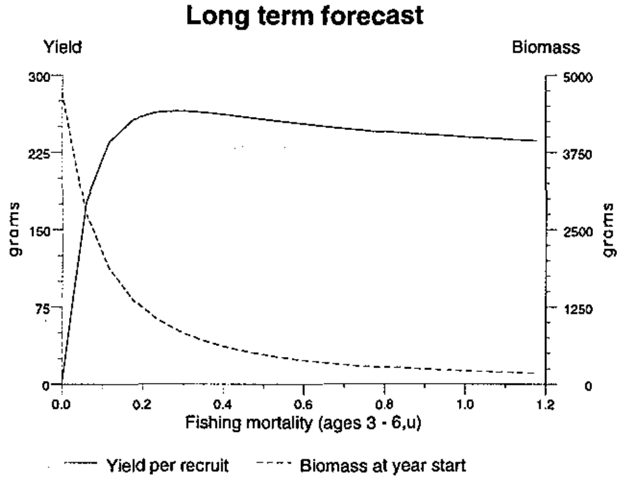
Special comments: Plaice and sole in the Celtic Sea are taken in the same fishery. If departure from *status quo* fishing mortality is implemented for either species, the implications for the associated species should be considered.

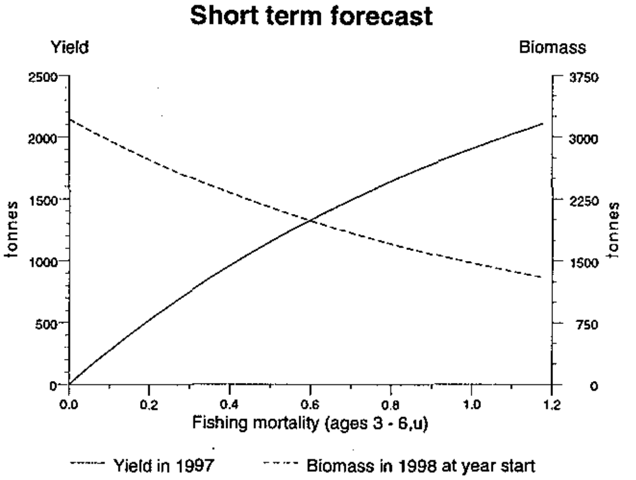
Data and assessment: Analytical age-based assessment based on landings, survey and commercial CPUE data.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).



Yield and Spawning Stock Biomass





3.9.5 Celtic Sea sole (Divisions VIIf and g)

Catch data (Table 3.9.5.1):

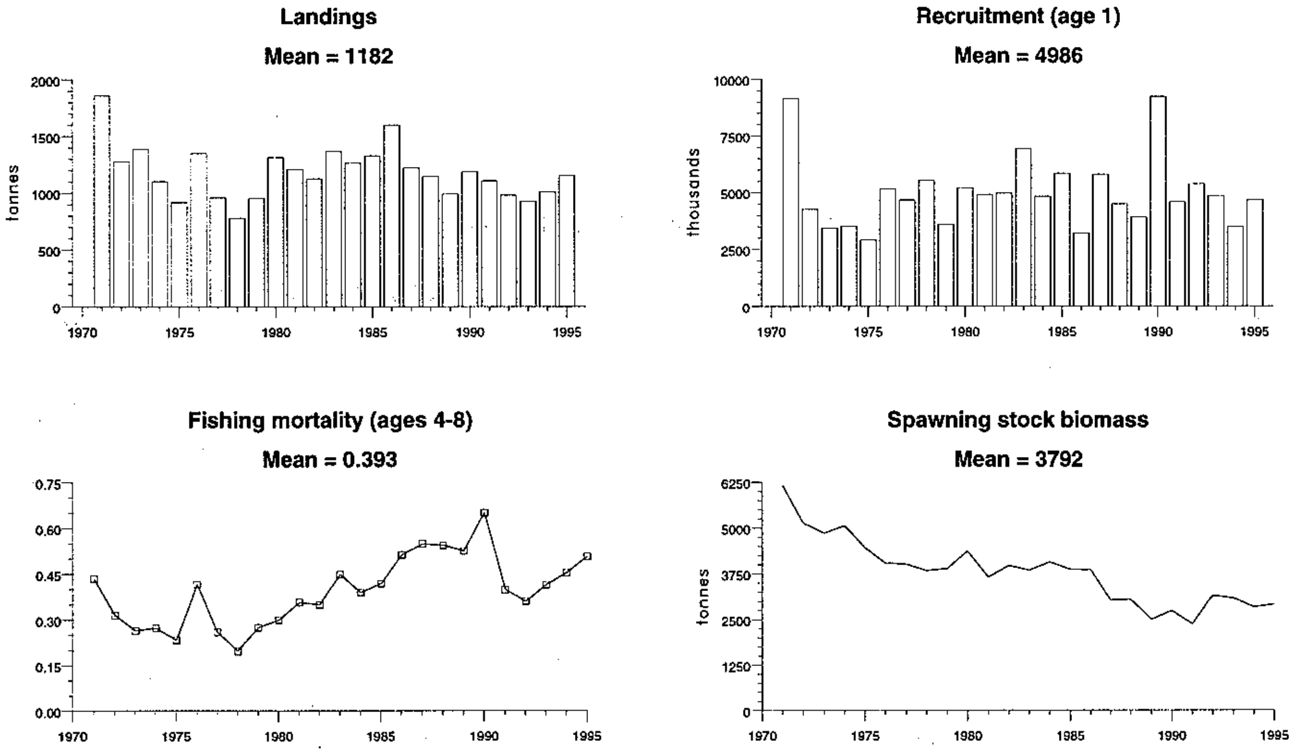
Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	*Status quo* F; TAC	1.6	1.6	1.2
1988	F=F(pre-86); TAC	0.9	1.1	1.1
1989	F at F(81-85); TAC	1.0	1.0	1.0
1990	No increase in F	1.2	1.2	1.2
1991	No increase in F	1.1	1.2	1.1
1992	No long-term gains in increasing F	1.1	1.2	1.0
1993	No long-term gains in increasing F	-	1.1	0.9
1994	No long-term gains in increasing F	-	1.1	1.0
1995	No increase in F	1.0	1.1	1.2
1996	20% reduction in F	0.8	1.0	

Weights in '000 t.

Historical development of the fishery: In the 1970s the fishery was mainly carried out by Belgian beam trawlers and Belgian and UK otter trawlers. In recent years the Belgian otter trawlers have been almost entirely replaced by beam trawlers. Both countries together have always taken approximately 85% of the catches.

State of stock: The stock is considered to be close to or outside safe biological limits. Fishing mortality increased since the late 1970s to a peak value in 1990; it has since decreased, but remains above F_{high} (0.48). SSB has steadily declined since the early 1970s, reaching a record low value in 1991 and has remained close to that level through 1995. There is a high probability that maintaining *status quo* F will result in SSB continuing near historical low levels in the short and medium term.

(Further details in Table 3.9.5.2)



Forecast for 1997:

SSB(96) = 2.6, F(96) = 0.51, Basis: F(96) = F(95), Catch(96) = Landings (96) =1.0.

Recruitment of the 1995 year class set equal to the geometric mean for the period 1971-1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.20	2.4	-	0.4	2.9
B	$0.6F_{95}$	0.30		-	0.6	2.7
C	$0.8F_{95}$	0.41		-	0.8	2.5
D	$1.0F_{95}$	0.51		-	0.9	2.3
E	$1.2F_{95}$	0.61		-	1.1	2.2

Weights in '000 t.

Options A and B, SSB increases in 1998 compared to 1996.
Option C, SSB stable, but at low level.
Option D and E, decreasing to below historical low

At the current level of F, SSB is predicted to decrease in 1998 to below historical low.

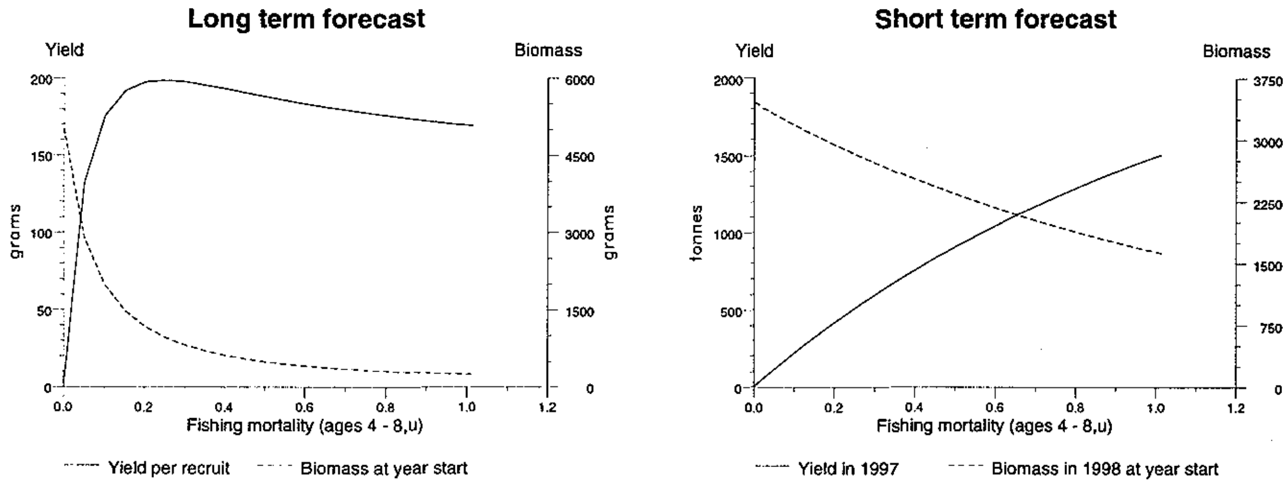
Management advice: To prevent further reductions in SSB for this stock, **ICES recommends that fishing mortality in 1997 should be reduced by 20 % compared to that in 1995**. Management of this stock should be viewed in conjunction with Celtic Sea plaice.

Special comments: Sole and plaice in the Celtic Sea are taken in the same fishery. If departure from *status quo* fishing mortality is implemented for either species, the implications for the associated species should be considered.

Data and assessment: Age-based analytical assessment using catch-per-unit effort data from two commercial fleets and one survey.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

Yield and Spawning Stock Biomass



3.9.6 Cod in Division VIIe (Western English Channel)

See Section 3.9.2.

3.9.7 Whiting in Division VIIe (Western English Channel)

See Section 3.9.3.

3.9.8 Plaice in Division VIIe (Western English Channel)

Catch data (Table 3.9.8.1):

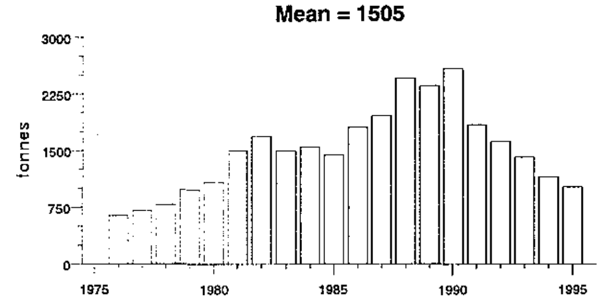
Year	ICES advice	Catch corresp. to advice[1]	Agreed TAC[1]	Official landings[2]	ACFM catch
1987	Precautionary TAC	6.8	8.3	1.9	2.0
1988	Precautionary TAC	6.9	9.96	2.3	2.5
1989	No increase in effort; TAC	11.7	11.7	2.2	2.4
1990	No increase in F; TAC	10.7	10.7	2.0	2.6
1991	50% reduction in F in VIIe	8.8	10.7	1.6	1.8
1992	S.q. F gives over mean SSB	2.0[3]	9.6	1.4	1.6
1993	Not outside safe biological limits	-	8.5	1.4	1.4
1994	Within safe biological limits	-	9.1	1.2	1.2
1995	No increase in F	1.4	8.0	1.0	1.0
1996	60% reduction in F	0.6	7.5		

[1]TACs for Divisions VIId,e. [2] Estimated for some countries. [3]At *status quo* F. Weights in '000 t.

Historical development of the fishery: Landings are taken mainly by the UK fishery and were stable at a low level between 1950 and the mid-1970s. Landings increased rapidly after 1978 as beam trawls began to replace otter trawls, though plaice are mainly taken as a by-catch in beam trawls directed at sole and anglerfish. Landings reached a peak in 1988-1990, but have since declined rapidly.

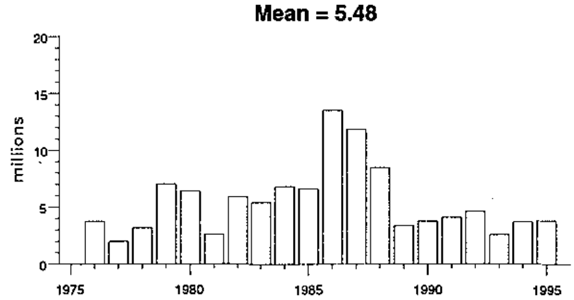
Landings

Mean = 1505



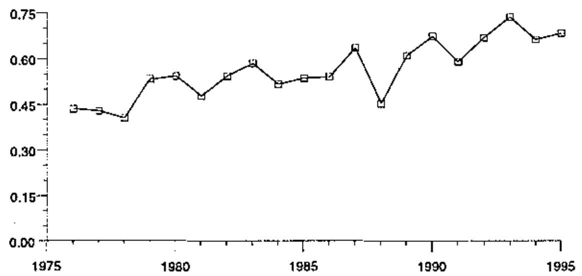
Recruitment (age 1)

Mean = 5.48



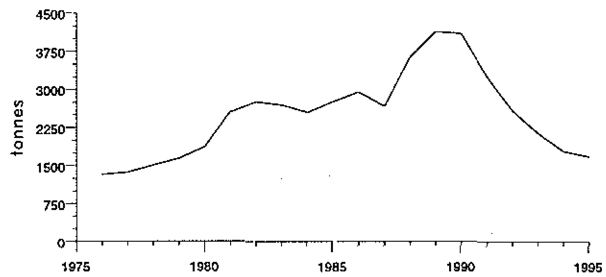
Fishing mortality (ages 3-7)

Mean = 0.563



Spawning stock biomass

Mean = 2501



State of stock: This stock is considered to be outside safe biological limits. SSB reached a peak level in 1989-1990, following a series of good year classes in the mid 1980s, but has declined rapidly and is close to the lowest recorded levels. This is due to both high fishing mortality and low recruitment since 1989. Fishing mortality has been increasing throughout the assessment period, is currently close to a record high and is above F_{med} (0.58). A series of years with low recruitment, coupled with a high F, make it likely that the SSB will decrease unless there is a reduction in F. There is evidence that recruitment is reduced at SSB below a 2,200 t threshold.

Further details in Table 3.9.8.2.

Forecast for 1997:

SSB(96) = 1.5, F(96) = 0.68, Basis: F(96)=F(95), Catch(96) = Landings (96) = 1.0.

Recruitment of the 1995 and 1996 year classes set equal to the geometric mean for the period 1976–1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.27	1.55	-	0.51	2.20
B	$0.6F_{95}$	0.41		-	0.73	2.00
C	$0.8F_{95}$	0.55		-	0.92	1.83
D	$1.0F_{95}$	0.68		-	1.09	1.67
E	$1.2F_{95}$	0.82		-	1.24	1.54

Weights in '000 t.

Under options A-D, SSB is forecast to increase in 1998 compared to 1996. However, this is due to assuming geometric mean recruitment which is higher than the recent average. At the current fishing mortality rate, SSB is expected to remain close to historically low levels in the medium term.

Management advice: To enable SSB for this stock to increase above the threshold of 2,200 t, **ICES recommends that fishing mortality in 1997 should be reduced by at least 60% compared to that in 1995.**

Special comments: The TAC is set for Divisions VIId,e combined, so the results from this assessment need to be considered along with the much larger Division VIId stock. Given that the Division VIId component dominates the TAC, a catch control is unlikely to constrain F on this stock. To achieve a decrease in fishing mortality, a direct reduction in fishing effort is necessary.

Data and assessment: Analytical age-based assessment based on landings, survey and (revised) commercial CPUE data. Misreporting of landings is known to occur.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

3.9.9 Sole in Division VIIe (Western English Channel)

Catch data (Table 3.9.9.1):

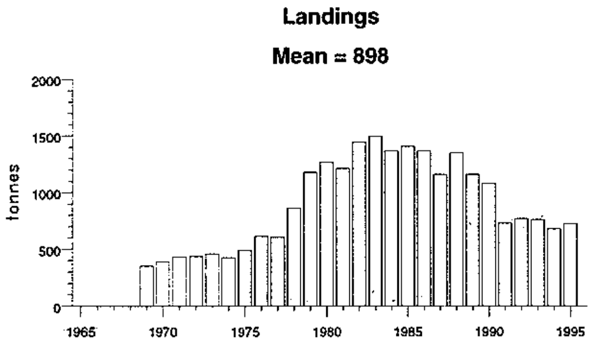
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ACFM catch
1987	No increase in F	1.15	1.15	1.1	1.2
1988	No decrease in SSB; TAC	1.3	1.3	0.9	1.4
1989	No decrease in SSB; TAC	1.0	1.0	0.8	1.2
1990	SSB ≥ 3,000 t; TAC	0.9	0.9	0.8	1.1
1991	TAC	0.54	0.8	0.6	0.7
1992	70% of F(90)	0.77	0.8	0.6	0.8
1993	35% reduction in F	0.7	0.9	0.7	0.8
1994	No increase in F	1.0	1.0	0.8	0.7
1995	No increase in F	0.86	0.95	0.9	0.7
1996	$F_{96} < F_{94}$	0.68	0.7		

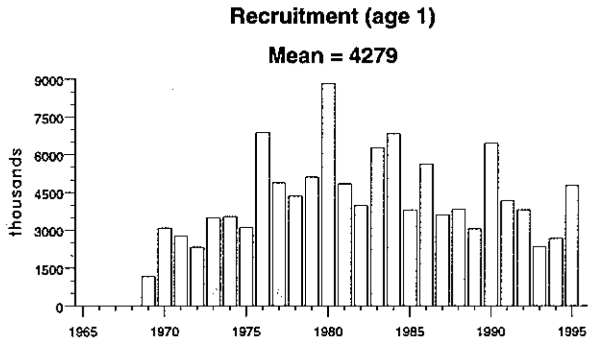
Weights in '000 t.

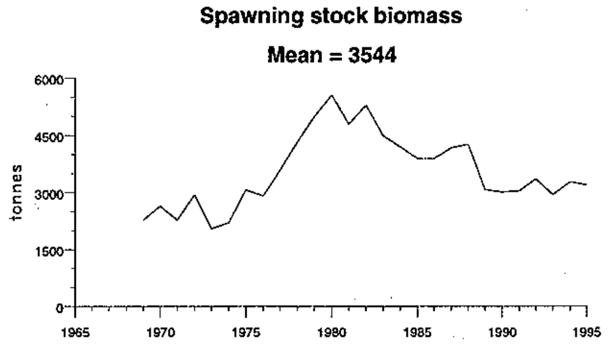
Historical development of the fishery: UK and France account for most of the landings. UK landings were stable at a low level between 1950 and the mid-1970s but increased rapidly after 1978 as beam trawls began to replace otter trawls in this fishery. Sole tends to be the target species with plaice and other species taken as by-catches. The latter species are relatively more important in the otter trawl fishery.

Total landings reached a peak in the early 1980s, initially because of high recruitment in the late 1970s and later because of an increase in exploitation.

State of stock: The stock is considered to be close to safe biological limits. SSB has declined since 1980 due to high fishing mortality and has remained stable at a low level since 1989. The 1992 and 1993 year classes were below average, but the 1994 year class appears to be above average. There is







evidence that recruitment is reduced at SSB below a 3,000 t threshold. Although fishing mortality has declined in recent years, it remains higher than levels in the early 1970s. Current F appears to be in the region of F_{med} (0.27).

Details in Table 3.9.9.2.

Forecast for 1997:

SSB(96) = 2.93, F(96) = 0.25, Basis:F(96) = F(95), Catch(96) = Landings (96) = 0.67.

Recruitment of the 1995 and 1996 year classes set equal to the geometric mean for the period 1969–1992.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.10	3.14		0.30	3.64
B	$0.6F_{95}$	0.15			0.44	3.50
C	$0.8F_{95}$	0.20			0.57	3.36
D	$1.0F_{95}$	0.25			0.69	3.23
E	$1.2F_{95}$	0.31			0.82	3.11

Weights in '000 t.

SSB is expected to increase above the current low level for all options. For options A and B, SSB is expected to be close to average in 1998.

There is a high probability that SSB will remain above the 3,000 t threshold in the medium term at *status quo* F.

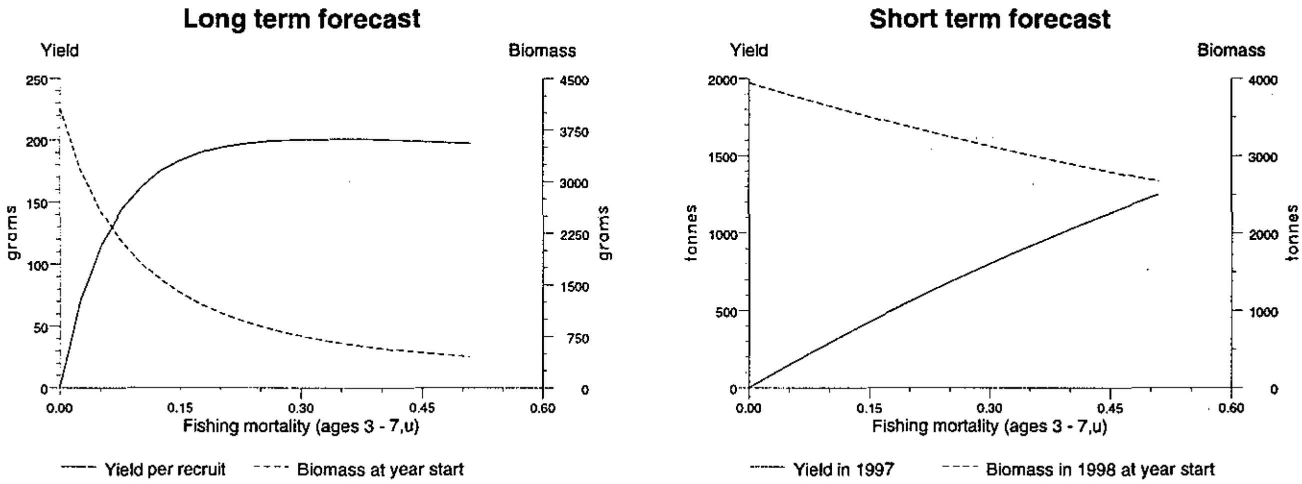
Management advice: ICES recommends that fishing mortality should not be allowed to increase.

Special Comment: There is evidence that recruitment is reduced at low spawning stock sizes. Fisheries for sole also take plaice as a by-catch. This needs to be taken into account in any management measures.

Data and assessment: Analytical assessment based on landings, survey and commercial CPUE data. Misreporting of landings is known to occur.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

Yield and Spawning Stock Biomass



3.9.10 Sole in Divisions VIIIa,b (Bay of Biscay)

Catch data (Table 3.9.10.1):

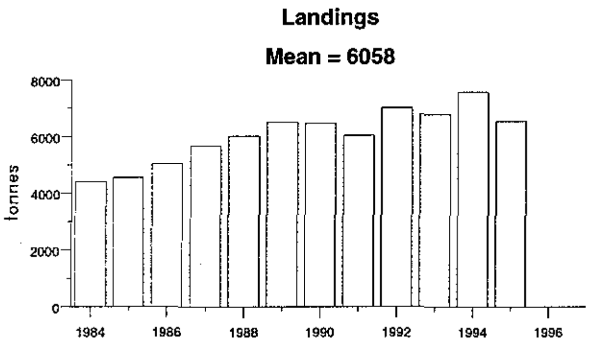
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Off. lndgs.	ACFM lndgs.	Disc. slip.	ACFM catch
1987	Not assessed	-	4.4	4.4	5.1	0.6	5.7
1988	Precautionary TAC	3.7	4.0	4.5	5.4	0.6	6.0
1989	No increase in effort; TAC	4.5	4.8	5.8[1]	5.8	0.7	6.5
1990	No increase in F; TAC	5.1	5.2	5.5[1]	5.9	0.6	6.5
1991	Precautionary TAC	4.7	5.3	4.7[1]	5.6	0.5	6.0
1992	F = F(90)	5.0	5.3	6.4[1]	6.6	0.5	7.0
1993	No long-term gain in increasing F	-	5.7	6.0	6.4	0.4	6.8
1994	No long-term gain in increasing F	-	6.6	6.9	7.2	0.4	7.6
1995	No long-term gain in increasing F	5.4[2]	6.6	5.9	6.2	0.3	6.5
1996	No increase in F	5.0	6.6				

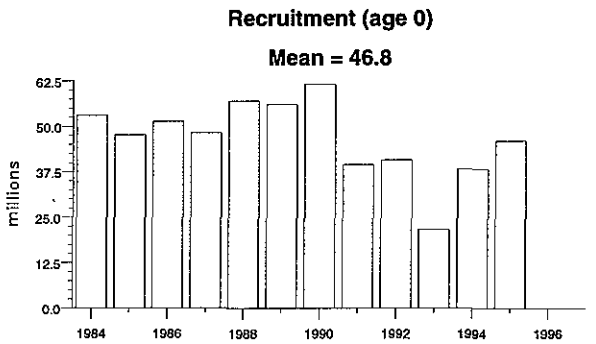
[1]Not reported for all countries. [2]Landings at *status quo* F. Weights in '000 t.

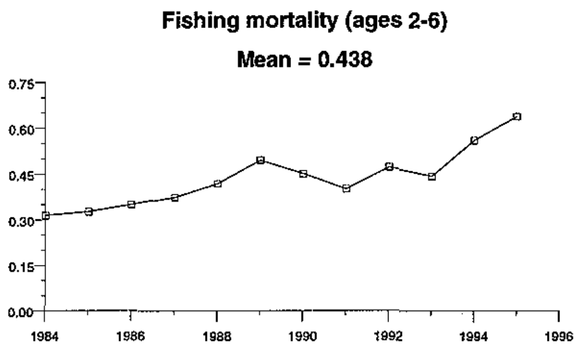
Historical development of the fishery: Catches have increased continuously in the last two decades. Since 1984, the French gill-net and trammel-net fishery expanded and it now accounts for 42% of the total landings in Les Sables d'Olonne. In contrast, catches of sole by small mesh shrimp trawlers decreased markedly. Since 1990, the fishing by Belgium beam trawlers has been relatively constant at twice the previous level.

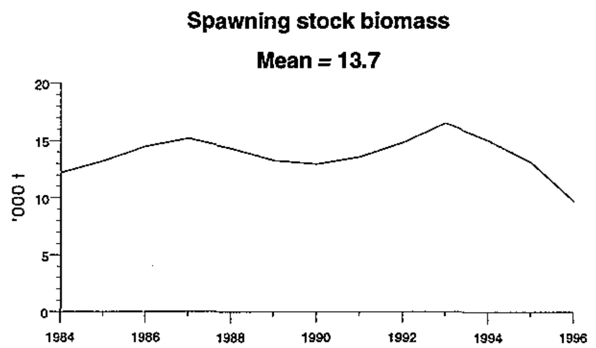
State of stock: The time series is short, but the stock is considered to be close to or outside safe biological limits. The increasing F and low recruitments of recent years have resulted in a decrease in SSB to record low levels in 1996.

Details in Table 3.9.10.2.









Forecast for 1997:

SSB(96) = 9.7, F(96) = 0.64, Basis:F(96) = F(95), Catch(96) = 6.2, Landings (96) = 5.5.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.26	8.6	2.5	2.2	12.3
B	$0.6F_{95}$	0.38		3.6	3.1	11.0
C	$0.8F_{95}$	0.51		4.6	4.0	9.9
D	$1.0F_{95}$	0.64		5.4	4.7	8.9
E	$1.2F_{95}$	0.77		6.2	5.3	8.0

Weights in '000 t.

For options A,B,C, SSB is expected to increase compared to 1996.

For options D and E, SSB is predicted to decline compared to 1996 in the short term.

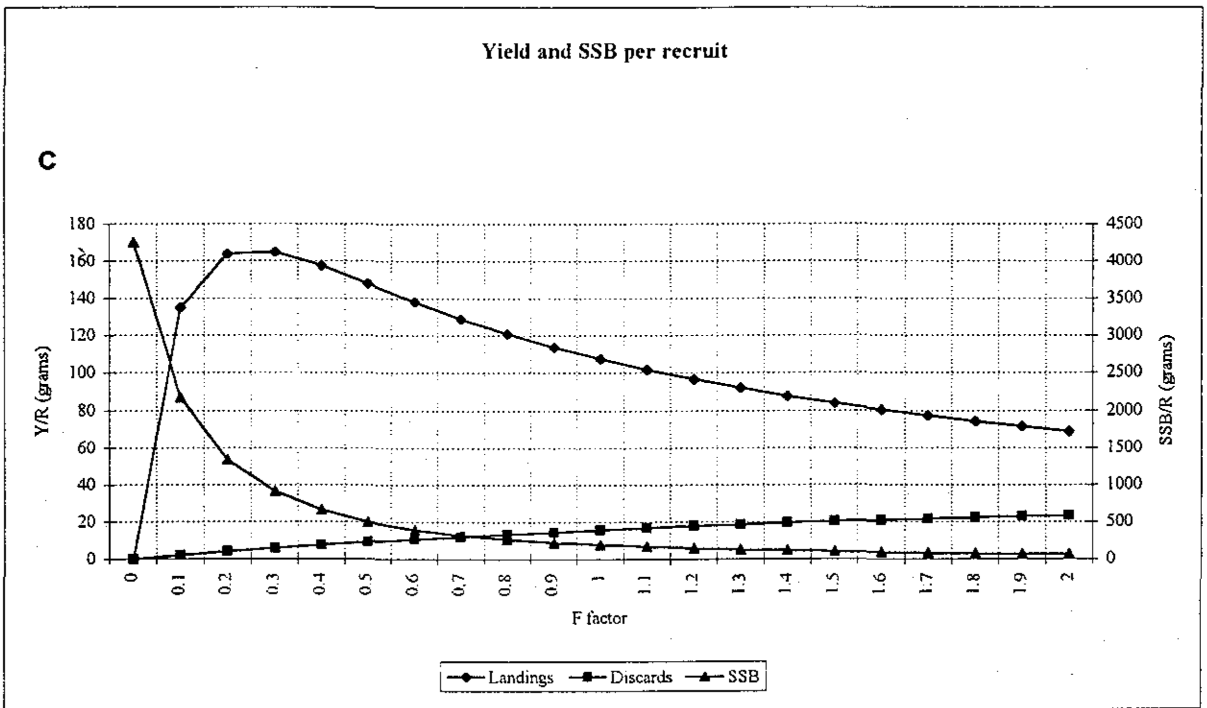
At the current level of F, SSB in 1997 and 1998 is predicted to be below its lowest level in the time series for which the assessment is reliable (1984-1995). A 40% reduction in F would be required to produce a significant increase in SSB compared to 1996.

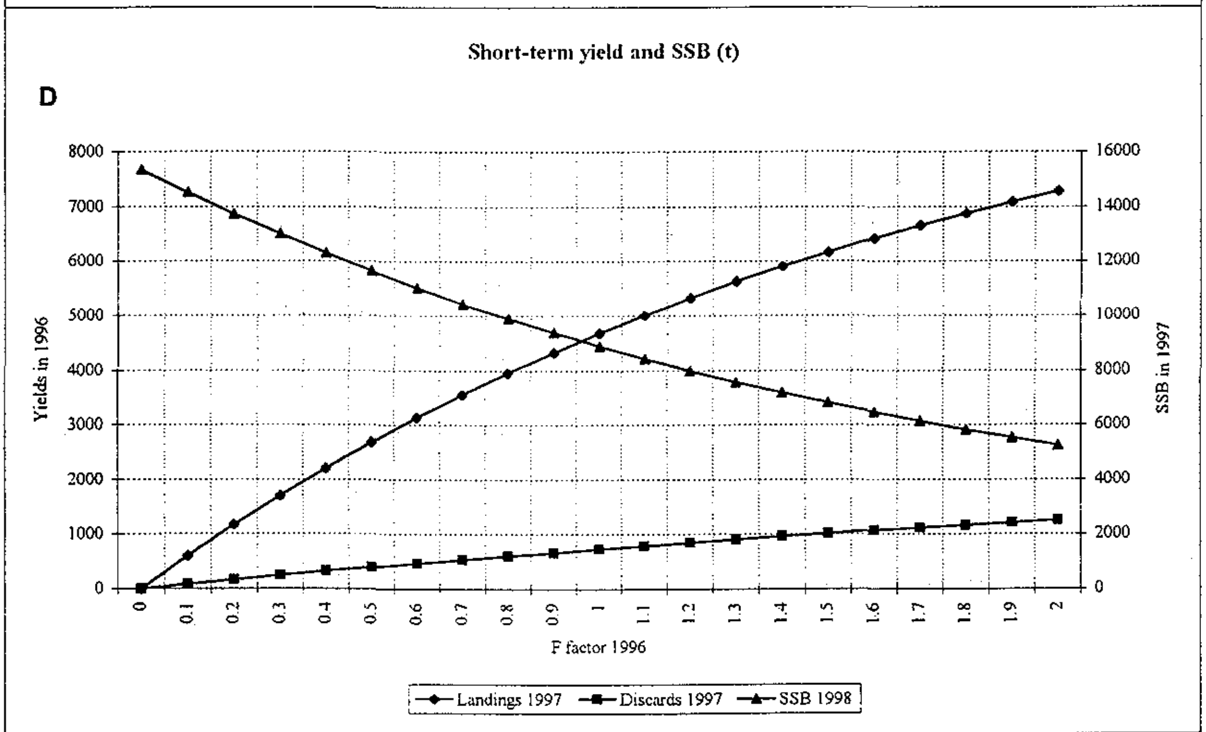
Management advice: In view of the increase in fishing mortality and in order to rebuild SSB, **ICES recommends that fishing mortality in 1997 should be reduced by 40% in relation to that in 1995**.

Data and assessment: Analytical assessment based on landings and CPUE data. No recruitment indices are available for this stock. Data prior to 1984 are not considered reliable.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

Bay of Biscay sole (Divisions VIIIa,b).





3.9.11 Celtic Sea and Division VIIj herring

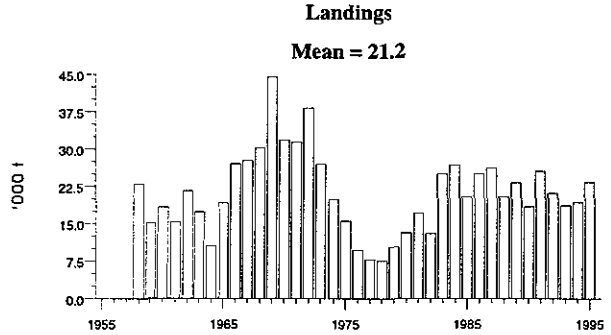
Catch data (Table 3.9.11.1–2):

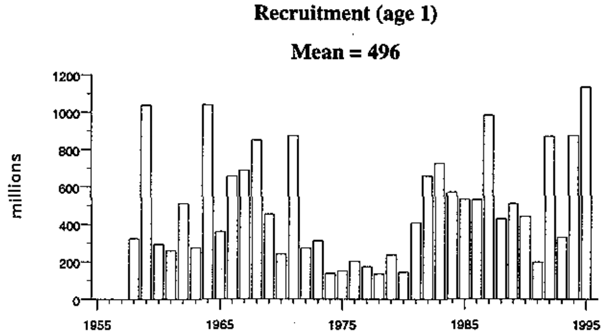
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official Landings	Discards	ACFM catch[1]
1987	Precautionary TAC	18	18	18	4.2	27.3
1988	TAC	13	18	17	2.4	19.2
1989	TAC	20	20	18	3.5	22.7
1990	TAC	15	17.5	17	2.5	20.2
1991	TAC (TAC excluding discards)	15 (12.5)	21	21	1.9	23.6
1992	TAC	27	21	19	2.1	23.0
1993	Precautionary TAC (including discards)	20-24	21	20	1.9	21.1
1994	Precautionary TAC (including discards)	20-24	21	19	1.7	19.1
1995	No specific advice	-	21	18	0.7	19.0
1996	TAC	9.8	16.5			

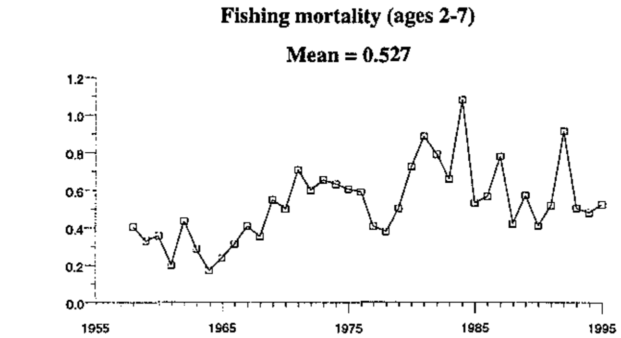
[1]By calendar year. Weights '000 t.

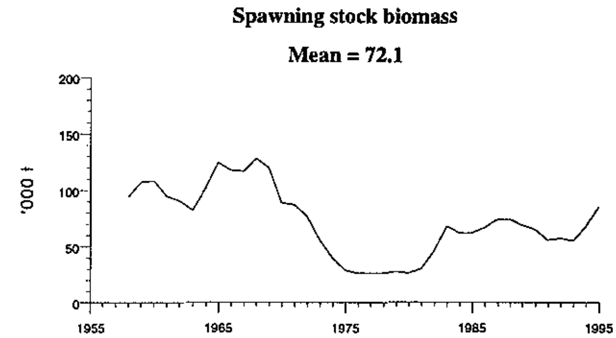
Historical development of the fishery: There are two spawning components in the stock (autumn- and winter-spawners). The fishery takes place on the spawning grounds in a "roe" fishery. The reported landings have been stable in recent years. The fishery in the Celtic Sea was closed from 1977–1982. The fishery on the autumn-spawning component has declined in recent years while that on the winter spawners has increased. Discards in this fishery have been estimated to be between 10%–20% of the total catch.

State of stock: The stock is considered to be within safe biological limits. At present SSB appears to be above the long-term average, and the 1992 year class appears to be strong. The latest assessment indicates that the stock has increased since 1992. The levels of fishing mortality are consistently higher than in other herring fisheries. Details in Table 3.9.11.3.









Forecast for 1997: Forecasts were carried out for 1997, assuming geometric mean recruitment:

F(96) = F(95) =0.52. Catch(96) = 32.1, SSB(96) =89.7

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F(95)	0.21	82	13.3	12.3	87
B	0.6 F(95)	0.31	81	19.1	17.5	81
C	0.8 F(95)	0.42	80	24.3	22.2	75
D	1.0 F(95)	0.52	78	28.9	26.6	70
E	1.2 F(95)	0.63	77	33.2	30.4	65

Weights in '000 t.

Medium-term considerations: Medium-term projections indicate that, with a continuation of the fishery at the present level of fishing mortality, the probability of SSB declining below the MBAL of 50,000 t is less than 40% (see figure on next page.

Management advice: There is no increase in yield to be obtained by increasing fishing mortality.

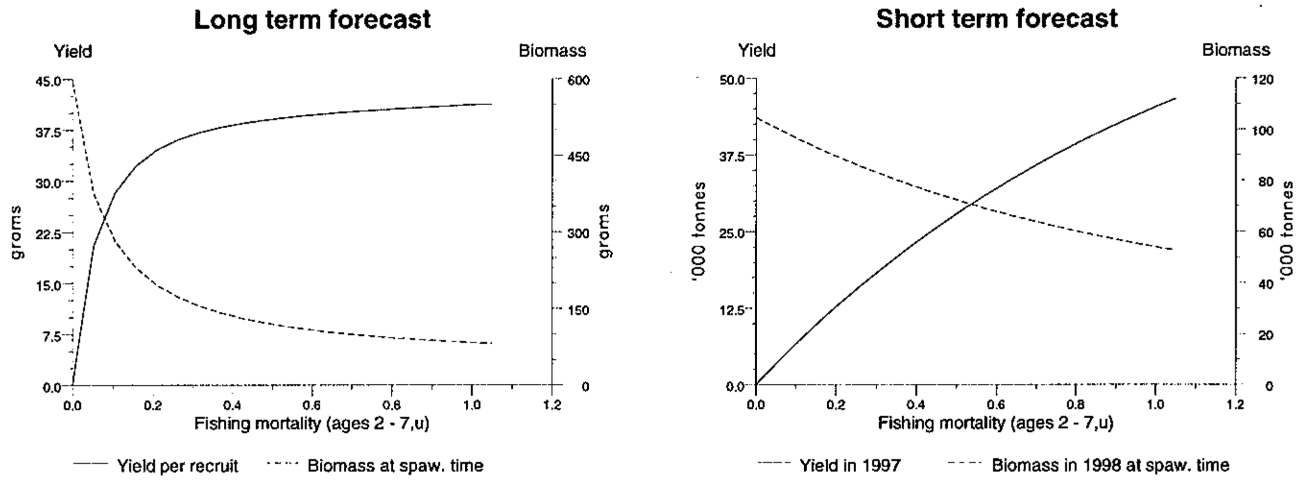
Special comments: The estimate of SSB from the most recent assessment is considerably higher than from the previous assessment. The new assessment is more consistent with the 1993 and 1994 estimates. The recent assessment is heavily influenced by the 1995/1996 acoustic surveys, which indicate a high stock size.

There is concern about the possible damage to spawning grounds along the Irish coast with regard to the extraction of gravel. Guidelines to protect spawning grounds exist and are laid down in a code of practice by ICES (ICES Cooperative Research Report, No. 182, 1992).

Data and assessment: The assessment is based on catch at age data and one acoustic survey. Discard data are available and are used in the assessment. For this stock age refers to number of winter rings which is one year less than the true age.

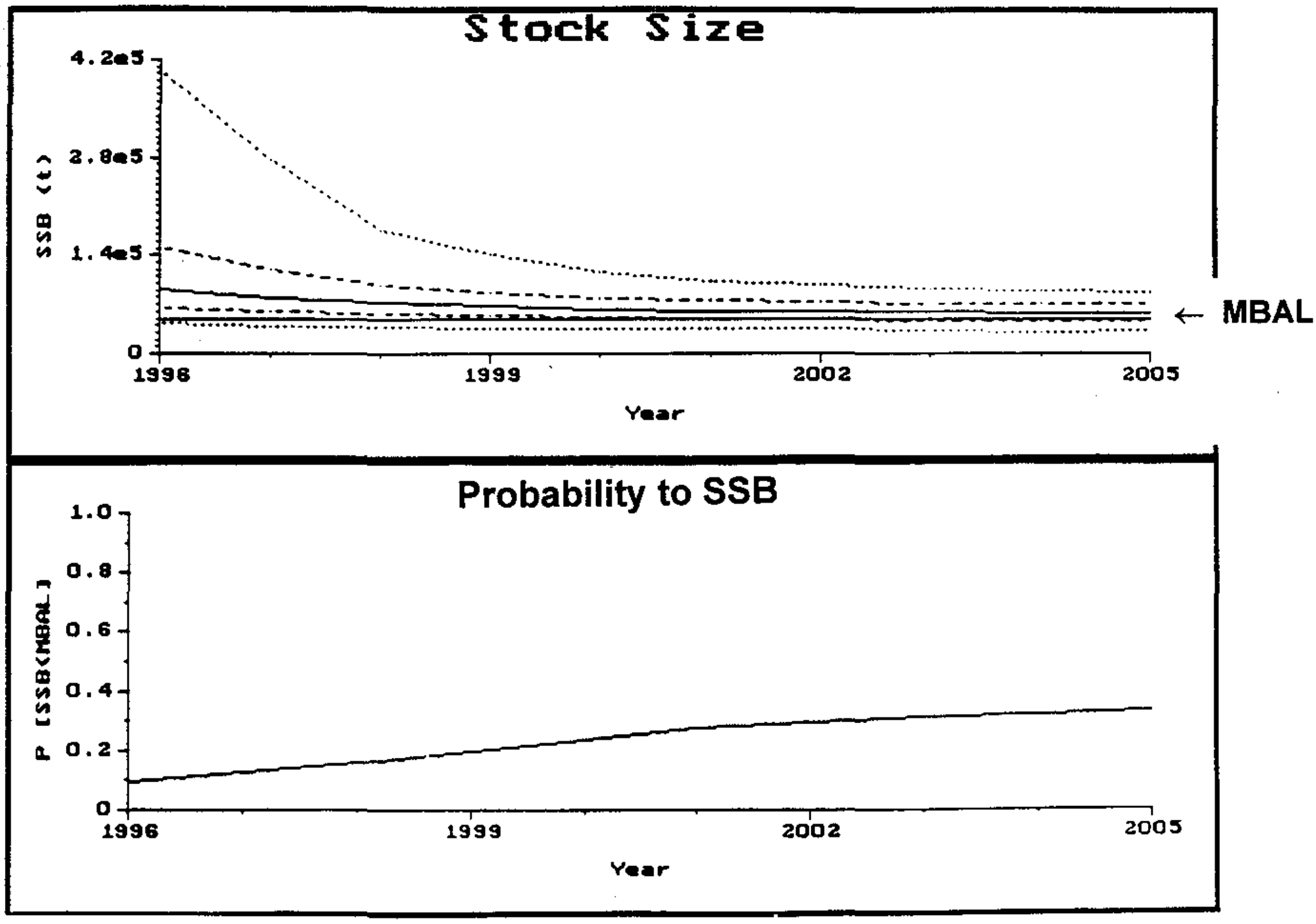
Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).

Yield and Spawning Stock Biomass



Celtic Sea and Division VIIj herring

Summary results of medium-term projections for fishing mortality from 1996–2005 constrained at the fishing mortality estimate for 1995 **Upper panel:** Solid line, 50th percentile; dashed lines, 25th and 75th percentiles; dotted line, 5th and 95th percentiles; horizontal straight line, MBAL of 50,000 t. **Lower panel:** The probability that the stock may fall below MBAL.



3.9.12 Sprat in Divisions VIId,e

Catch data (Table 3.9.12.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	No assessment	-	5	2.7
1988	No assessment	-	5	5.5
1989	No assessment	-	12	3.4
1990	No assessment	-	12	2.1
1991	No assessment	-	12	2.6
1992	No assessment	-	12	1.8
1993	No assessment	-	12	1.8
1994	No assessment	-	12	3.1
1995	No assessment	-	12	1.5
1996	No assessment	-	12	

Weights in '000 t.

Historical development of the fishery: Sprat catches are very low and are mainly taken in the second half of the year by the Lyme Bay sprat fishery. The 1995 catch is the lowest in the last 10 years.

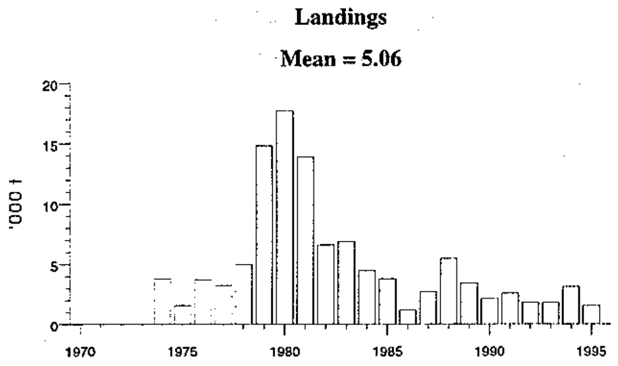
State of stock: The state of the stock is not known.

Forecast for 1997: not available.

Data and assessment: Insufficient data are available to carry out an assessment.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).

Details in Table 3.9.12.2.



3.9.13 Megrim (*L. whiffiagonis*) in Divisions VIIb,c,e-k and VIIIa,b

Catch data (Table 3.9.13.1):

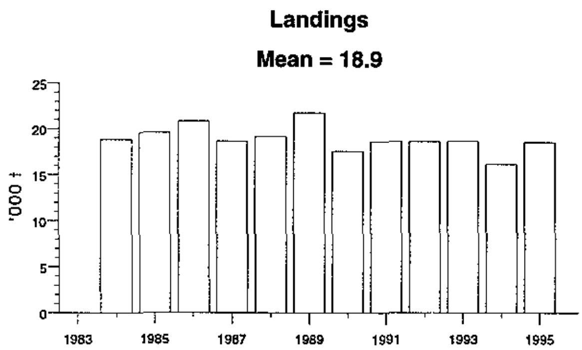
Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM lndgs.	Disc. slip.	ACFM catch
1987	Not assessed	-	16.46	17.0	1.7	18.7
1988	Not assessed	-	18.1	17.5	1.7	19.2
1989	Not assessed	-	18.1	19.2	2.6	21.7
1990	Not assessed	-	18.1	14.3	3.2	17.6
1991	No advice	-	18.1	15.0	3.6	18.6
1992	No advice	-	18.1	15.5	3.1	18.6
1993	Within safe biological limits	-	21.46	14.9	3.8	18.6
1994	Within safe biological limits	-	20.33	13.5	2.6	16.2
1995	No particular concern	-	22.59	15.5	3.1	18.6
1996	No long-term gain in increased F	16.6[2]	21.20			

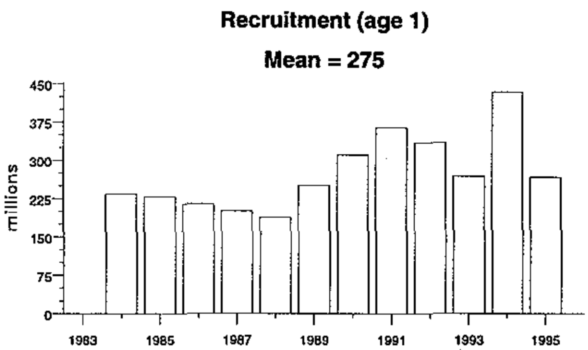
[1]Includes Division VIIa. [2]Landings at *status quo* F. Weights '000 t.

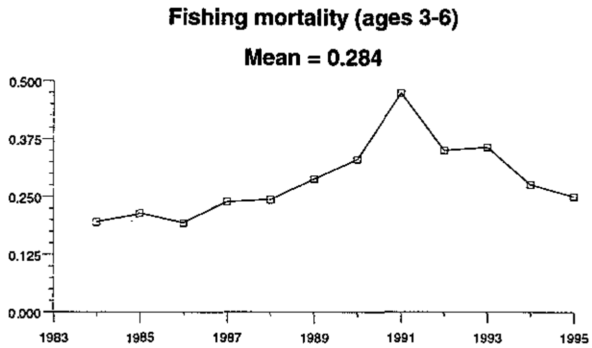
Historical development of the fishery: Megrim is caught predominantly by Spanish, French, Irish and UK demersal trawlers. For most fleets megrim is a by-catch caught with hake, anglerfish, *Nephrops*, cod and whiting. Landings have remained relatively stable over the whole period. Discards are estimated to be about 15% of the total catches by weight and comprise fish over a large range of sizes.

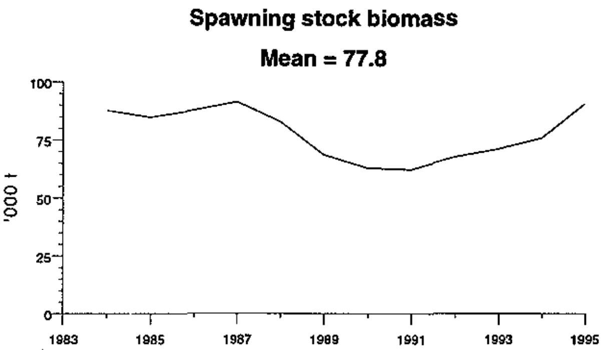
State of stock: The time series is short, but the stock appears to be within safe biological limits. SSB was below average in 1989–1992, but has increased since then. The fishing mortality has declined from the high 1991 level. The 1990 and 1991 year classes are above average and the 1993 year class seems to be strong.

Details in Table 3.9.13.2.









Forecast for 1997:

SSB(96) = 97.3, F(96) = 0.25, Basis:F(96)=F(95), Catch(96) =20.0, Landings (96) = 16.9.

Recruitment of the 1994, 1995 and 1996 year classes set equal to the geometric mean for the period 1987-1993

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.10	104.0	9.7	8.3	120.9
B	$0.6F_{95}$	0.15		14.2	12.1	115.4
C	$0.8F_{95}$	0.20		18.4	15.7	110.2
D	$1.0F_{95}$	0.25		22.4	19.1	105.3
E	$1.2F_{95}$	0.30		26.2	22.3	100.6

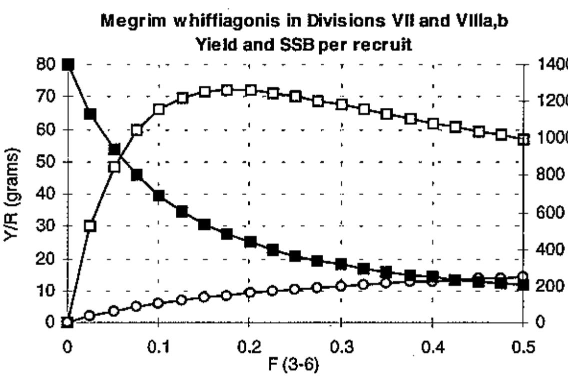
Weights in '000 t.

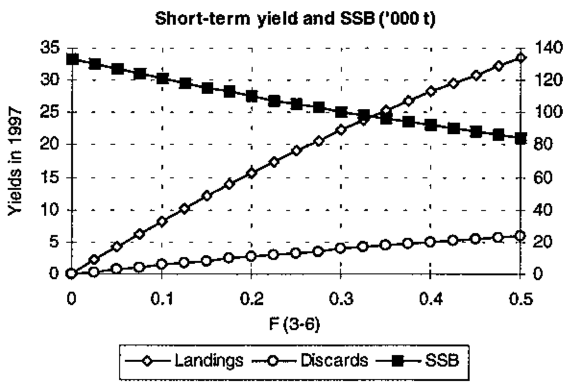
For all options SSB remains high. Continuing *status quo* F in 1998 is predicted to result in landings of 23,500 t (catch = 27,000 t) and SSB in 1999 of 110,000 t.

Special comments: A large proportion (up to 40 %) of the catch is composed of megrim less than 25 cm. An improvement in the exploitation pattern will lead to an increase in long-term yield. Catches of *L. boscii* represent about 5% of the total megrim catch in these Divisions.

Data and assessment: Age-based analytical assessment using catch-per-unit effort from four commercial fleets and one survey.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).





3.9.14 Anglerfish in Divisions VIIb-k and VIIIa,b *(L.piscatorius* and *L. budegassa)*

Catch data (Tables 3.9.14.1-5):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM catch	Catch of *L. piscat.*	Catch of . *L. budeg.*
1987	Not assessed	-	39.08	29.5	21.9	7.6
1988	Not assessed	-	42.99	28.5	20.1	8.4
1989	Not assessed	-	42.99	30.0	20.5	9.5
1990	Not assessed	-	42.99	29.3	19.7	9.6
1991	No advice	-	42.99	25.0	16.2	8.8
1992	No advice	-	42.99	21.1	12.8	8.3
1993	Concern about *L. pisc.* SSB decrease	-	25.1[2]	20.1	13.5	6.7
1994	SSB decreasing, still inside safe biological limits	-	23.9[2]	21.9	16.1	5.8
1995	No increase in F	20.0	23.2[2]	25.0	18.4	6.6
1996	No increase in F	28.9	30.4[2]			

[1]Includes Division VIIa; applies to both species. [2]Includes Divisions VIIId,e. Weights in '000 t.

Historical development of the fishery: The fishery for anglerfishes developed in Sub-areas VII and VIII in the 1970s due to gear improvement, and overall annual landings may have attained 30-35,000 t by the early 1980s. The main exploiting nations are Spain and France. There has been an expansion of the gill net fishery in the last decade in the Celtic Sea. This seems to have coincided with high recruitment to both stocks. Even though fishing effort increased until 1990, landings decreased by 37% between 1986 and 1993, but have increased in recent years by 24%.

L. piscatorius

State of stock: The time series is too short to determine whether the stock is inside or outside safe biological limits. SSB decreased continuously until 1993 but increased in recent years due to good recruitment since 1990.

Details in Table 3.9.14.6.

Forecast for 1997:

SSB(96) = 53.6, F(96) = 0.32, Basis: F(96)=F(95), Catch(96) = Landings (96) = 23.5.
Recruitment for 1995 and 1996 year classes set equal to geometric mean for the period 1986-1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.13	66.8	-	12.2	97.8
B	$0.6F_{95}$	0.19		-	17.6	91.5
C	$0.8F_{95}$	0.26		-	22.6	85.6
D	$1.0F_{95}$	0.32		-	27.3	80.2
E	$1.2F_{95}$	0.38		-	31.7	75.1

Weights in '000 t.

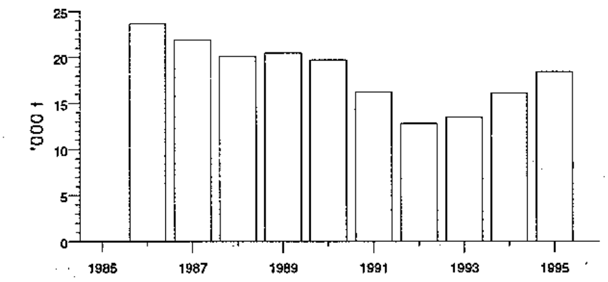
For all options given, SSB is predicted to increase in 1998 well above the average for 1986-1994. Continued fishing at the current level of F in 1997 will be accompanied by an increase in SSB in 1998, while landings continue to increase.

Special comment:. *L piscatorius* and *L. budegassa* are both caught on the same grounds by the same fleets, and are often not separated by species in markets; therefore, management measures for *L. piscatorius* must be considered with respect to their impact on *L. budegassa.*

Data and assessment: Age-based assessment using CPUE data. No recruitment indices are available for this stock, and average recruitment was assumed for the incoming year classes. However, short-term predictions of SSB are not sensitive to assumed recruitment because of the late maturity.

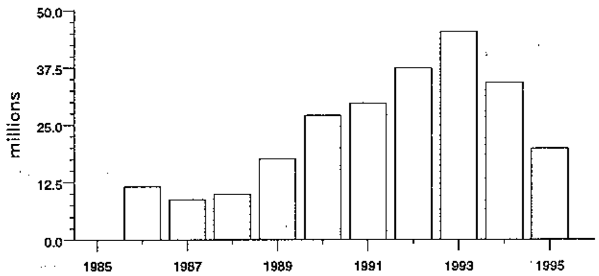
Landings

Mean = 18.3



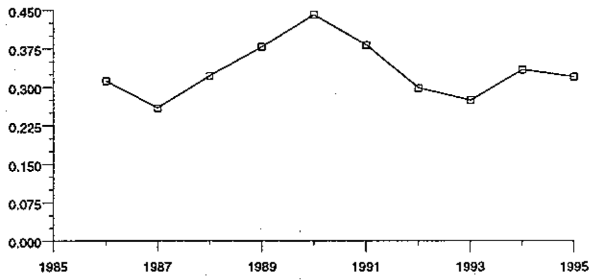
Recruitment (age 0)

Mean = 24.2



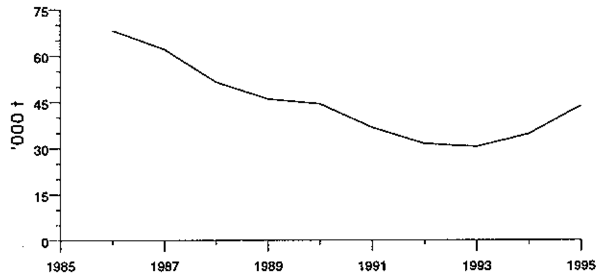
Fishing mortality (ages 3-7)

Mean = 0.332



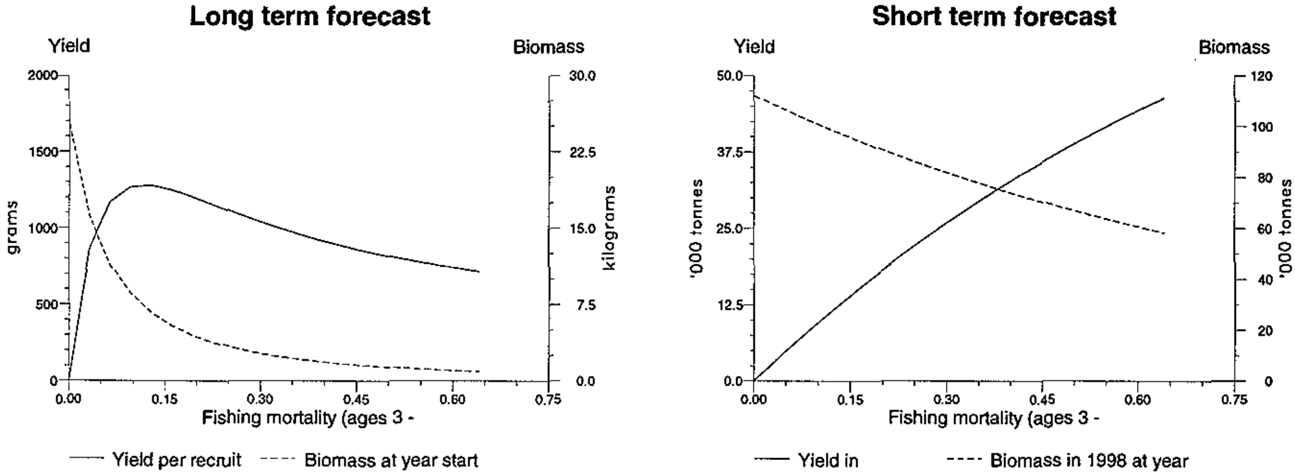
Spawning stock biomass

Mean = 44.9



L. piscatorius

Yield and Spawning Stock Biomass



L. budegassa

State of stock: The time series is too short to determine whether the stock is inside or outside safe biological limits. Landings and spawning stock biomass have decreased steadily since 1989.

Details in Table 3.9.14.7.

Forecast for 1997:

SSB(96) = 35.5, F(96) = 0.18, Basis:F(96)=F(95), Catch(96) = Landings (96) = 6.8.
Recruitment for the 1995 and 1996 year classes set equal to the geometric mean for the period 1986-1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.07	35.7	-	3.0	40.3
B	$0.6F_{95}$	0.11		-	4.4	38.7
C	$0.8F_{95}$	0.14		-	5.7	37.0
D	$1.0F_{95}$	0.18		-	7.0	35.5
E	$1.2F_{95}$	0.21		-	8.2	34.0

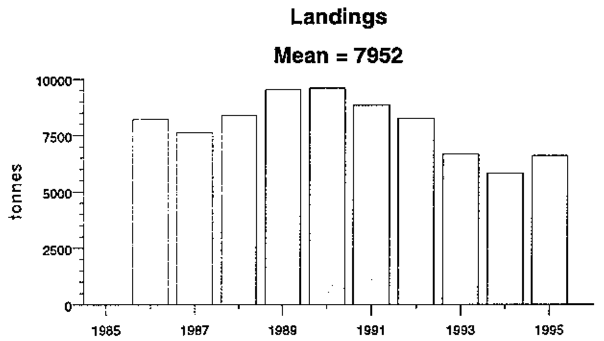
Weights in '000 t.

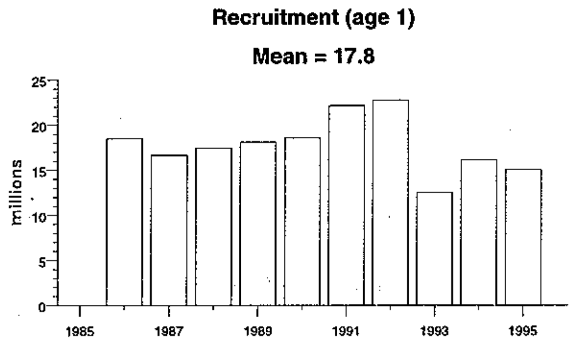
Continued fishing at the current level of F in 1997 is expected to result in stable landings in 1997 with no improvement of SSB in 1998.

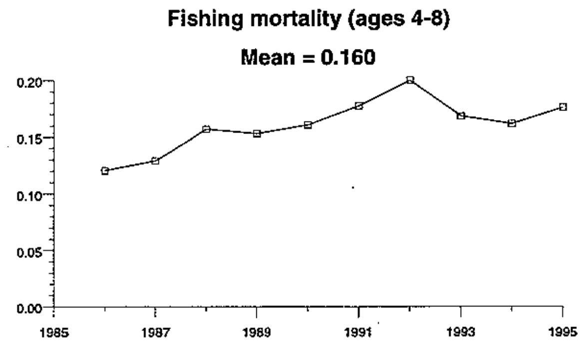
At options A to D, SSB is expected to be stable or to increase above the current low level.

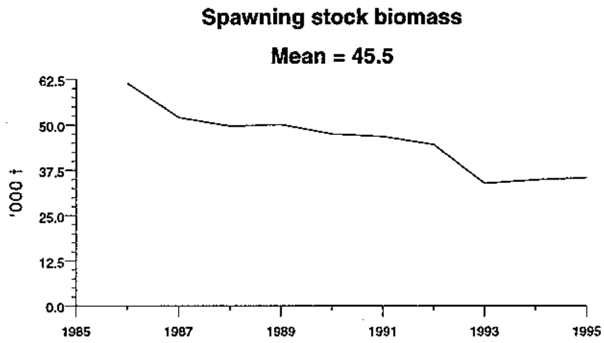
Special comment: *L. piscatorius* and *L. budegassa* are both caught on the same grounds by the same fleets, and often not separated by species in markets; therefore, management measures for *L. budegassa* must be considered with respect to their impact on *L. piscatorius*.

Data and assessment: Age-based assessment using CPUE and survey data.



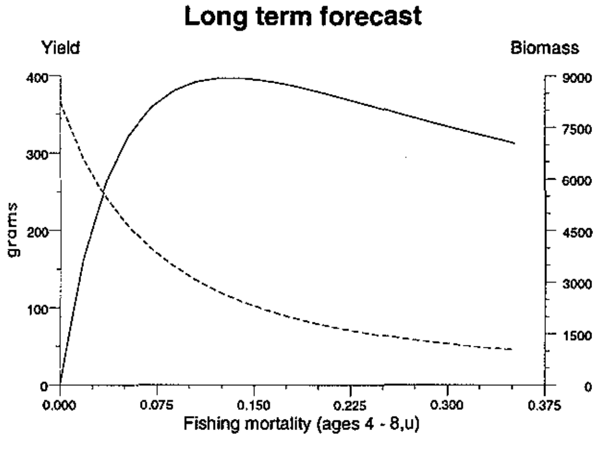


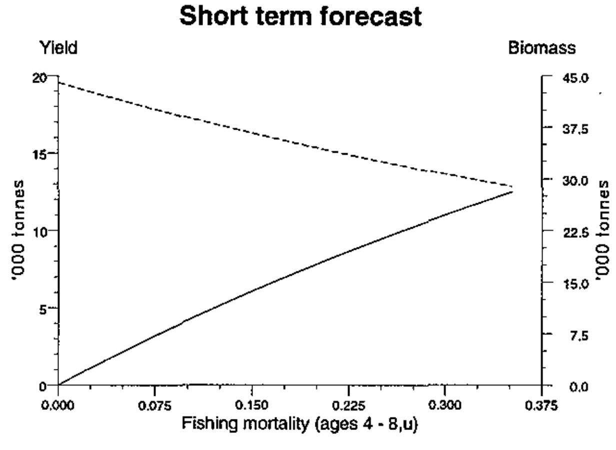




L. budegassa

Yield and Spawning Stock Biomass





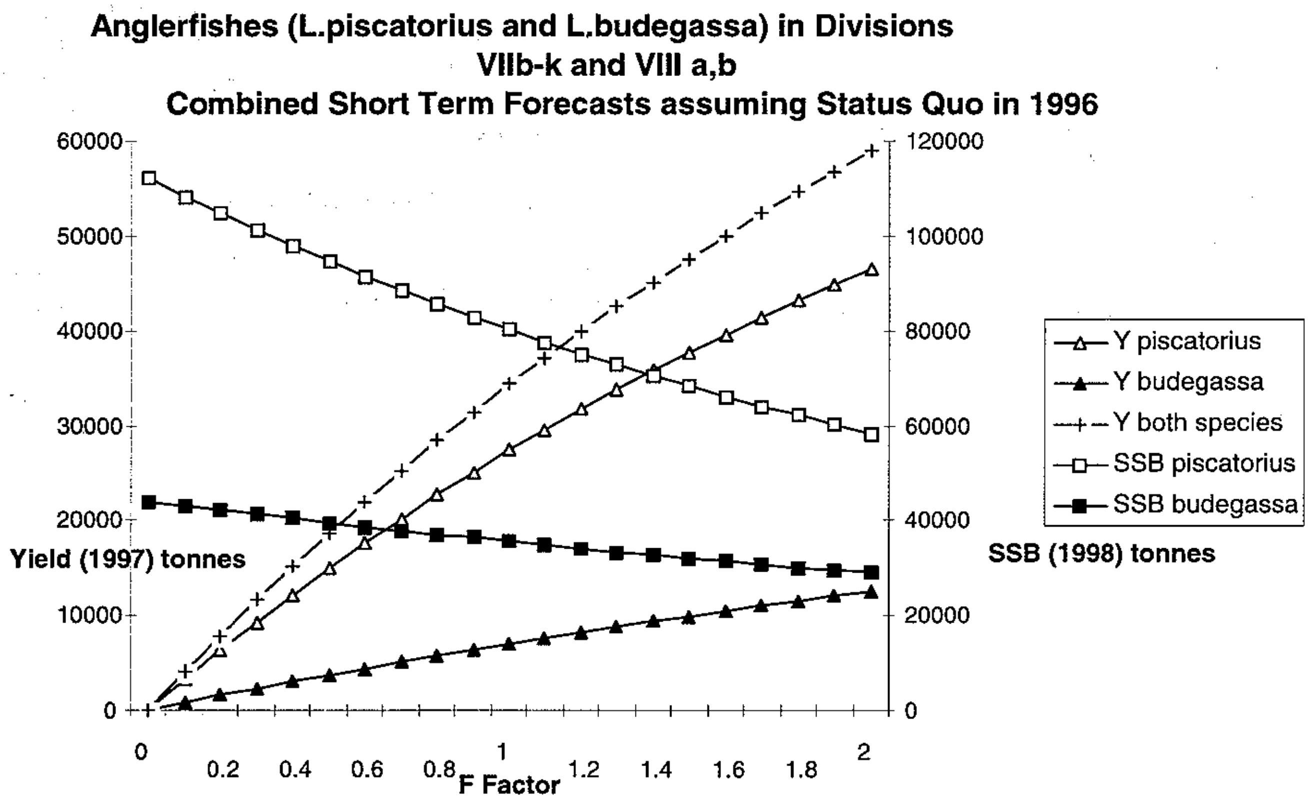
L. piscatorius and *L. budegassa*

A combined forecast diagram for both species is given below.

Management advice: No long-term gain is to be expected by increasing fishing mortality on these stocks. As the state of these stocks is not known in relation to safe biological limits, **ICES recommends that fishing mortality on these stocks should not be allowed to increase.**

Special Comment: The fishery has become heavily dependent on juvenile fish in recent years.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997Assess: 5).



3.10 Stocks in Divisions VIIb,c,h–k (West of Ireland)

3.10.1 Overview

Fleet and Fisheries

The fishery in Divisions VIIb,c is mainly a trawl fishery although some gill netting is carried out. The fishery in Divisions VIIh–k is also a trawl fishery but gill netting is increasing in importance in the area. These are mixed fisheries for cod, whiting, hake, sole and plaice; and cod and whiting are taken as by-catch in the *Nephrops* fishery.

Landings in these ICES Divisions are difficult to interpret as several countries differ in the manner in which they report their landings data for the various ICES Divisions.

Other species taken in the area are herring, mackerel and blue whiting (See Sections 3.10.3, 3.9.11, 3.12.3 and 3.12.5).

Management Measures

There are single cod and whiting TACs covering the whole of Divisions VIIb–k so that assessment areas do not correspond to management areas.

State of the Stocks

There are no analytical assessments for these stocks as the data time series is short. In 1996, however, preliminary assessments using catch curves and yield per recruit analysis were presented. These groups of fish may be only components of larger stock complexes. The fishing mortality rates (F) were compared with those in adjacent areas but it is still not clear if these stocks should be assessed with the stocks in the Celtic Sea or with the stocks off the West of Scotland (see Table 3.10.1.1).

Stock monitoring programmes and annual groundfish and young fish surveys are in place and will eventually permit more elaborate assessments.

There is a directed fishery for hake mainly in Divisions VIIh–k and an overview of hake is provided in Section 3.12.2.

Anglerfish and megrim are important species in this area but are assessed for Sub-areas VII and VIII. An overview is provided in Sections 3.9.13 and 3.9.14.

Nephrops fisheries take place in Functional units 16–19 (see Section 3.10.4 in the 1995 ACFM report). Catch per unit of effort has been stable and has fluctuated without trend over recent years. There is a TAC for all of Sub-area VII. There is an overview of *Nephrops* stocks in Section 2.1.1 in the 1995 ACFM report.

3.10.2 Demersal Stocks

Officially reported landings of cod, whiting, plaice and sole in Divisions VIIb,c,h-k are given in Tables 3.10.2.1–2.

3.10.3 Herring in Divisions VIa (South) and VIIb,c

Catch data (Table 3.10.3.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official Landings	Disc. slip.	ACFM catch
1987	TAC	18	17	17	-	49
1988	TAC depending on whether 1987 TAC is taken	11-18	14	15	-	29
1989	TAC	15	20	21	1.0	29
1990	TAC depending on whether 1989 TAC is taken	25-27	27.5	28	2.5	44
1991	TAC	<26	27.5	23	3.4	38
1992	TAC (including discards)	29	28	27	0.1	32
1993	Precautionary TAC (including discards)	29	28	30	0.2	37
1994	Precautionary TAC	28	28	27	0.7	34
1995	Precautionary TAC (including discards)	36	28	27		28
1996	If required, precautionary TAC	34	28			

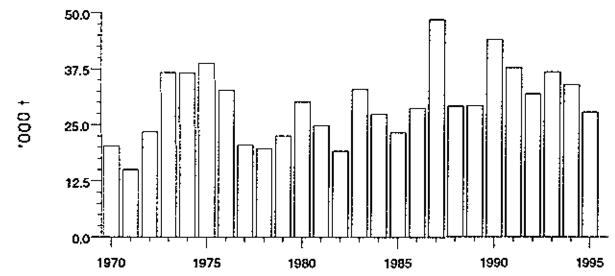
Weights in '000 t.

Historical development of the fishery: Catches in this fishery, taken mainly by Ireland, have declined from a maximum in 1987. A large portion of the catch is taken in a "roe" fishery. In recent years the stock appears to have been distributed further north and to have been composed of more winter/spring-spawners than autumn-spawners. The fishery in Division VIa was closed in the late seventies and, when it was re-opened in the early eighties, it was combined with Division VIIb for assessment and management purposes.

State of stock: The stock is declining from a high level in the late 1980s but its present level cannot be defined with sufficient precision. The present fishing mortality may be in the range 0.2-0.4. Details in Table 3.10.3.2.

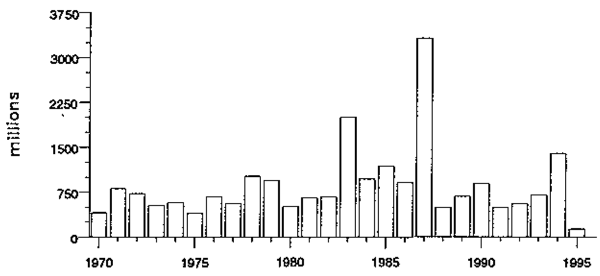
Landings

Mean = 29.7



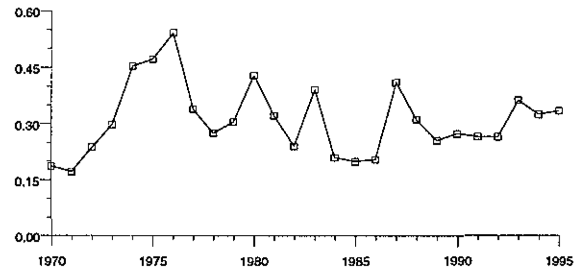
Recruitment (age 1)

Mean = 856



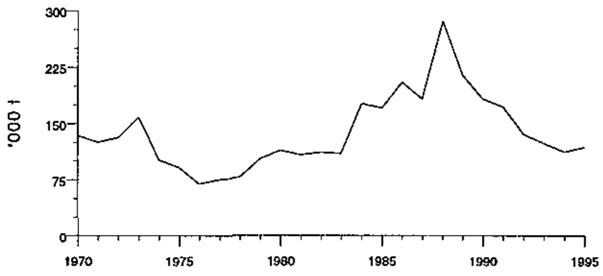
Fishing mortality (ages 3-7)

Mean = 0.310



Spawning stock biomass

Mean = 138



Forecast for 1997: The *status quo* forecast is based on the recent average F of 0.34 in 1996 and 1997.

F(96) = 0.34, Catch(96) = 25.3, SSB(96) =89

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	1.0F(93-95)	0.34	97	25.0	103

Weights in '000 t.

Management advice: If a precautionary TAC is required, ICES advises that it should be set such that the resulting catches do not exceed 25,000 t.

Data and assessment: Assessment using SSB estimate from one acoustic survey. There has generally been good quality of biological data for this fishery but the level of sampling decreased in 1995. Lack of sufficient fishery-independent information. No assessment was made in previous years. For this stock age refers to the number of winter rings which is one year less than the true age.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).

3.11 Stocks in the Iberian Region (Division VIIIc and Sub-areas IX and X)

3.11.1 Overview

The fisheries

The Iberian Region along the eastern Atlantic shelf is considered an upwelling area with high productivity; this phenomenon takes place during late spring and summer due to the northerly wind and current system in the area. This region is characterized by a large number of commercial and non-commercial fish species.

The fisheries in the region are of a typical mixed nature. Different kinds of Spanish and Portuguese fleets operate in the Iberian Region: one is the mixed trawl fleet (single, pair and crustacean trawlers) fishing for species such as hake, blue whiting, horse mackerel, megrim, anglerfish, mackerel, *Nephrops*, bib and cephalopods as the main species. Other fleets fishing for different target species are longliners fishing for hake and mackerel, fixed nets used for hake, anglerfish and mackerel and purse seiners which target sardine and anchovy, and secondly mackerel and horse mackerel.

Many bottom trawlers are fishing in the southern part of Division IXa (Gulf of Cadiz); these trawlers are smaller than those operating in the northern parts of the Iberian Region. The composition of their catches is also different. They are fishing for hake as well as crustaceans and molluscs (Octopus etc.).

The number of trawlers has decreased since the early 1980s, resulting in a decreasing trend in the overall effort in the Portuguese and Spanish fleets. The fleets operating gillnets and long lines have also declined in number of boats in recent years. Spanish boats using trawl, longline or fixed nets are currently subjected to a restricted entry system.

Two stocks of anchovy are considered in the Iberian Region, one in Sub-area VIII and one in Division IXa. The Spanish and French fleets fishing for anchovy in Sub-area VIII are well separated geographically and in time (the Spanish fleet operates in Division VIIIc in spring and the French fleets in Division VIIIa in summer and autumn and in Division VIIIb in winter and summer). Changes in the catch age composition between the 1984–1994 period and the earlier years could be related to a higher dependence of catches on recruitment in recent years and a change in the seasonality in this fishery. The number of Spanish purse seiners for anchovy has remained stable since 1990 and a slight increase in the number of French purse seiners has been observed in the last five years. A sharp increase in fishing effort for anchovy in the Bay of Biscay has occurred since 1987 mainly due to the increased effort in the French pelagic trawl fleet.

In previous years the anchovy fishery in Division IXa was located in the Gulf of Cadiz (Sub-division IXa South) but in 1995 the fishery was located to the North of Portugal and to the West of Galicia (Sub-Division IXa North) and very reduced in the Gulf of Cadiz.

In Divisions VIIIc (East) and VIIIb the target species for the purse seine fleet change with the season - anchovy in spring and tuna in the summer. This fleet changes gear and uses trolling and bait boats to catch tuna.

The catches of horse mackerel in Divisions VIIIc and IXa have been relatively stable over the last ten years. The proportion of landings by different gears has changed, i.e. trawl catches are decreasing while the purse seine catches are increasing.

Management measures

The fisheries in the Iberian Region are managed by a TAC system and technical measures. Common mesh sizes for trawls are 65 mm, except for trawlers fishing blue whiting or horse mackerel (40 mm). Other measures are a minimum landing size and seasonal closed areas to protect juvenile hake.

There has been observed a decrease in mean age in the anchovy catches since 1987; besides that the fishing effort is increasing. This fishery therefore needs to be managed. There are no management measures enforced in the sardine fishery except for a minimum landing size adopted at national level. With the present situation for this stock further management measures are needed. To improve monitoring of these stocks recruitment surveys are needed.

State of stocks

The major data problems in the Iberian Region are the short time series of landing statistics, notably in the Gulf of Cadiz, little information about length composition for demersal species in the landings in that area, lack of routine estimates of discards (only available for Spanish waters in 1994). For most of the stocks the sampling level of the landings is considered adequate for assessment purposes, but the low level of samples of discards and particularly undersized hake is considered a problem. There are still some problems in consistency in age reading of hake and horse mackerel.

The Iberian Region is an important nursery ground for hake, sardine, horse mackerel, mackerel and blue whiting. Catches of fleets operating gears with low selectivity therefore contain significant quantities of juvenile fish.

The situation for hake is alarming. The spawning stock biomass (SSB) reached a new record low level in 1995. The landings reach a record low in 1994 and a small increase in 1995 due to the average year classes in 1992 and 1993 entering the fishery. Recovery of the SSB is unlikely at the current level of fishing mortality.

Information from the fisheries for the two species of anglerfish demonstrates a recent decline in landings and CPUE indicating that the stock is currently at a very low level.

Catches of megrim *Lepidorhombus boscii*, which is the most abundant of the two species of megrim in the Iberian Region, have declined since 1989 and stabilized in the most recent years. SSB in 1995 was at the lowest level observed and is expected that decrease further at current levels of fishing mortality. The stock of megrim *Lepidorhombus wiffiagonis* is considered to be outside safe biological limits.

Two stocks of *Nephrops* are considered in Division VIIIc and five in Division IXa. For the overall management areas the landings are slightly decreasing in Division VIIIc while the catches fluctuate without a clear trend in Division IXa. The fishing mortality is low and stable for this area.

Both catches and SSB of horse mackerel have been relatively stable over the last ten years.

The sardine stock is considered to be outside safe biological limits. The decline in SSB over many years, the very low recruitments in the last three years and the shrinking distribution area all suggest that the stock is in a very poor condition.

3.11.2 Hake - Southern stock (Divisions VIIIc and IXa)

Catch data (Table 3.11.2.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM lndgs.	ACFM catch
1987	Precautionary TAC; juvenile protection	15.0	25.0	15.2	15.2
1988	TAC; juvenile protection	15.0	25.0	15.4	15.4
1989	TAC; juvenile protection	15.0	20.0	12.9	12.9
1990	TAC; juvenile protection	15.0	20.0	12.0	12.0
1991	Precautionary TAC	10.0	18.0	11.6	11.6
1992	Precautionary TAC	10.3	16.0	12.8	12.8
1993	F = 10% of F 91	1.0	12.0	10.9	10.9
1994	F lowest possible at least reduced by 80%	2.0	11.5	9.5	9.5
1995	F lowest possible	-	8.5	11.8	11.8
1996	F lowest possible	-	9.0		

Weights in '000 t.

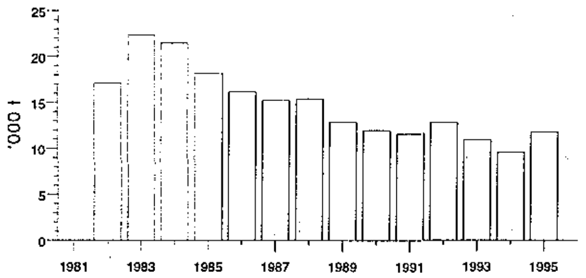
Historical development of the fishery: This stock is exploited in a mixed fishery by Spanish and Portuguese fleets using trawls, gillnets and longlines. In order to protect juvenile fish fishing is prohibited in some areas during part of the year. Landings have declined since 1983 reaching their lowest level in 1994.

State of stock: The stock is outside safe biological limits. SSB decreased very sharply between 1984 and 1986 and is at its lowest recorded level in 1995. Recruitment has declined steadily since 1984 and, with the exception of two years (1992 & 1993) has been poor since 1989. Fishing mortality in 1995 was above F_{med} (0.21). There is evidence of reduced recruitment below a threshold of 23,000 t.

Further details in Table 3.11.2.2.

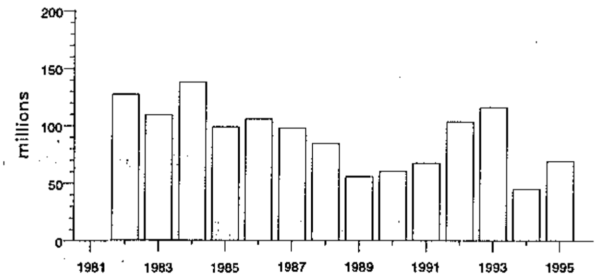
Landings

Mean = 14.8



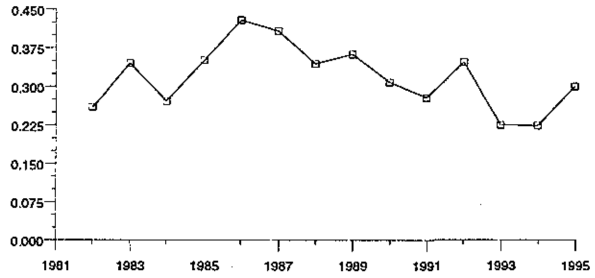
Recruitment (age 0)

Mean = 91.2



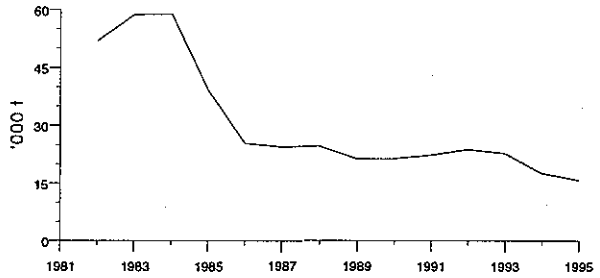
Fishing mortality (ages 2-5)

Mean = 0.318



Spawning stock biomass

Mean = 30.4



Forecast for 1997:

SSB(96) = 16.6, F(96) = 0.30, Basis: F(96)=F(95), Catch(96) = Landings (96) = 13.4.
Recruitment of the 1995 and subsequent year classes set equal to the geometric mean for the period 1982-1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.12	17.2		5.6	23.1
B	$0.6F_{95}$	0.18			8.0	21.1
C	$0.8F_{95}$	0.24			10.3	19.3
D	$1.0F_{95}$	0.30			12.4	17.6
E	$1.2F_{95}$	0.36			14.3	16.1

Weights in '000 t.

Options A-D, result in an increase in SSB above the 1996 level.
For option E, SSB is expected to remain close to lowest observed level.

A reduction in F of more than 60% is required to return SSB above the 23,000 t threshold by 1998.

Management advice: ICES recommends that fishing mortality in 1997 should be reduced to the lowest possible level to give SSB the greatest chance of recovery.

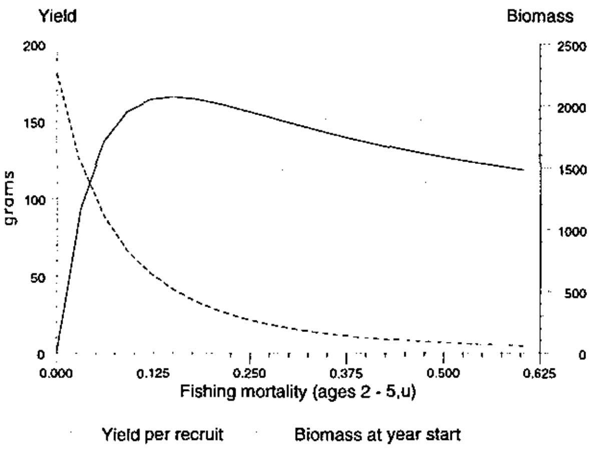
Special comments: Seen in isolation, fishing mortality on hake should be reduced to zero in order to bring about a recovery in SSB. Hake are taken as part of a mixed trawl fishery, and any management action with regard to this stock will have consequences for other species. Prior to 1995, agreed TAC's consistently exceeded both the advice and the actual landings.

Data and assessment: Catch-at-age data derived by numerical conversion of length to age compositions. Analytical assessment using CPUE data from 4 commercial fleets and 3 surveys. Spanish discards were sampled in 1994. Short-term predictions are not sensitive to recruiting year class strength. Difficulties in sampling undersized fish (<27 cm) since 1989.

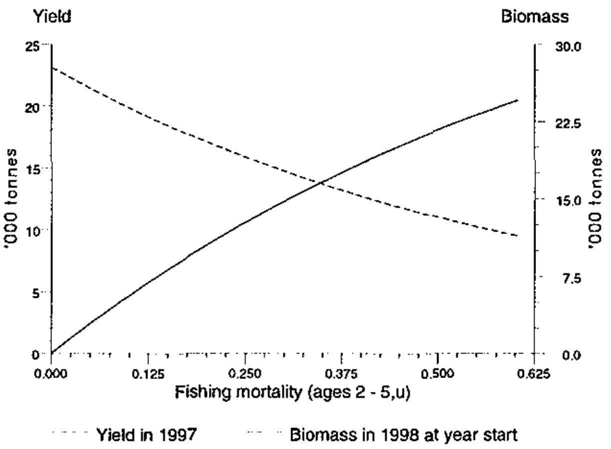
Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

Yield and Spawning Stock Biomass

Long term forecast



Short term forecast



3.11.3 Megrim in Divisions VIIIc and IXa

Catch data (Tables 3.11.3.1-2):

Year	ICES advice	Catch corres. to advice	Agreed TAC[1]	ACFM Landings	Landings *L. boscii*	Landings *L. whiff.*
1987	Not dealt with	-	13.0	2.19	1.69	0.50
1988	Not dealt with	-	13.0	3.04	2.22	0.82
1989	Not dealt with	-	13.0	3.34	2.63	0.71
1990	Not dealt with	-	13.0	2.93	1.95	0.98
1991	No advice	-	14.3	2.29	1.68	0.61
1992	No advice	-	14.3	2.44	1.92	0.52
1993	*L. boscii* no long-term gain in increasing F, *L. whiff* within safe biological limits	-	8.0	1.76	1.38	0.38
1994	No long-term gains in increasing F	-	6.0	1.88	1.40	0.48
1995	Concern about low SSB	-	6.0	1.87	1.65	0.22
1996	Mixed fishing aspects	-	6.0			

[1]Including *L. whiffiagonis*+*L. boscii*. Weights in '000 t.

Historical development of the fishery: These species (*Lepidorhombus boscii* and *L. whiffiagonis*) are generally taken as a by-catch in mixed fisheries by Portuguese and Spanish trawlers. *L. boscii* accounts for about 80% of combined megrim landings. Both species are subject to a common TAC which considerably exceeds the landings.

3.11.3.a Megrim (*L. boscii*) in Divisions VIIIc and IXa

State of stock: The time series is too short to determine whether the stock is inside or outside safe biological limits. SSB in 1995 was at the lowest level observed over the period of the assessment, and it is expected to continue to decline at *status quo* fishing mortality. Recruitment appears to be very low for the 1993 year class.

Further details in Table 3.11.3.a.1.

Forecast for 1997:.
SSB(96) = 4.10, F(96) = 0.46, Basis:F(96)=F(95), Catch(96) = Landings (96) = 1.89.

Recruitment of the 1995 and subsequent year classes set equal to the geometric mean for the period 1990-1995.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.18	3.45		0.72	4.24
B	$0.6F_{95}$	0.27			1.02	3.91
C	$0.8F_{95}$	0.37			1.30	3.62
D	$1.0F_{95}$	0.46			1.55	3.36
E	$1.2F_{95}$	0.55			1.78	3.13

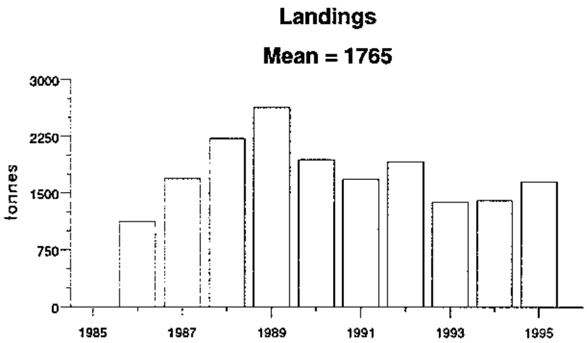
Weights in '000 t.

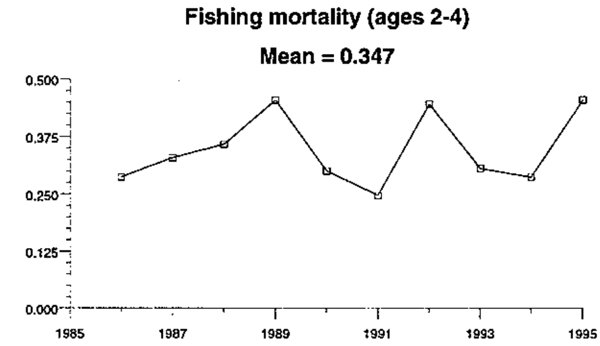
Continued fishing at current levels will lead to a SSB lower than the lowest level of the series due to the extremely low 1993 year class. A 50% reduction in F is required to halt the decline in SSB.

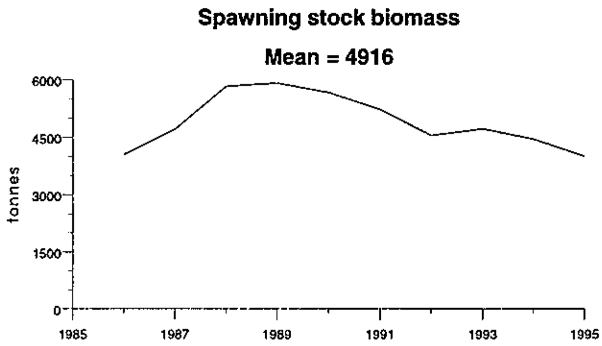
Management advice:. The stocks of both species of megrim are at their lowest observed levels, and a substantial (>50%) decrease in fishing mortality is required to halt the decline in SSB. Management should take into account that megrim are caught in fisheries which contain a large number of commercial species in catches.

Data and assessment: Age-based analytical assessment using CPUE data from two commercial fleets and two surveys. No landings data are available for this stock before 1986. The assessment is considered to be uncertain.

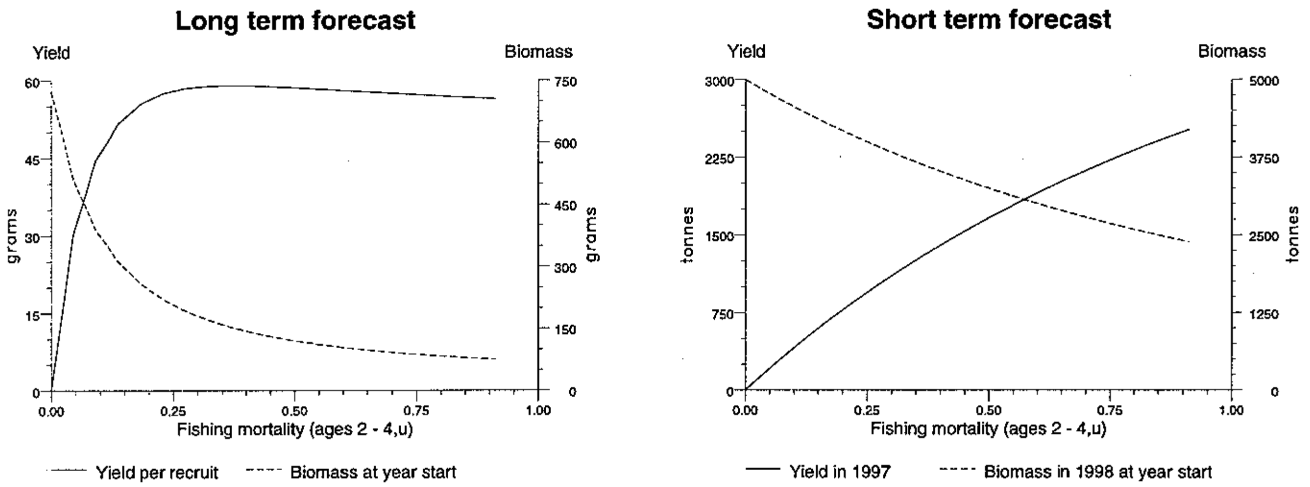
Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).







Yield and Spawning Stock Biomass



3.11.3.b Megrim (*L. whiffiagonis*) in Divisions VIIIc and IXa

State of stock: This stock is considered to be outside safe biological limits. Recruitment has been low in recent years, when the SSB has declined to successively lower levels. Further details in Table 3.11.3.b.1.

Forecast for 1997:
SSB(96) = 0.51,F(96) = 0.54, Basis:F(96)=(F(95),Catch(96) = Landings (96) = 0.24.

Recruitment of the 1995 and subsequent year classes set equal to the geometric mean for the period 1990-1995.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.22	0.47		0.10	0.58
B	$0.6F_{95}$	0.33			0.14	0.53
C	$0.8F_{95}$	0.43			0.17	0.49
D	$1.0F_{95}$	0.54			0.20	0.45
E	$1.2F_{95}$	0.65			0.23	0.42

Weights in '000 t.

SSB is expected to decrease further for options C,D and E, and to remain close to historical low levels for options A and B.

Management advice: The stocks of both species of megrim are at their lowest observed levels, and a substantial (>50%) decrease in fishing mortality is required to halt the decline in SSB. Management should take into account that megrim are caught in fisheries which contain a large number of commercial species in catches.

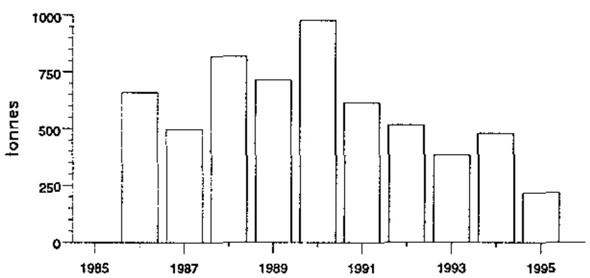
Special comments: TACs affecting this stock include both species of megrim and have been well above actual catches in recent years.

Data and assessment: Age-based analytical assessment using CPUE data from two commercial fleets and one survey. No landings data are available for this stock before 1986.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Species, September 1995 (CM 1997/Assess:5).

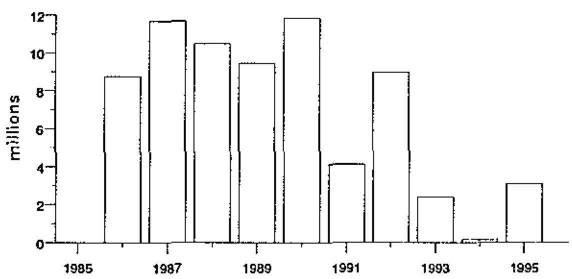
Landings

Mean = 587



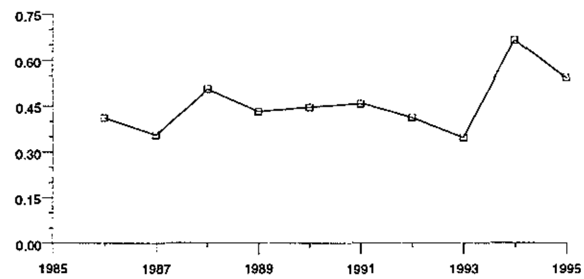
Recruitment (age 1)

Mean = 7.10



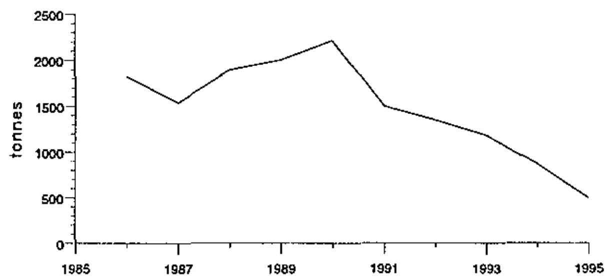
Fishing mortality (ages 2-4)

Mean = 0.458



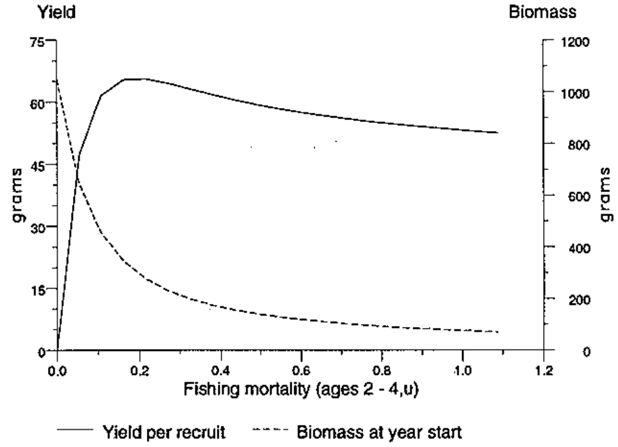
Spawning stock biomass

Mean = 1488

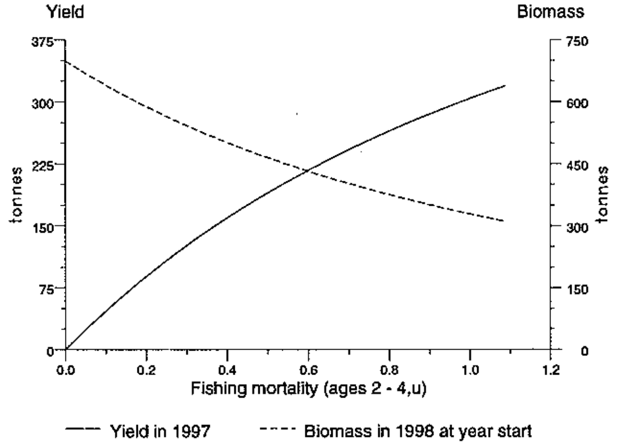


Yield and Spawning Stock Biomass

Long term forecast



Short term forecast



3.11.4 Anglerfish in Divisions VIIIc and IXa (*L. piscatorius* and *L. budegassa*)

Catch data (Tables 3.11.4.1-2):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM catch[1]	Catch of *L. piscat.*	Catch of *L. budeg.*
1987	Not dealt with	-	12.0	8.9	5.1	3.8
1988	Not dealt with	-	12.0	10.0	6.3	3.7
1989	Not dealt with	-	12.0	7.6	5.0	2.6
1990	Not dealt with	-	12.0	6.1	3.8	2.3
1991	No advice	-	12.0	5.8	3.6	2.2
1992	No advice	-	12.0	5.5	3.4	2.1
1993	No long-term gain in increasing F	-	13.0	4.5	2.3	2.2
1994	No advice	-	13.0	3.6	2.0	1.6
1995	If required a precautionary TAC	-	13.0	3.6	1.8	1.8
1996	If required a precautionary TAC	-	13.0			

[1]For both species combined. Weights in '000 t.

Historical development of the fishery: Both species are caught in mixed fisheries by Portuguese and Spanish fleets. In the early 1970s, commercial interest for these species increased and a directed artisanal fishery developed in Spain, originally targeting large fish. In recent years, anglerfish have comprised around 2.5% of the total catches of both the Spanish trawl fleet and the Portuguese artisanal fleet (mainly from gill nets), 2% of the Portuguese fish trawl fleet's landings, and 13% of the total catch of the Portuguese crustacean trawl fleet.

TACS have been well above actual catches in recent years.

Lophius piscatorius

State of stock:. The recent decline in landings and commercial CPUE indicates that the stock is currently at a low level.

Management advice: If a TAC is to be implemented for this stock, it should be set on the basis of recent catch levels.

Data and assessment: No reliable assessment available.

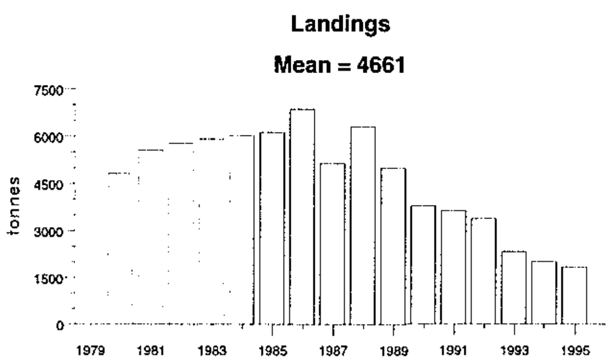
Lophius budegassa

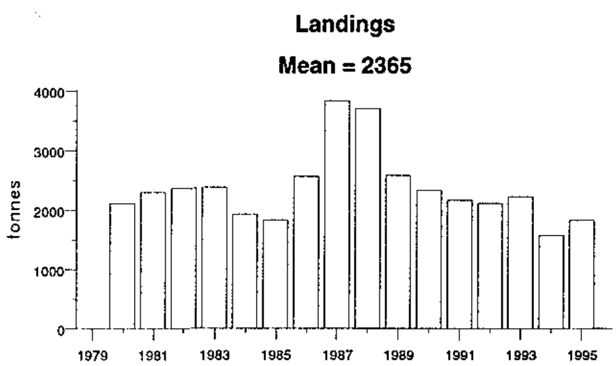
State of stock: There is no consistent trend in landings or CPUE between fleets which would indicate substantial changes in the stock.

Management advice: If a TAC is to be implemented for this stock, it should be set on the basis of recent catch levels.

Data and assessment: No reliable assessment available.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).





3.11.5 Mackerel in Divisions VIIIc and IXa (Southern component)

Evaluation of this component is given in Section 3.12.3 dealing with the combined mackerel assessment.

3.11.6 Southern horse mackerel (*Trachurus trachurus*) (Divisions VIIIc and IXa)

Catch data (Tables 3.11.6.1-5):

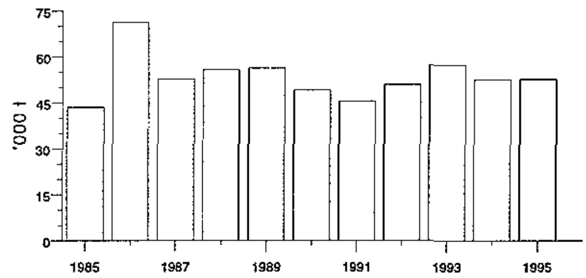
Year	ICES advice	Catch corresp. to advice²	Agreed TAC¹	ACFM catch²
1987	Not assessed	-	72.5³	55
1988	Mesh size increase	-	82.0³	56
1989	No increase in F;TAC	72.5	73.0³	56
1990	F at $F_{0.1}$;TAC	38	55.0⁴	49
1991	Precautionary TAC	61	73.0⁴	46
1992	If required, precautionary TAC	61	73.0⁴	51
1993	No advice	-	73.0⁴	57
1994	*Status quo* prediction	55⁵	73.0⁴	53
1995	No long-term gains in increasing F	63⁵	73.0⁴	53
1996	No long-term gains in increasing F	60⁵	73.0⁴	

[1]Includes all *Trachurus* spp. [2]Includes only *Trachurus trachurus* L. [3]Division VIIIc, Sub-areas IX and X, and CECAF Division 34.1.1 (EC waters only). [4]Division VIIIc and Sub-area IX. [5]Catch at *status quo* F. Weights in '000 t.

Historical development of the fishery: Horse mackerel catches are reported to have reached 160 thousand t during the 1970s when the Soviet Union fleet was fishing in the area. Since 1980 this fishery has involved only Spanish and Portuguese fleets and the catches have remained rather constant at an average level of 57 thousand t. Purse seiners and trawlers harvest more than 90 % of the catches. There are annual changes in the proportion of the catches taken by each gear type. In general the major catches of horse mackerel occur during the second and third quarters. The catch data have been revised since 1981 to correspond only to those of *Trachurus trachurus.*

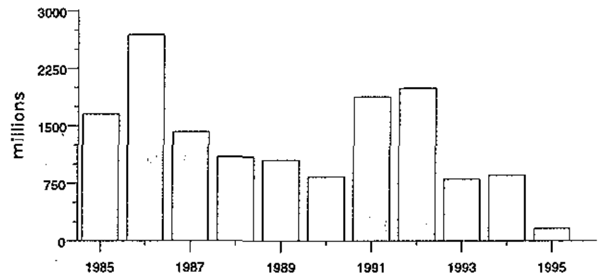
Landings

Mean = 53.5



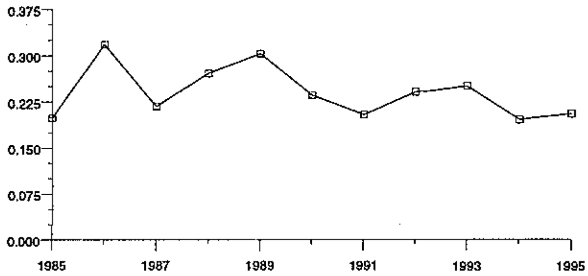
Recruitment (age 0)

Mean = 1313



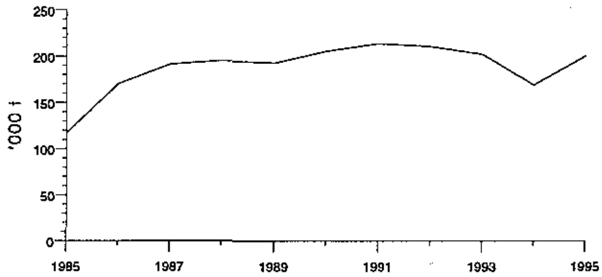
Fishing mortality (ages 1-11)

Mean = 0.240



Spawning stock biomass

Mean = 188



State of stock: With this short time series it is difficult to determine the state of the stock in relation to safe biological limits. The SSB is estimated to have been between 117,000 - 213,000 t. The 1995 SSB estimated by egg surveys was 260,000 t. The strong 1982 year class has dominated the SSB during the period for which data are available.

Details in Table 3.11.6.6.

Forecast for 1997:

SSB(96) =211, F(96) =0.21, Basis: F(96)=F(95), Catch(96) =54, Landings (96) =54.

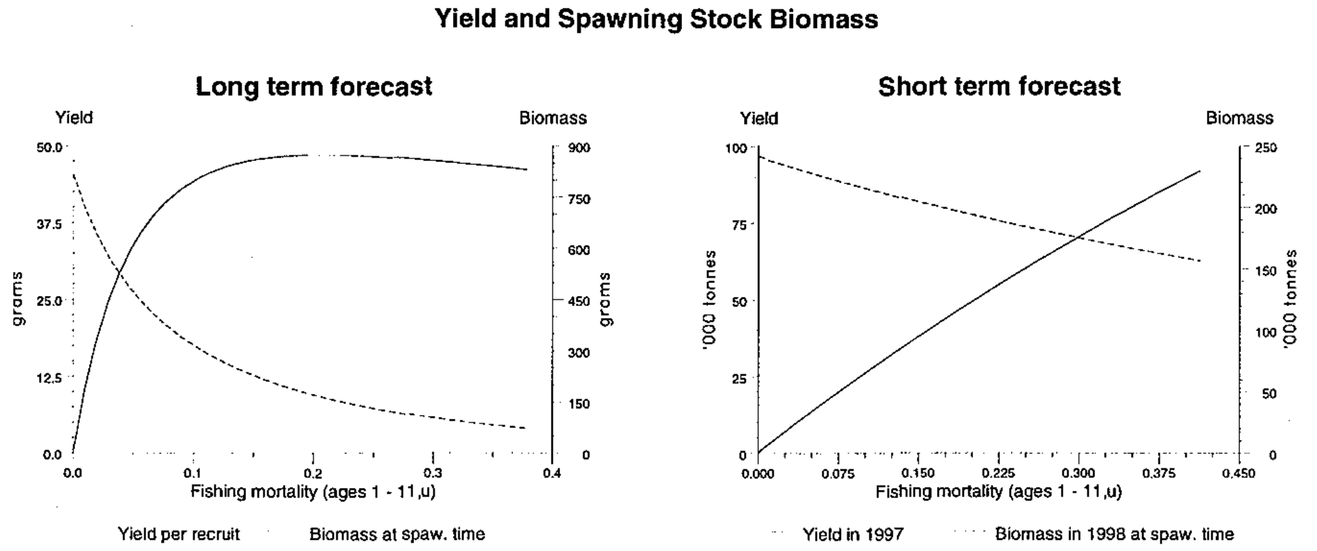
Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	0.4 F_{95}	0.08	211	22	220
B	0.6 F_{95}	0.12	209	32	210
C	0.8 F_{95}	0.17	207	41	201
D	1.0 F_{95}	0.21	205	51	193
E	1.2 F_{95}	0.25	203	60	185

Weights in '000 t.

The spawning stock will decrease for all the options given except A in relation to the 1996 SSB of 211 thousand t.

Data and assessment: Catch at age data for both Spain and Portugal are available from 1985 onwards. Two CPUE series from commercial Spanish catches starting in 1983 and fishery-independent information derived from trawl surveys were used for tuning the assessment.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, August 1996 (CM 1997/Assess:3).



3.11.7 Sardine

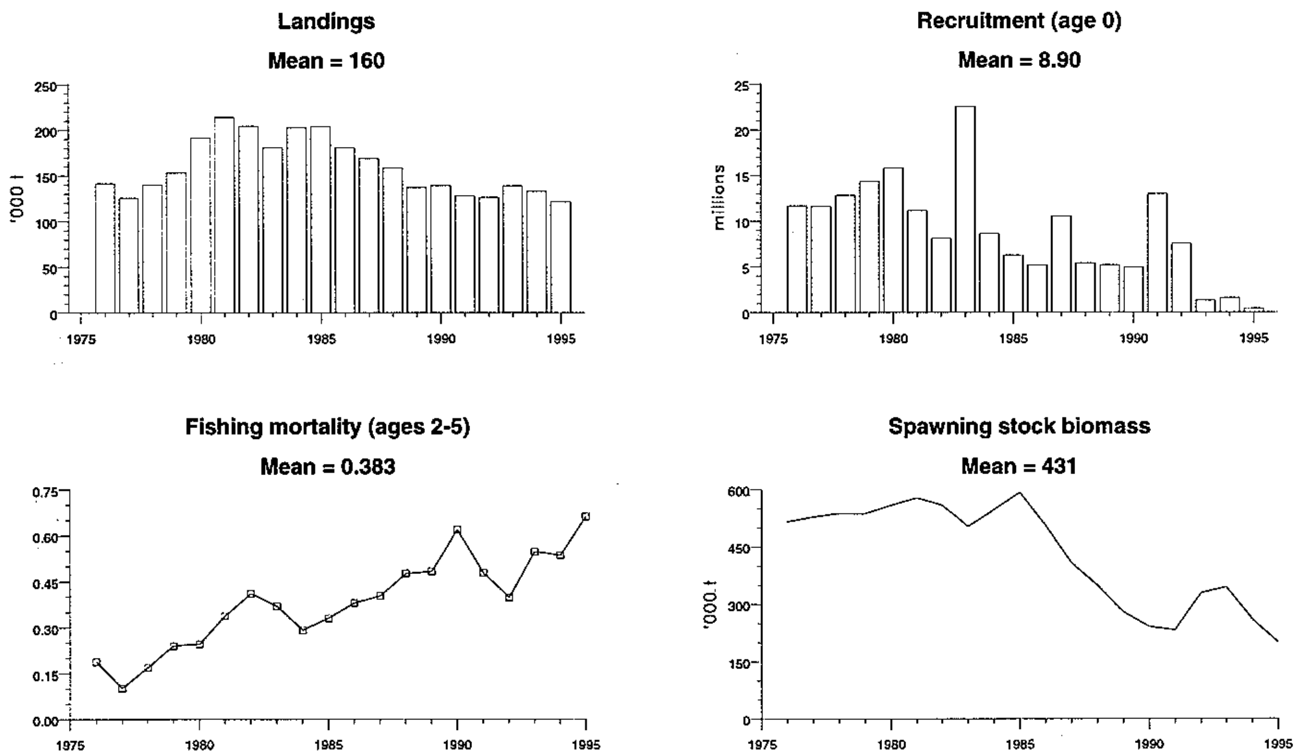
3.11.7.a Sardine in Divisions VIIIc and IXa

Catch data (Table 3.11.7.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official Landings	ACFM catch
1987	No increase in F; TAC	140	-		169
1988	No increase in F; TAC	150	-	167	159
1989	No increase in F; TAC	212	-	146	137
1990	Room for increased F	227[2]	-	150	139
1991	Precautionary TAC	176	-	135	128
1992	No advice	-	-		126
1993	Precautionary TAC	135	-		139
1994	No advice	118[1]	-		133
1995	No advice; apparently stable stock	-	-		121
1996	Lowest possible level	-	-		

[1]Estimated catch at *Status quo* F. [2]Catch corresponding to 20% increase in F. Weights in '000 t.

Historical development of the fishery: Catch data from 1940 to 1995 (Figure 3.11.7.1) show three periods of decreasing trend : 1944-1949, 1961-1977 and 1981-1994. The highest landings occurred in 1961 (250,000 t) and the lowest in 1949 (67,000 t). The stock is mainly fished in Division IXa by Portugal and Spain. The trend in the catches of both countries has been similar in the last years. Nevertheless, after a period of high catches from 1980 to 1985, the Spanish catches have shown a decreasing trend since 1987, whereas the Portuguese catches have remained quite stable (100,000 t per year) (Figure 3.11.7.1). The sardine is a target species for the Portuguese and Spanish purse-seine fleets. The highest catches occur in the second half of the year (68% of the total). The catches show a decreasing trend since 1985. The fishery has become highly dependent on recruiting year classes.



State of stock: The stock is considered to be outside safe biological limits. The SSB has shown a decrease since 1985 and is at the lowest observed level. With the exception of year class 1991 recruitment has been low since 1987. The area of distribution of the stock has decreased compared to the mid-1980s.

Details in Table 3.11.7.2.

Medium-term considerations: Over the whole range of fishing mortalities, medium-term projections demonstrate the very low probability that SSB will increase.

Management advice: To prevent a further decline in SSB ICES recommends a reduction of the current fishing mortality to almost zero.

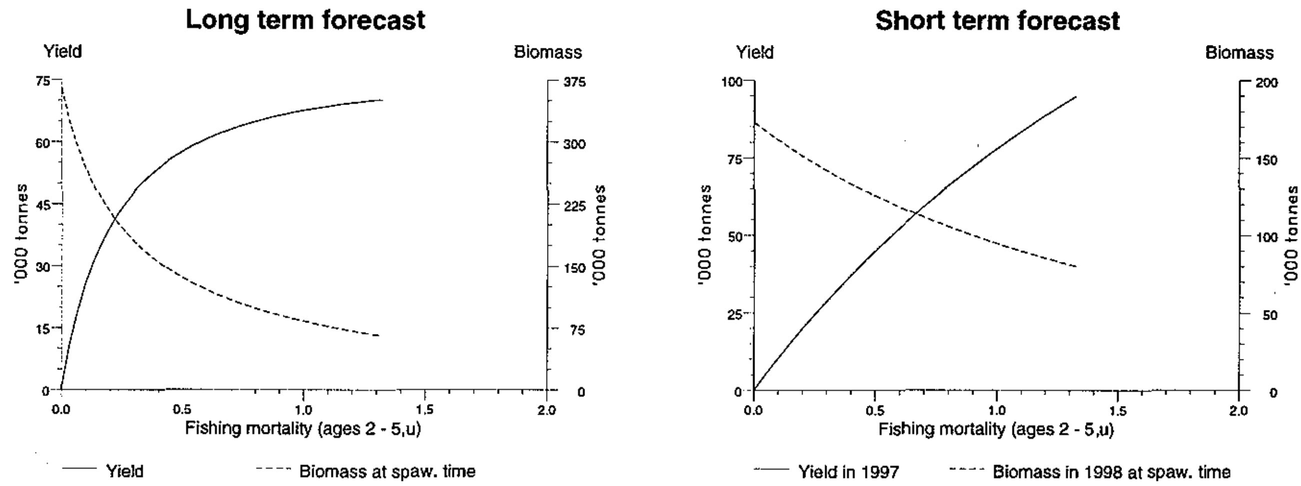
Special comments: The historical pattern of recruitment in this sardine stock (and other sardine stocks worldwide) indicates that periods of weak recruitment persist for a number of years. With the low levels of recruitment observed recently for this stock, ICES considers it prudent to assume that recruitment will continue to be very low until there are reliable indicators of improved recruitment. ICES, therefore, has serious concern about the state of the stock. The fishery is currently not regulated by TACs, and the stock appears to be heading towards a collapse. SSB is at such a low level that recruitment appears to be impaired.

From the history of this stock it appears that an SSB in the order of 450,000 t is required to have a high likelihood of reasonable recruitment.

Data and assessment: Catch-at-age data for ages 0 to 6+ are available for this fishery from 1976 to 1995, and acoustic surveys since 1983.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, August 1996 (CM 1997/Assess:3).

Yield and Spawning Stock Biomass



3.11.7.b Response to request for advice on Sardine from the Government of Portugal

The Government of Portugal has requested ICES to advise on:

- possibilities to evaluate the effects of a sardine box in relation to the need to protect juvenile sardine taking into account different scenarios of recruitment and fishing mortality levels.

Background information

There is substantial information available on the distribution of juvenile (0-group) sardine, but data from only a few years have been used for this evaluation and thus the findings should be regarded as preliminary.

Catch data from the fisheries and acoustic surveys confirm that concentrations of juvenile sardine (0-group) are consistently found mainly in Sub-divisions VIIIc West, IXa North, Central-North and Central-South in the third and fourth quarters. During the third quarter juvenile sardine catches increase from south to north while in the fourth quarter this trend is from north to south. From 1984 to 1988 0-group sardine off Portugal were distributed in shallow water near the coast (in less than 50 m depth).

About 57% of the total sardine catches come from Sub-divisions IXa, Central-North and Central-South. In 1992 during the third and fourth quarters, 80% of the 0-group were caught in Sub-divisions IXa North and Central-North. In 1993, catches of 0-group mainly occurred in Sub-division VIIIc East during the third quarter and in Division IXa during the fourth quarter. This pattern was similar to that in 1994 whereas in 1995 catches of 0-group occurred in Sub-division IXa Central-South. Taking into account the information reviewed, it may be concluded that the most important areas of recruitment, in those areas where the sardine fishery is active, seem to be in the northern part of Sub-division IXa Central South, in Sub-division IXa Central North and in Sub-division IXa North.

More than 60% of the total abundance of juvenile sardines estimated by acoustic surveys in May–June 1995 and in June–July 1996 were found in the Gulf of Cadiz. This is also an important area of juveniles. Nevertheless, the catches from this area have never been included in the assessments.

Conclusions

The most important areas of recruitment where the sardine fishery is active seem to be in Sub-divisions IXa Central-South, IXa Central-North and IXa North (Figure 1) in the third and fourth quarters of the year.

Protection of juveniles by an area closure would enhance survival to the spawning stock, and would therefore be beneficial.

In the present situation in which the stock is outside safe biological limits as a result of the combination of poor recruitment and increased fishing mortality, the stock will remain at a low level until better recruitment occurs. Management advice for the stock emphasises the need to keep fishing mortality at the lowest possible level and the requirement to protect the juveniles in order to take full advantage of good year classes when they appear. The imposition of closed areas to protect juvenile sardine is therefore necessary, but will not be a sufficiently strong management measure on its own to allow the stock to recover, if recruitment remains at the recent low level.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy. August 1996 (ICES CM 1997/Assess:3).

3.11.8 Anchovy

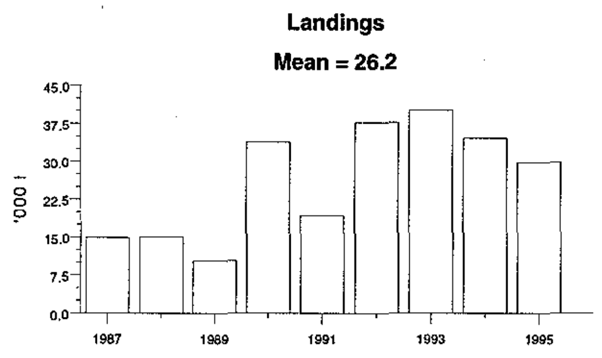
3.11.8.a Anchovy in Sub-area VIII (Bay of Biscay)

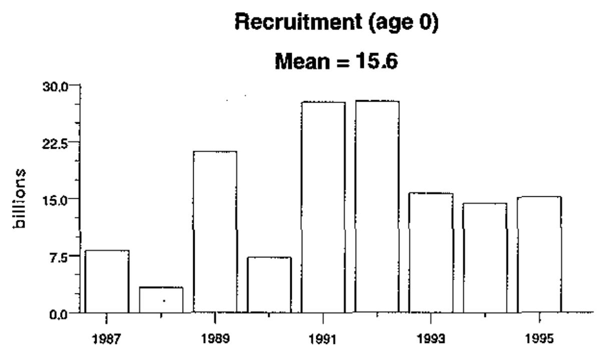
Catch data (Table 3.11.8.a.1 and Figure 3.11.8.a.1) :

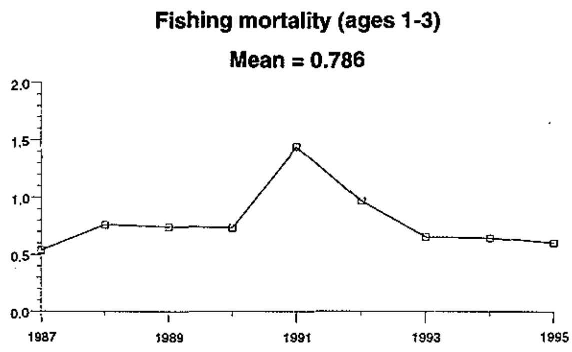
Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ACFM catch
1987	Not assessed	-	32	14	15
1988	Not assessed	-	32	14	15
1989	Increase SSB; TAC	10.0[1]	32	n/a	10
1990	Precautionary TAC	12.3	30	n/a	34
1991	Precautionary TAC	14.0	30	n/a	19
1992	No advice	-	30	n/a	38
1993	Reduced F on juveniles; closed area	-	30	n/a	40
1994	Reduced F on juveniles; closed area	-	30	n/a	35
1995	Reduced F on juveniles; closed area	-	33	n/a	30
1996	Reduced F on juveniles; closed area	-	33		

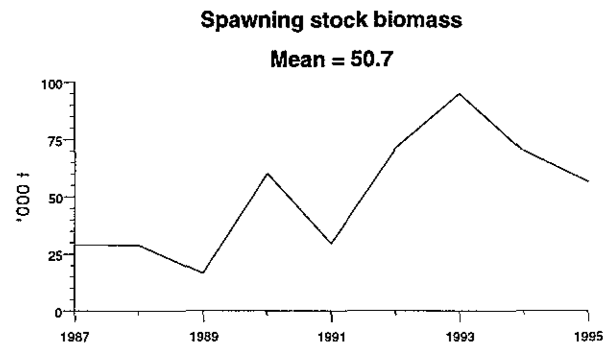
[1]Mean catch of 1985-1987. Weights in '000 t.

Historical development of the fishery: The fishery developed during the 1950s with the modernisation and increase in units of the Spanish purse seine fleet (Figure 3.11.8.a.1). The maximum catches and number of vessels were reached in the 1960s, but subsequently, due to a sharp decrease in catches, this fleet was considerably reduced. Since 1985, the French fleet of midwater trawlers involved in this fishery has increased continuously. During the last 6 years, the number of vessels in the French fleet has doubled and their catches have reached the same level as the Spanish ones. This has resulted in a sharp increase in fishing effort on anchovy in the Bay of Biscay since 1987, despite a slight decrease in the number of Spanish purse seiners. The level of effort is now probably the same as in the beginning of the 1970s.









State of stock: The state of the stock is uncertain in relation to safe biological limits. Surveys indicate an SSB of approximately 45,000 t. The stock is likely to fluctuate widely due to the large variations in recruitment and much of this variation is driven by environmental factors. The relatively low catches in the 1980s, and the change in the exploitation pattern, the catches consisting mainly of age-1 fish, suggest a relatively low spawning stock biomass in recent years compared to the 1960s or 1970s. Compared with the 1960s and 1970s the distribution area of the stock has decreased.

Details in Table 3.11.8.a.2.

Management advice: Reduced fishing mortality on juvenile anchovy will increase the spawning biomass without a major loss in total yield. This may be achieved by closing fishing areas with high abundance of 1-group anchovy. To this end, ICES reiterates its advice that fishing for anchovy could be prohibited between January and June inclusive within the area defined by the following boundaries:

- 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: Caution should be paid to the continuous increase of effort, because catches could be exceeding the productivity of the stock. Effective management of this fishery is required.

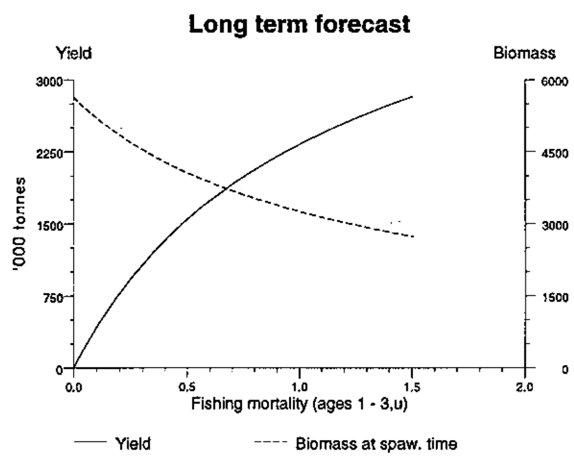
Advice on the level of catches for a given year is difficult a year in advance because the catches of this short-lived species largely depend on the recruitment each year. A recommendation on catch levels would be better implemented on the basis of an estimate of incoming recruitment, either from a recruitment survey or from some other sources (such as CPUE or environmental predictors). In the case of the Bay of Biscay, the earliest that this advice could be supplied is at the end of the previous year or at the beginning of the management year, after a recruitment acoustic survey has been performed or once a predictor index from the environment has been obtained. An egg survey could be carried out in May to confirm or revise the previous advice and to assess the actual state of the spawning stock. A revised assessment could be done after the acoustic surveys, or when the environmental index is obtained, to formulate scientific advice on the level of the catches for the year of management.

Data and assessment: Catch-at-age and catch-at-length data from French and Spanish fisheries. Stock biomass estimates from egg (1987–1995) and acoustic (1989-1992) surveys. The acoustic surveys have stopped and the egg surveys have not been adequately supported since 1995 to implement the full methodology of the daily egg-production method.

Quantitative evaluation of the stock will improve with the implementation of acoustic surveys or with the use of environmental predictor indices. The assessment is assumed to be indicative of stock trends only.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, August 1996 (CM 1997/Assess:3).

Yield and Spawning Stock Biomass



3.11.8.b Anchovy in Division IXa

Catch data (Table 3.11.8.b.1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM catch
1987	Not assessed	-	4.6	n/a
1988	Not assessed	-	6	4.7
1989	Not assessed	-	6	6.0
1990	Not assessed	-	9	6.7
1991	Not assessed	-	9	5.9
1992	Not assessed	-	12	3.2
1993	If required, precautionary TAC	-	12	2.0
1994	If required, precautionary TAC	-	12	3.4
1995	If required, precautionary TAC	-	12	13.0
1996	If required, precautionary TAC	-	12	

[1]TAC for Sub-areas IX and X and CECAF 34.1.1. Weights in '000 t.

Historical development of the fishery: Anchovy is only a target species for Spain in Sub-division IXa South (Gulf of Cadiz). In the Portuguese sardine fishery, anchovy is taken as a by-catch. The Spanish catch in Sub-division IXa South made up about 93% of the total catch during the period 1988-1994. From 1943-1987 data are available for Portugal only. In the period 1943-1968 high catches occurred, followed by a period with very low catches. High catches occurred again in the 1980s, but gradually decreased.

State of stock: Unkown, but the 1995 catch was the highest on record.

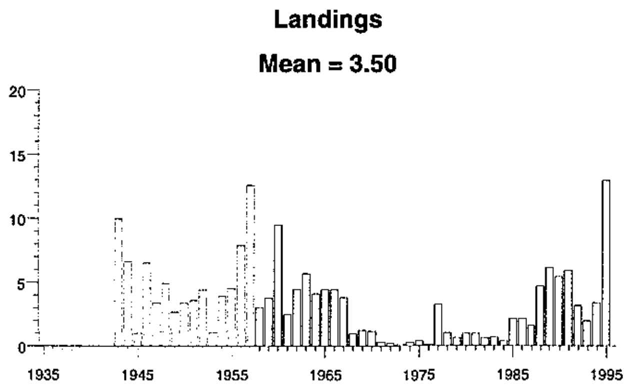
Management advice: If a TAC is required for 1997, it should be set at a level as observed prior to 1995.

Special comments: In 1995, a sudden increase in catches was observed mainly in Sub-division IXa North (Galician waters) and Sub-division IXa Central-North (Portuguese waters), due to the recruitment of a strong year class. In Sub-division IXa South, however, the catch decreased in 1995. Preliminary data from the first half of 1996 indicate that catches in Sub-division IXa Central-North and North decreased again to similar levels to those in the period 1991-1994.

Data and assessment: No assessment because of insufficient data.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, August 1996 (CM 1997/Assess:3).

(Details in Table 3.11.8.b.1; Only Portuguese landings up to 1987).



3.12 Widely distributed and migratory stocks

3.12.1 Overview

A number of stocks assessed by ICES are not confined to the individual areas considered in other sections of this report. They include species some of whose stock units are distributed over much wider areas such as hake and a number of deep-water species, and migratory species such as mackerel, horse mackerel and blue whiting.

The fisheries for many of these species are summarised in the area overviews, and in this section of the report the detailed assessments are given for those stocks which are distributed over more than one area, namely Northern hake, mackerel, Western horse mackerel, blue whiting, blue ling, ling and tusk.

Most of the stocks concerned are fished throughout their area of distribution.

3.12.2 Hake - Northern stock (Division IIIa, Sub-areas IV, VI and VII, and Divisions VIIIa,b)

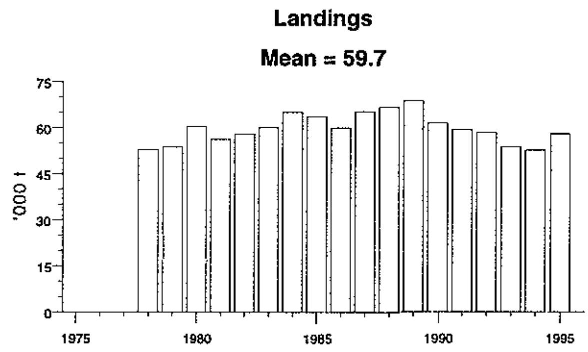
Catch data (Table 3.12.2.1):

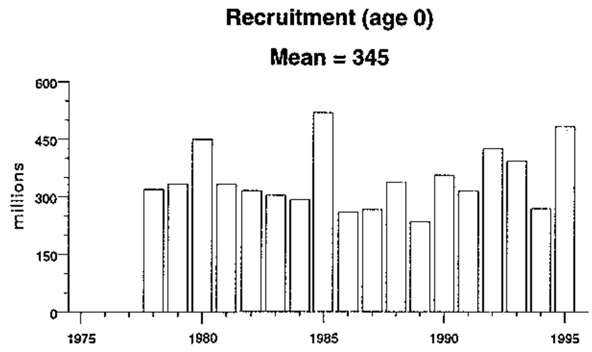
Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM lndgs.	Disc. slip.	ACFM catch
1987	Precautionary TAC; juvenile protection	-	63.46	63.3	2.0	65.3
1988	Precautionary TAC; juvenile protection	54	66.16	64.8	2.0	66.8
1989	Precautionary TAC; juvenile protection	54	59.67	66.5	2.3	68.8
1990	Precautionary TAC; juvenile protection	59	65.1	59.9	1.5	61.4
1991	Precautionary TAC; juvenile protection	59	67.0	57.6	1.7	59.3
1992	If required, precautionary TAC	61.5	69.0	56.6	1.7	58.3
1993	Enforce juvenile protection legislation	-	71.5	52.1	1.5	53.6
1994	F significantly reduced	<46	60.0	51.3	1.4	52.6
1995	30% reduction in F	31	55.1	56.2	1.7	57.9
1996	30% reduction in F	39	51.1			

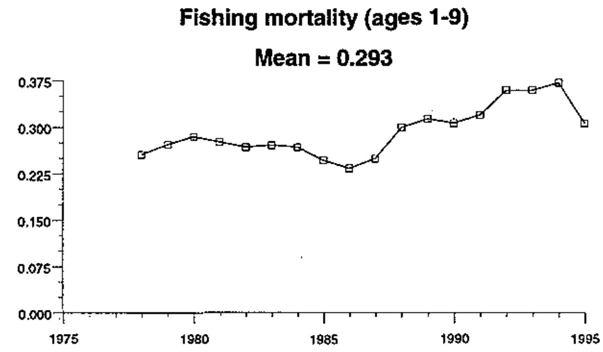
[1]Sum of area TACs corresponding to Northern stock plus Division IIa (EC zone only). Weights in '000 t.

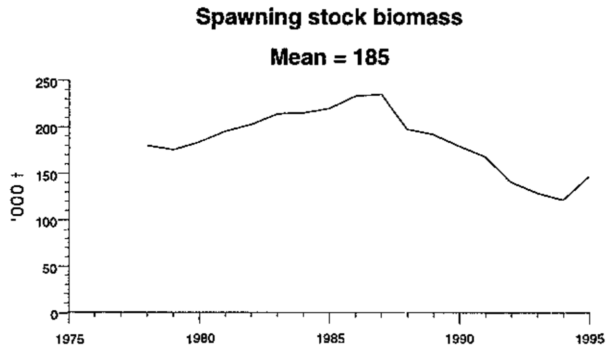
Historical development of the fishery: Since the pre-war period, hake has been the main species supporting the development of the steam, and then motor-trawl, fleets in ports of the Atlantic coasts of France and Spain. In these two countries, which make up about 85% of the landings, it still ranks among the first species in value landed, despite the decline in landings. Hake is present in the catches of nearly all fisheries identified in Sub-areas VII and VIII.

The fishery has been subject to TACs since 1986. Initially these were precautionary TACs. The fishery is also subject to technical measures regarding mesh sizes of trawls and minimum landing size, but compliance is known to be poor.









State of stock: The stock is considered to be close to safe biological limits. SSB decreased continuously between 1987 and 1994 to the lowest observed level. There have been at least two above-average year classes recently, but though there are some signs of recovery, the SSB remains below the long-term average.

Despite an apparent drop in 1995, F has risen continuously since 1986. SSB has declined over the same period to its lowest observed level in 1994. Although SSB in 1995 indicates some increase, at recent levels of F there is a high probability of continued stock decline in the medium term.

Further details in Table 3.12.2.2.

Forecast for 1997:

SSB(96) = 160.2, F(96) =0.24, Basis: F(96)=F(95), Catch(96) = 64.2, Landings (96) = 62.3.
Recruitment of the 1995 and subsequent year classes set equal to the geometric mean for the period 1982–1993.

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	$0.4F_{95}$	0.09	169.3	29.8	29.1	212.0
B	$0.6F_{95}$	0.14		43.2	42.1	198.2
C	$0.7F_{95}$	0.16		49.5	48.2	191.7
D	$0.8F_{95}$	0.19		55.6	54.2	185.4
E	$1.0F_{95}$	0.24		67.2	65.5	173.6
F	$1.2F_{95}$	0.28		78.0	76.0	162.6

Weights in '000 t.

If fishing continues at present levels, SSB is expected to increase in 1997 and in 1998.

Management advice: In order to allow the stock to increase and to reduce the probability of further stock decline in the medium term, **ICES recommends a reduction in F in 1997 by 20% compared with 1995.** Large numbers of juvenile hake are still being caught and measures to effectively reduce such catches should be taken.

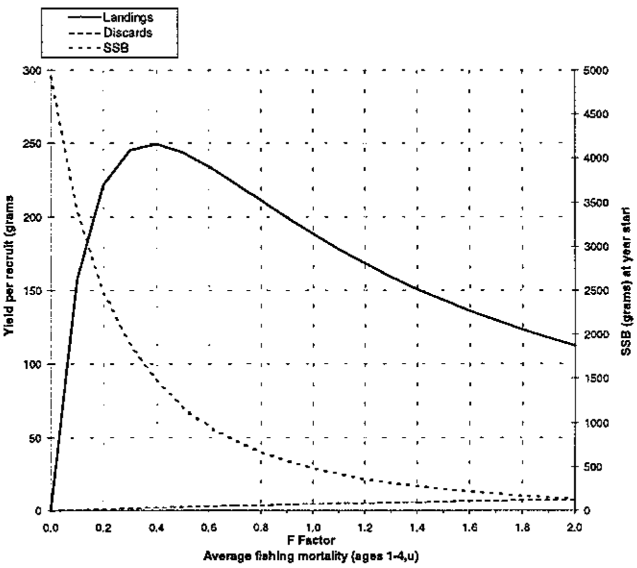
Special Comment: There is some doubt about the size of recent year classes, which leads to uncertainty in the catch and SSB forecast. The steady increase in SSB between 1978 and 1987 coincided with a period of relatively constant exploitation. In addition, two of the 10 recruiting year classes were well above the overall mean but most others exhibited a declining trend. A period of higher exploitation, commencing in the late 1980s, corresponded to a substantial decline in SSB through 1994 despite a coincident trend towards improved recruitment. This increase in exploitation, as measured by fishing mortality rates and yield/biomass ratio, is reflected to a greater extent by the age 1–9 mean F compared to the age 1–4 mean used in previous assessments.

The response in SSB to trends in recruitment is delayed by about 4-5 years due to the late age at maturation for this stock (e.g. 60% at age 4). The observed increase in SSB in 1995 and the projected increase in 1997 and 1998 result primarily from this delayed response in SSB to recruitment of the stronger 1992 year class.

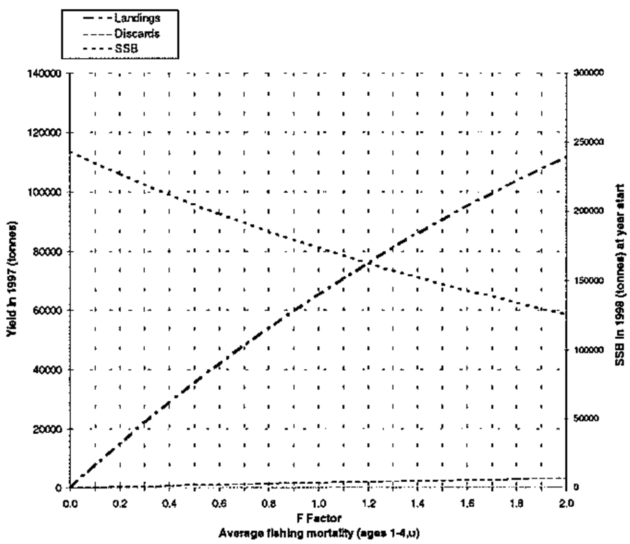
Data and assessment: Length composition data by fishery unit available annually for 1978–1989 and quarterly for 1990–1995. Prior to 1992, converted to age compositions by numerical methods. For 1992–1995, age readings were used. Data include discards estimates.

Source of information: Report of the Working Group on the Assessment of Southern Shelf Demersal Stocks, September 1996 (CM 1997/Assess:5).

Long-term yield and spawning stock biomass



Short-term yield and spawning stock biomass



3.12.3 Mackerel

3.12.3.a Mackerel (combined Southern, Western and North Sea spawning components)

Introduction

The mackerel caught in north-east Atlantic waters were, prior to 1995, treated as three stock units: North Sea, Southern and Western mackerel. This stock differentiation has mainly been based upon differences in spawning areas and time as observed in egg surveys in the North Sea, Western and Southern areas. However, overlapping egg distribution between Southern and Western spawning areas has been observed. Tagging experiments in the North Sea and in the Western areas have revealed differences in migration patterns between North Sea and Western mackerel. These experiments have demonstrated that there have been considerable changes in migration patterns since 1970. Due to these changes, large proportions of Western mackerel are caught in the North Sea (Sub-area IV) and in the Norwegian Sea (Division IIa) in the second half of the year. Since it is impossible to split the mackerel caught in these areas by stocks, all the catches have been allocated to the Western mackerel and the catches of the North Sea mackerel have thereby been included in the assessment of Western mackerel since 1988. Due to the small size of the North Sea component this has a negligible impact on the assessment of Western mackerel. As estimated from egg surveys the spawning biomass in the North Sea is about 3% of that spawning in Western areas.

In March-April 1994 a tagging experiment in the south-east corner of the Bay of Biscay demonstrated that mackerel migrated to the North Sea and Norwegian Sea and thus mixed with North Sea and Western mackerel. Since it is impossible to split catches into different stocks ACFM decided in 1995 to carry out a combined assessment of mackerel, including the North Sea, Southern and Western stock components.

Based on egg surveys in 1995 the Western and Southern spawning components are estimated at approximately 2.37 million t and 371,000 t respectively. Spawning stock biomass in the North Sea surveyed in June–July 1996 is estimated at about 84,000 t.

Management advice is given for the combined area, and specific recommendations are given for the separate components.

Catch data combined area (Tables 3.12.3.a.1–6)

Year	ICES advice	Catch corresp. to advice	Total Agreed TAC[4]	Official[3] landings	Disc.[1] slip.	ACFM catch[2]
1987	Given by stock component		442	589	11	655
1988	Given by stock component		610	621	36	676
1989	Given by stock component		532	507	7	586
1990	Given by stock component		562	574	16	626
1991	Given by stock component		612	599	31	668
1992	Given by stock component		707	723	25	760
1993	Given by stock component		767	778	18	825
1994	Given by stock component		837	792	5	823
1995	Given by stock component		645	660	8	756
1996	Significant reduction in F	-	452			

[1]Data on discards and slipping from only two fleets, [2]Landings and discards from IIa, IIIa, IV, Vb, VI, VII, VIII and IXa. [3]As reported to ICES by August 1996, [4]All areas except some catches in international waters in II. Weights in ' 000 t

Catch data western component (Table 3.12.3.a.5):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	Disc. slip.	ACFM catch[2]
1987	SSB = 1.5 mill. t; TAC	380	405	11	615
1988	$F = F_{0.1}$; TAC; closed area; landing size	430	573[1]	36	628
1989	Halt SSB decline; TAC	355	495[1]	7	567
1990	TAC; $F = F_{0.1}$	480	525[1]	16	606
1991	TAC; $F = F_{0.1}$	500	575[1]	31	646
1992	TAC for both 1992 and 1993	670	670[1]	25	742
1993	TAC for both 1992 and 1993	670	730[1]	18	805
1994	No long-term gains in increased F	831[3]	800[1]	5	798
1995	20% reduction in F	530	608[1]	8	729
1996	No separate advice	-	422[1]		

[1]TAC for mackerel taken in all areas VI, VII, VIIIabd,Vb,IIa,IIIa,IV (excluding VIIIc, IXa and some catches in international waters). [2]Landings and discards of Western component; includes catches of North Sea component. [3]Catch at *Status quo* F. Weights in '000 t.

Catch data North Sea component (Tables 3.12.3.2.a, 5, 6, 9):

Year	ICES advice	Catch corresp. to advice[1]	Agreed TAC[2]	ACFM catch[3]
1987	Lowest practical level	LPL	55	3
1988	Closed areas and seasons; min. landing size; by-catch regulations	LPL	55	6
1989	Closed areas and seasons; min. landing size; by-catch regulations	LPL	49.2	7
1990	Closed areas and seasons; min. landing size; by-catch regulations	LPL	45.2	10
1991	Closed areas and seasons; min. landing size; by-catch regulations	LPL	65.5	-[4]
1992	Closed areas and seasons; min. landing size; by-catch regulations	LPL	76.3	-[4]
1993	Maximum protection; closed areas and seasons; min landing size;	LPL	83.1	-[4]
1994	Maximum protection; closed areas and seasons; min landing size;	LPL	95.7	-[4]
1995	Maximum protection; closed areas and seasons; min landing size	LPL	76.3	-[4]
1996	Maximum protection; closed areas and seasons; min landing size	LPL	52.8	

[1]Sub-area IV and Division IIIa. [2]TAC for Sub-area IV, Divisions IIIa, IIIb,c,d (EU zone) and Division IIa (EU zone). [3]Estimated landings of North Sea component. [4]No information. Weights in '000 t.

Catch data for this component are uncertain, due to the fact that the North Sea component mixes partly with the Western component in the feeding areas in the northern North Sea. Since 1987 it has not been possible to split the catches taken in the North Sea and adjacent areas into the two components. A catch at the same level as in 1990 is assumed for 1991 to 1995.

Details are given in Table 3.12.3.9.

Catch data southern component (Tables 3.12.3.a.4–6):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM catch
1987	Reduce juvenile exploitation	-	36.57	22
1988	Reduce juvenile exploitation	-	36.57	25
1989	No advice	-	36.57	18
1990	Reduce juvenile exploitation	-	36.57	21
1991	Reduce juvenile exploitation	-	36.57	21
1992	No advice	-	36.57	18
1993	No advice	-	36.57	20
1994	No advice	-	36.57	25
1995	No advice	-	36.57	28
1996	No separate advice	-	30.00	

[1]Division VIIIc, Sub-Areas IX and X, and CECAF Division 34.1.1 (EU waters only). Weights in '000 t.

Historical development of the fishery:

Western component: The catches of this component developed from low levels in the 1960s to more than 800,000 t in 1993. The main catches are taken in directed fisheries by purse seiners and trawlers. Large catches of the Western component are taken in the northern North Sea and Norwegian Sea.

North Sea component: Large catches were taken in the 1960s in the purse seine fishery reaching a maximum of about 1 million t in 1967. Catches declined to less than 100,000 t in the late 1970s, and are assumed to have been about 10,000 t during the last 5 years.

Southern component: Mackerel is a target species for the hand-line fleet during the spawning season (about one third of total catches) in Sub-Division VIIIc east, and is a by-catch for other fleets. The highest catches (about 80%) are taken in the first half of the year, mainly in Division VIIIc, and consist of adult fish. In the second half of the year the catches consist of juveniles, which are mainly taken in Division IXa. Catches have been stable at about 22,000 t since 1977. In 1995 they reached a maximum since 1977.

State of the stock:

Combined assessment: The combined assessment is dominated by the Western component. The North Sea component is depleted and it is assumed that the dynamics of the Southern component follow that of the Western component. Stock diagrams are given below and details are given in Table 3.12.3.a.7.

Western component: This component declined from about 4 million t in the early 1970s to about half that size, and is now estimated to be at its lowest level in the time series which started in 1972. The spawning stock size was estimated in international egg surveys in 1995 to be 2.37 million t. Stock diagrams are given on the next page for illustrative purposes, to show the historical perspective from 1972–1995.

Details are given in Table 3.12.3.a.8.

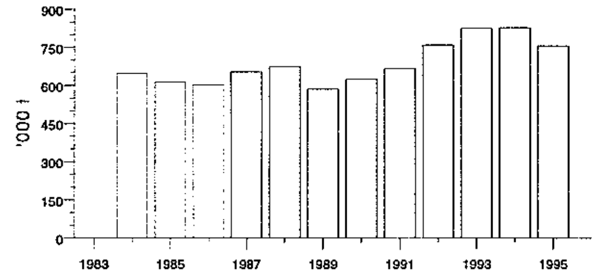
North Sea component: From tagging experiments a spawning biomass was estimated in the early 1960s, before the boom in the purse seine fishery, of over 3 million t. The last big year class observed was that of 1969 which was produced by a spawning biomass of 1.1 million t. The stock has since collapsed (see diagrams on next page). Spawning biomass was estimated to be less than 200,000 t in the early 1980s, and 84,000 t in 1996 (see Table 3.12.3.a.9), which is about 3% of the size of the Western component. There have been no signs of any good year classes in the International Bottom Trawl Surveys in the North Sea since 1972..

Southern component: Egg surveys in 1995 indicate a spawning biomass of 371,000 t. Based on egg surveys in 1992 and 1995 the Southern spawning component is about 16% of the combined stock in the North-East Atlantic. A diagram showing landings of this component is given on the following pages (see Table 3.12.3.a.4).

Combined Stock

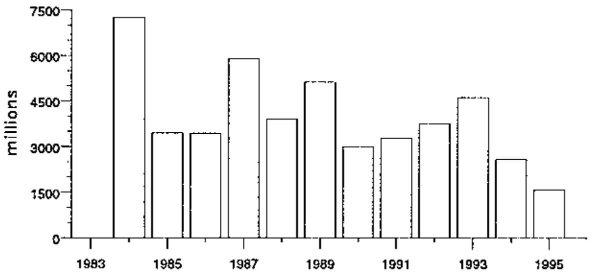
Landings

Mean = 687



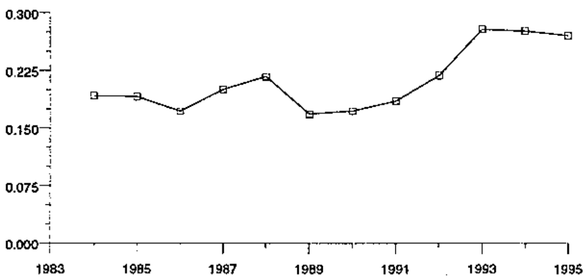
Recruitment (age 0)

Mean = 3994



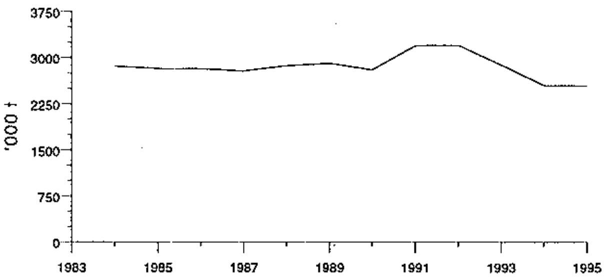
Fishing mortality (ages 4-8)

Mean = 0.212

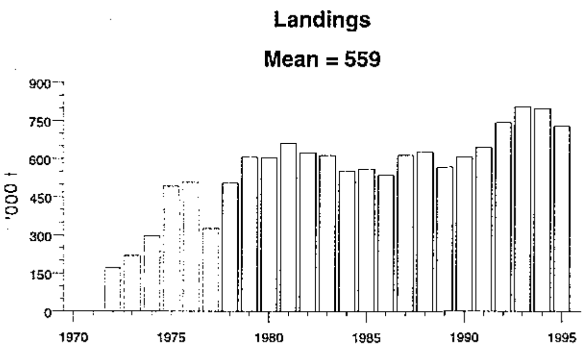


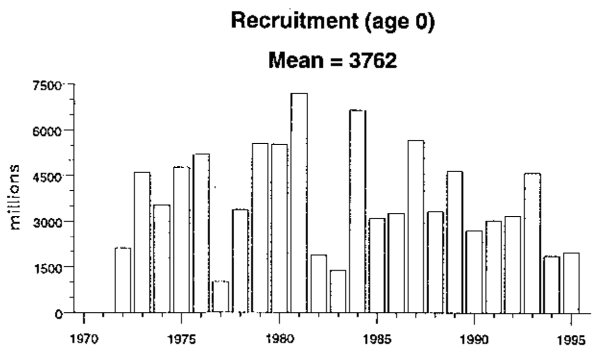
Spawning stock biomass

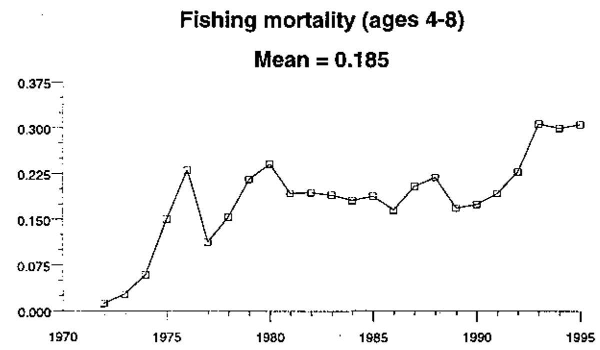
Mean = 2851

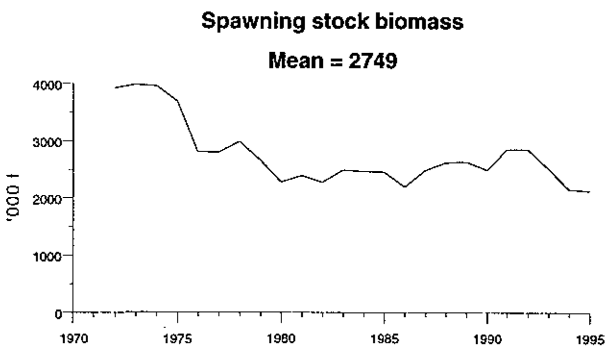


Western Component

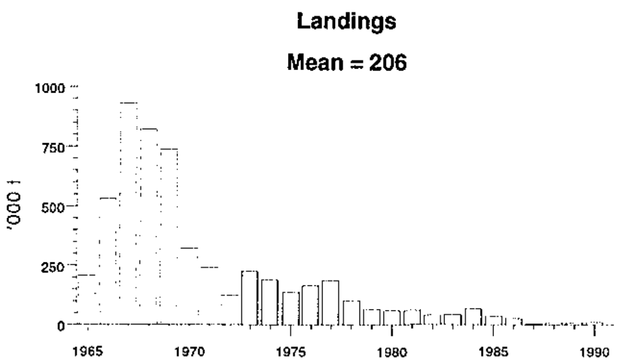


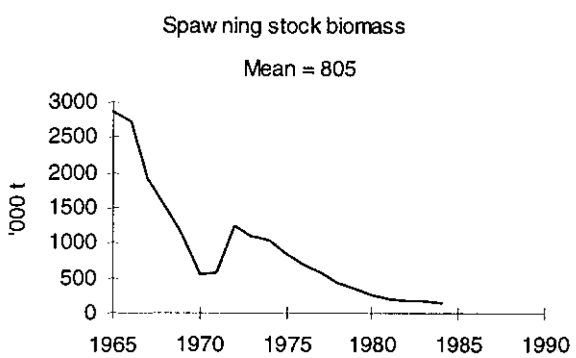




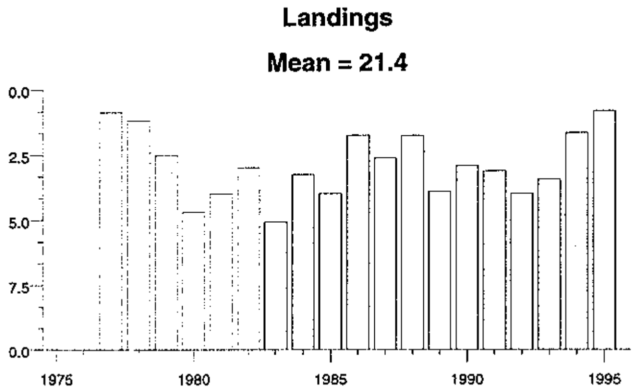


North Sea Component





Southern Component



Forecast for 1997: The forecast for 1997 is +based on mean recruitment and *status quo* F in 1996 giving a catch in 1996 of 712,000 t consisting of 646,000 t in the northern area, 27,000 t in the southern area and 39,000 t in international waters.

SSB(96) = 2337, F(96) = 0.270, Basis: F(96)=F(95), Catch(96) = 712 , Landings (96) =712 .

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	0.2 F_{95}	N 0.052	2384	142	2736
		S 0.002		5	
B	0.4 F_{95}	N 0.103	2339	277	2576
		S 0.004		11	
C	0.56 F_{95}	N 0.144	2303	381	2456
		S 0.006		15	
D	0.6 F_{95}	N 0.155	2294	407	2427
		S 0.007		16	
E	0.8 F_{95}	N 0.207	2251	530	2288
		S 0.009		20	
F	1.0 F_{95}	N 0.258	2208	646	2158
		S 0.011		25	

Weights in '000 t.

N: Northern area comprising the Western areas, North Sea, Skagerrak and Norwegian Sea (IIa, IIIa, IVa, Vb, VI, VII, VIIIa,b,d); catches in the international zone in IIa are included;

S: Southern area (VIIIc, IXa).

Medium-term considerations: A variety of medium-term projections were considered. *Status quo* fishing mortality results in a high probability of the SSB remaining below the historically lowest level (2.3 million t). An F of 0.15 (option C in the table above), as agreed between the EU and Norway for 1997, and maintaining F at this level in the medium term, should lead to stable SSBs well above the historical minimum.

Management advice:

Combined Western and Southern components: To restore and maintain the spawning stock biomass within the range observed in the short time series available **ICES recommends a significant reduction in fishing mortality.**

North Sea component: This spawning component still needs the maximum possible protection and **ICES therefore reiterates its previous recommendations, which were first formulated in 1987, 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 Sub-area IV should be maintained.

Special comments:

Western component: Forecasts made with the same options for the Western component and keeping the Southern component at its present level of F, resulted in only minor changes in SSB and catches of the Western component.

Since 1985 considerable catches of the western component have been taken in international waters in the Norwegian Sea and have not been counted against any TAC. The ICES advice applies to all areas where mackerel are caught.

North Sea component: The management advice is aimed at enhancing the probability of the recovery of this spawning component. Maximum protection could be given to the North Sea component by closing mackerel fisheries in the North Sea and Subareas II, III and VI but, since a considerable quantity of the Western component is present in these areas during the second half of the year, this would seriously affect the fishery for the Western component. The closure of Divisions IVb,c gives protection to juvenile mackerel which are abundant in the area during the third and fourth quarters.

Southern component: The low level of catches, the apparent small fishing areas compared to the known spawning areas and the high egg production detected in the area allocated to the southern stock during the egg surveys in 1988, 1990, 1992 and 1995, suggest that catches are only a small fraction of the total biomass which is present in the area at spawning time.

Data and assessment:

Combined assessment: Analytical assessment tuned with triennial egg surveys. The most recent survey of the Western and Southern component was carried out in 1995, that of the North Sea component in 1996. The new assessment is consistent with the longer-term traditional assessment of the Western component.

There is great concern about the precision of the catch figures due to underreporting of catches, discards and slipping. So far, however, it has been impossible to correct the catch data because of lack of information. ICES recommends that data on discards and slipping should be provided.

Southern component: Catch-at-age from the Spanish and Portuguese fleets are available. CPUE from commercial trawlers, hand-liners and indices from Spanish and Portuguese bottom trawl surveys are also available.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, August 1996 (CM 1997/Assess:3) and additional information supplied to ACFM.

3.12.3.b Response to requests for advice from the Government of the United Kingdom

1. The Mackerel Box

The United Kingdom has requested ICES to undertake appropriate analyses of the Mackerel Box and provide updated advice on:

- whether juvenile mackerel still need protection;
- whether any protection needed is best provided through the Mackerel Box in its present location;
- whether a Mackerel Box or Boxes are required in other locations;
- the effectiveness of the Mackerel Box in the light of the impacts of all pelagic fishing including or excluding handlining.

Background

An area off the south-west coast of the UK, commonly known as the SW Mackerel Box, has current restrictions on fishing for mackerel. The area is bounded by the following co-ordinates (Figure 3.12.3.b.1):

- a point on the south coast of England at 02°00'W.
- latitude 49° 30'N, longitude 02° 00'W.
- latitude 49° 30'N, longitude 07° 00'W.
- latitude 52° 00'N, longitude 07° 00'W.
- a point on the west coast of Wales at latitude 52° 00'N.

The restrictions were imposed in the early 1980s in order to reduce the fishing effort on juvenile mackerel which were abundant in the area. The only targeted mackerel fishing permitted in this area is for vessels fishing with gill nets or handlines. This fishery is regulated by a quota, which was 1,804 t in 1995. Mackerel may also be taken legally inside the box as a 10% or 15% by-catch in pelagic fisheries for other species.

Information on fishery and biological data

Historical information:

In the late 1970s and early 1980s there was an increasing trend in the dominance of 1- and 2-group mackerel in the catches from the area around Cornwall and the Cornish Box (Mackerel Box) was established to afford some measure of protection to the immature mackerel. The introduction of the restriction coincided with two very weak year classes (1982 and 1983) and this, together with natural changes in the stock distribution, resulted in a rather minor conservation effect on the immature mackerel in the 1980s. The "Mackerel Box" has nevertheless been retained to give some protection to juvenile mackerel.

Present situation:

The UK fishery, in 1994, reported a catch of 1,651 t of juvenile and adult mackerel from inside the box, taken mainly by handliners. In recent years sardine have become more abundant in the area. This has led to an increased effort by UK mid-water trawlers and purse seiners which generates a small by-catch of mackerel inside the box. A total of 18,161 t of mackerel (both juveniles and adults) was taken by the UK pelagic fleet from the rectangles immediately outside the box.

A Dutch human consumption fishery, targeted at horse mackerel, and a Danish industrial fishery for sardine and horse mackerel, regularly take place inside the box. In 1994 the by-catch of mackerel (juveniles and adults) from inside the box, in the Dutch and Danish fisheries, was an estimated 2,200 t and a further 1,000 t has been reported from rectangles immediately outside the box.

Additional information shows that catches have increased considerably in recent years in Division VIa (South) and Division VIIb, mainly during the fourth quarter. In 1995 over 16,000 t of mackerel were recorded from this fishery which takes place close to the Irish coast. The main catches are taken from Statistical Rectangles 39E1, 38E1, 38E0 and 37E0 which together constituted over 12,000 t. Smaller catches of juvenile mackerel are taken from other squares in these Divisions and also in the adjacent Divisions VIIj and VIIg. It is not possible to determine whether the increased catches from this area are a result of a change or an expansion of the area normally inhabited by these small fish or whether they are the result of increased effort. Certainly, in 1994 and 1995 a number of large Irish vessels, which normally fish in the North Sea during the fourth quarter, took part in this fishery. Local fishermen report that there has been a notable increase in mackerel shoals in the area in recent years.

The length compositions of the catches of mackerel from the handliner fleet fishing inside the box during the 1995/96 season indicate that in general the handliners exploit larger mackerel than the pair trawlers.

The catches are composed of young mackerel in the age groups 1–4 which comprise over 86% of the total catch in numbers from the area. In some years (1993 and 1995) 0-group mackerel were taken in the directed trawl fishery for mackerel or, in 1987, as a by-catch in the herring fishery, but there was no directed mackerel fishery in that year. The length distribution of the catches indicates that approximately 50% of the fish were under 33 cm.

Mackerel Box Monitoring

The last surveys to determine the proportion and abundance of juvenile mackerel inside the restricted area were carried out in January–February 1990 and in January 1991. The most recent survey of mackerel within the Mackerel Box was carried out on a commercial mid-water trawler during December 1995 and January 1996. In addition to these surveys, UK landings from the area have been regularly sampled.

The percentage of immature mackerel in the catches was about 70% by number and 60% by weight. Compared to 1990 and 1991, the catches in number have somewhat decreased, but commercial landings into the UK from ICES Division VIIe (where the Mackerel Box, and rectangles immediately outside it are situated) showed that the percentage of juvenile mackerel by number was still high at 44% in the last quarter of 1995 and 56% in the first quarter of 1996.

The distribution and abundance of juvenile mackerel

The distribution and abundance of juvenile mackerel, i.e. age groups 0–4, is highly variable from year to year. Survey results indicate that the 1994 year class is weak while the 1995 year class may be strong. The distribution of both the 1994 and 1995 year classes indicates that a large number of juveniles were observed outside the Mackerel Box (Figure 3.12.3.b.2), a change from the distribution which led to the introduction of the Mackerel Box. The geographical distribution of ages 0–4 mackerel appears to be quite variable from year to year.

There also seem to be intra-annual changes in mackerel distribution in the north-south direction. In the first quarter of 1996 the distribution of the 1995 year class was similar to the preceding quarter with particularly high abundance to the north-west of Ireland, but additional areas of abundant juvenile fish were found along the outer edge of the Continental Shelf as far as Viking Bank in the northern North Sea. This year class was less abundant than usual around the south of Ireland and the Cornish Peninsula (Figure 3.12.3.b.2).

Estimates of catches of juveniles by area

Juvenile fish are caught in Quarter 1 and 4 in Divisions IVa, in Divisions VIIa,e,f,g,h, and possibly also in Division VIa (South). A smaller quantity is caught in Division VIa in both quarters. The Division IVa fishery catches juvenile fish as a small proportion of the total catch, making it impractical to reduce mortality on juveniles by management measures in this area. The landings by year by division for the period 1991–1995 show that there is an increasing trend in the catches of juveniles in Divisions VIIa,e,f,g,h with the highest catches being taken in 1995. The data clearly indicate that management measures intended to protect juvenile mackerel in this Division should not be relaxed but may rather need to be strengthened. Catches of juveniles in Divisions VIa and IXa are also high and have been increasing in the fourth quarter in Division VIa. In both these areas, the proportion of juveniles in the catches has been high. Present information confirms that large catches of juveniles have consistently been taken in Divisions VII a, e–h, and that, had fishing been permitted within the SW Mackerel Box, an even greater number of juvenile fish would have been caught. There is therefore strong justification for retaining the present Mackerel Box.

Conclusions

In response to the questions from the Government of UK, ICES advises as follows:

1. There is a need for juvenile mackerel protection. The strong year class of 1995 will contribute to the spawning stock biomass mainly in 1998 and will contribute to the recovery of the spawning stock biomass from the present historically low levels.

2. Although juvenile mackerel have appeared to be distributed mostly outside the Mackerel Box in recent years, the present box should be retained because it nevertheless affords some protection to juvenile mackerel.

3. The high proportion of young fish in the catches in Divisions IVb,c indicates that closure of fisheries during the third and fourth quarters in this area would give extra protection to juvenile mackerel. In Divisions VIa and IXa the catches also consist of juveniles in the second half of the year and protection measures could be considered in these Divisions.

   As an alternative to spatially and/or temporally fixed boxes, immediate but short-term closures of areas where catches of juvenile mackerel exceed a certain percentage may be a better means of protecting juvenile mackerel.

4. Handlining normally exploits larger mackerel. However, fisheries targeting other species (mid-water trawlers and purse seiners) are limiting the effectiveness of the box. There is also heavy fishing pressure on the rectangles immediately outside the box, which will tend to reduce the effect of the closure.

3.12.4 Western horse mackerel (*Trachurus trachurus*) (Divisions IIa, IVa, Vb, VIa, VIIa-c,e-k, VIIIa,b,d,e)

Catch data (Table 3.12.4.1–5):

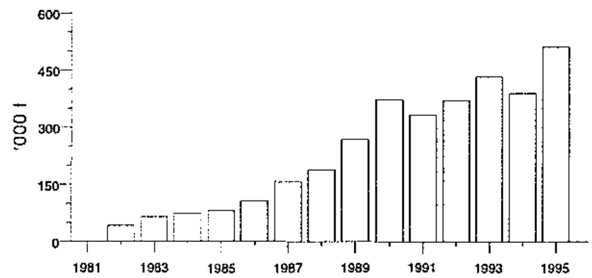
Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM landings.	Disc. slip.	ACFM catch[2]
1987	Not assessed	-	155	157	-	157
1988	No increase in catches	102	169	184	4	188
1989	If sustained catches required; TAC	100	153	267	1	269
1990	TAC	~200	203	363	10	373
1991	Within safe biological limits	-	230	328	5	334
1992	Within safe biological limits	-	250	369	2	371
1993	Within safe biological limits	-	250	424	9	433
1994	Prudent not to increase F	-	300	385	4	389
1995	Reduction in catch	-	300	509	2	511
1996	Reduction in catch	-	300			

[1]Division Vb (EU waters only), Sub-areas VI and VII, Divisions VIIIa,b,d,e. [2]See Table 3.12.4.5. Weights in '000 t.

Historical development of the fishery: The catches increased in the 1980s due to the extremely strong 1982 year class. Changes in migration pattern became evident at the end of the 1980s when the largest fish in the stock (mainly the 1982 year class) migrated into Divisions IIa and IVa during the 3rd and 4th quarters. Since 1987 considerable catches have been taken by the Norwegian purse seine fleet for reduction purposes, particularly in Division IVa, while most catches of other countries have been taken for human consumption purposes in Sub-areas VI, VII and Divisions VIIIa,b,d,e. The 1982 year class has dominated the catches for many years and still constituted in 1995 a significant part (50% by weight and 35% in numbers) of the catches.

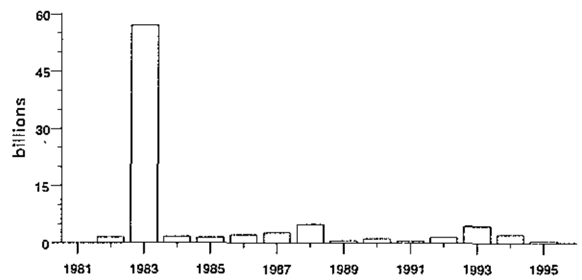
Landings

Mean = 242



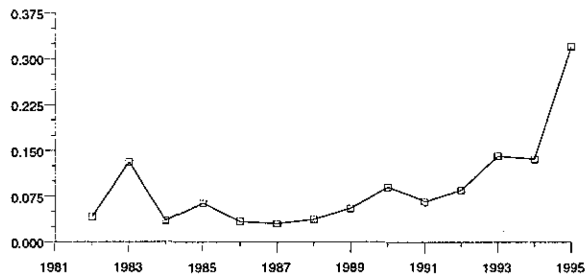
Recruitment (age 1)

Mean = 5.87



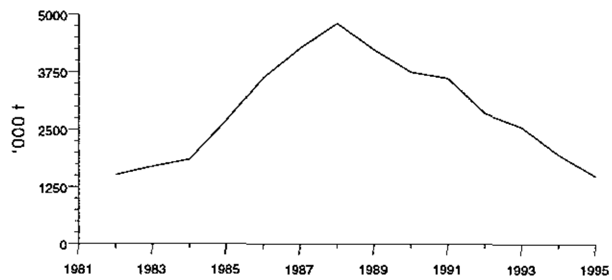
Fishing mortality (ages 5-14)

Mean = 0.090



Spawning stock biomass

Mean = 2914



State of stock: The biomass is close to the low value that can be expected in the absence of strong year classes, and which should be preserved to maintain that biomass which produced the large 1982 year class. Fishing mortality is very high and well above the value before the 1982 year class recruited to the fishery. With the present fishing mortality the SSB will continue to decline.

Details are given in Table 3.12.4.6

Medium-term considerations: A medium-term forecast was carried out assuming weak recruitment as has been observed in recent years. The forecasts of several options of annual catches (200,000 to 500,000 t) and one option of F = M = 0.15 all show decreases in SSB.

Management advice: Despite the uncertainty about the present size of the stock, **ICES recommends a substantial reduction of the fishing mortality, at least to 0.15, to maintain the spawning stock biomass above that which produced the 1982 year class. This corresponds to a catch in 1997 of 173,000 t, assuming *status quo* fishing mortality in 1996.**

Special comments: The recent history of this stock reflects the development of a single large year class within the period of 14 years for which data are available. The frequency of the occurrence of such large year classes cannot be evaluated on the basis of the short time series.

The stock may thus be considered as normally exhibiting a low SSB, which may occasionally produce a large year class. The management strategy could thus be to shift between a preservation strategy when the SSB is low, and a harvesting strategy in the years following recruitment of a large year class. The low SSB which is expected in the absence of a large year class, and at which a harvesting strategy should be changed to a preservation strategy, cannot be determined from the short time series. A level of around 1.5 million t, as was observed before the strong 1982 year class recruited to the spawning stock, may be used as a reference.

The stock is now considered to be close to this biomass, and the management should therefore be changed from harvesting to preservation. This implies a low fishing mortality. The fishing mortality within this strategy should be less than the natural mortality.

Inconsistencies are observed between the estimates of spawning stock biomass from the triennial egg surveys and from the VPA, but the assessment can be used to monitor stock trends.

Uncertainty exists about the actual catches. The fishing mortality in 1995 may be an overestimate if catches are overestimated.

The EU sets a TAC applicable to EU vessels. This TAC only applies to parts of the total fishery. **ICES recommends that a TAC should apply to all areas where Western horse mackerel are fished, i.e. Divisions IIa, IIIa (western part), IVa, Vb, VIa, VIIa-c,e-k, VIIIa,b,d,e.**

There is a large discrepancy between the advised TACs, the agreed TACs and the actual landings. The ICES advice is usually not followed, and TACs which are set are not implemented.

Data and assessment: The assessment is based on triennial egg surveys. As in previous years some countries with major catches did not sample the catch, which severely hampers the assessment. **ICES recommends that sampling needs to be improved.** The maturity ogive is not well estimated.

Source of information: Report of the Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy, August 1996 (CM 1997/Assess:3).

3.12.5 Blue whiting combined stock (Sub-areas I-IX, XII and XIV)

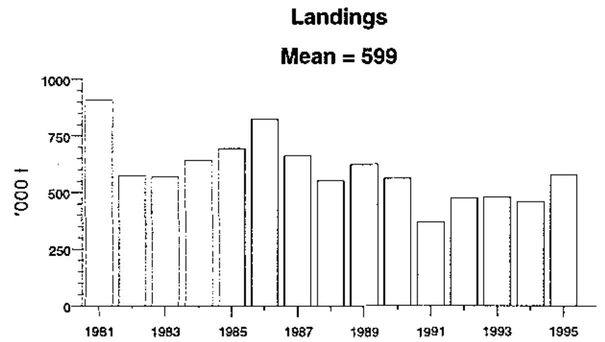
Catch data (Tables 3.12.5.1-5)

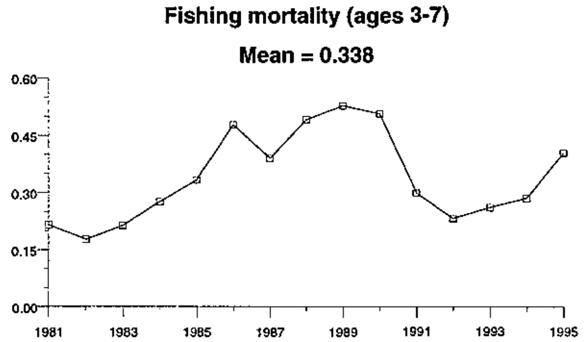
Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	TAC for northern areas; no advice for southern areas	950	-	664
1988	TAC for northern areas; no advice for southern areas	832	-	553
1989	TAC for northern areas; no advice for southern areas	630	-	625
1990	TAC for northern areas; no advice for southern areas	600	-	562
1991	TAC for northern areas; no advice for southern areas	670	-	370
1992	No advice	-	-	474
1993	Catch at *status quo* F (northern areas); no assessment for southern areas	490	-	481
1994	Precautionary TAC (northern areas); no assessment for southern areas	485	650[1]	459
1995	Precautionary TAC for combined stock	518	650[1]	579
1996	Precautionary TAC for combined stock	500	650[1]	

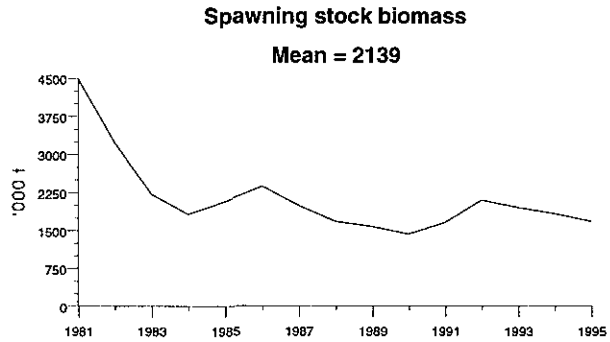
[1]NEAFC proposal for NEAFC regions 1 and 2. Weights in '000 t.

Historical development of the fishery: The fishery for blue whiting was fully established in 1977. Most of the catches are taken in the directed pelagic trawl fishery in the spawning and post-spawning areas (Divisions Vb, VIa,b and VIIb,c) but they are also caught in an industrial mixed fishery in Sub-area IV and Division IIIa and in the pelagic trawl fishery in the Norwegian Sea (Sub-areas I and II, Divisions Va, XIVa, b). These fisheries in the northern area have taken 340,000 - 790,000 t per year in the last ten years while catches in the southern fishery (Sub-areas VIII, IX, Divisions VIId,e and g-k) have been stable in the range 28,000–33,000 t.

State of stock: The stock size is not precisely known. The contribution of the strong 1989 year class to the spawning stock is decreasing but surveys indicate that the 1994 and 1995 year classes are strong. This was also obvious from the considerable Norwegian landings of 0-group in the mixed industrial fishery in the North Sea during autumn 1995. Details in Table 3.12.5.6.







Forecast for 1997:
SSB(96) = 1,703, F(96) = 0.40, Basis: *status quo*, Catch (96) = 535

Option	Basis	F (97)	SSB (97)	Catch (97)	SSB (98)
A	1.0 F(95)	0.40	1,936	540	2,289

Weights in '000 t.

The forecast does not include expected increases in industrial by-catches in the North Sea in 1996 and 1997 due to the large 1994 and 1995 year classes.

Medium-term considerations : A medium-term prognosis indicates increasing biomass and stock size at *status quo* fishing mortality. This is due to the contribution from the larger recruiting year classes (1994 and 1995).

Management advice: If a TAC is to be set for this stock, a precautionary TAC based on a *status quo* forecast corresponding to 540,000 t in 1997 seems appropriate. This forecast does not include expected increases in industrial by-catches in industrial fisheries in the North Sea due to recent recruitment of large year classes.

Special comments: The blue whiting is widely distributed in the eastern North Atlantic, extending from the Barents Sea to the Straits of Gibraltar (see Figures 3.12.5.1–2 in the 1995 ACFM report). It is treated as one stock as it has not been possible to demonstrate significant differences between fish from various parts of the distribution area, or to define an unambiguous borderline between populations. The actual level of the spawning stock is uncertain due to inconsistent indications in the data available. Survey estimates (which are abundance indices) of the spawning stock indicate a level of 4.5-6 million t, whereas catch analysis indicates a stock size in 1996 between 1.4 and 2.3 million t (95% confidence limits).

Data and assessment: Analytical assessment, based on catch data and acoustic and bottom trawl surveys and commercial CPUE data. The various data sources are not consistent, but the assessment is considered to indicate historical stock trends. It can be noted that a survey and commercial CPUE data from the southern part of the distribution which covers only a small part of the total stock seem to be equally, and for some ages, more consistent with total catch at age data than the acoustic surveys covering the main spawning population west of the British Isles.

Source of information: Report of the Northern Pelagic and Blue Whiting Fisheries Working Group, April 1996 (CM 1996 /Assess:14).

3.12.6 Deep-water Fisheries Resources south of 63° N

1. Background:

During the past two or three decades a certain amount of research and exploratory work has been undertaken on deep-water resources. Dwindling resources on the continental shelves of the North Atlantic have encouraged the development of fisheries in deeper waters. There has been a tendency for fisheries for species such as anglerfish and Greenland halibut to extend into deeper waters and new fisheries have developed to target new deep-water species found there. In recent years deep-water species such as the argentine or greater silver smelt (*Argentina silus*), roundnose grenadier (*Coryphaenoides rupestris*) and orange roughy (*Hoplostethus atlanticus*) which were previously by-catch species are now being targeted within the ICES area.

In some parts of the north-east Atlantic where the continental shelf is virtually non-existent, such as off Portugal (including Madeira and the Azores), there are traditional fisheries which have been exploiting deep-water species for many years.

Experience in other parts of the world has shown that deep-water fisheries can develop rapidly and that the resources which they exploit may be especially vulnerable to overfishing. There is concern that species such as these will be depleted before advice on appropriate management measures can be provided.

2. The species

The term deep-water was defined to include waters of depths greater than 400 m. The following were identified as some of the most important deep-water species.

DEEP-WATER SPECIES LIST

Alepocephalus bairdii	Baird's smoothhead
Aphanopus carbo	Black scabbardfish
Argentina silus	Argentine, greater silver smelt
Beryx decadactylus	Red bream, alfonsino
Beryx splendens	Golden eye perch
Chimaera monstrosa	Rabbitfish
Coryphaenoides rupestris	Roundnose grenadier
Epigonus telescopus	Big eye, Deep-water cardinal fish
Helicolenus dactylopterus	Bluemouth
Hoplostethus atlanticus	Orange roughy
Hoplostethus mediterraneus	Silver roughy
Lepidopus caudatus	Silver scabbardfish
Macrourus berglax	Roughhead grenadier
Mora moro	Mora
Pagellus bogaraveo	Red (=blackspot) seabream
Phycis blennoides	Greater forkbeard
Polyprion americanus	Wreckfish
Trachyrhynchus trachyrhynchus	Roughnose grenadier
Sharks, various	
Chaecon (Geryon) affinis	Deep-water red crab
Aristeomorpha foliacea	Giant red shrimp

The main shark species caught in deep-water fisheries are:

Centrophorus granulosus	Gulper shark
Centrophorus squamosus	Leafscale gulper shark
Centroscyllium fabricii	Black dogfish
Centroscymnus coelolepis	Portuguese dogfish
Centroscymnus crepidater	Longnose velvet dogfish
Dalatias licha	Kitefin shark
Deania calcea	Birdbeak dogfish
Etmopterus princeps	Great lantern shark
Etmopterus spinax	Velvetbelly
Scymnodon ringens	Knifetooth dogfish

There are a number of other species which might be considered as deep-water species for which advice is already provided.

Micromesistius poutassou	Blue whiting
Reinhardtius hippoglossoides	Greenland halibut
Sebastes spp.	Redfish
Molva molva	Ling
Molva dypterygia	Blue ling
Brosme brosme	Tusk

In addition, there are other species which have been fished on the continental shelf but whose distribution extends into deeper waters. This group includes hake (*Merluccius merluccius*), anglerfish (*Lophius* spp.) and megrim (*Lepidorhombus* spp.) and recent years have seen an extension of fishing into deeper waters for these species in ICES Sub-areas VI, VII, VIII, and IX. Advice is provided on these species elsewhere in the ACFM report.

3. Update of information on National Deep-Water Fisheries

New information on the following fisheries was made available to ICES.

France: the trawl fishery in ICES Sub-areas V, VI and VII for blue ling, roundnose greanadier, orange roughy, black scabbardfish and the deep-water sharks

Norway: more details on the Norwegian deep-water long line fisheries for ling and tusk and on the trawl fisheries for greater silver smelt and roundnose grenadier

Russia: exploratory surveys and subsequent exploitation of alfonsino and other species on the Mid-Atlantic Ridge

Spain: details of

- by-catches in Sub-areas VI-VII, Divisions VIIIa,b,c,d;
- directed fisheries in Sub-areas VI-VII and Divisions VIIIa,b,d;
- traditional artisanal fisheries in Divisions VIII b,c;
- deep-water shark fisheries in Sub-areas VI-VII, and Divisions VIIIa,b,c,d;
- the fishery on deep-water red crab in Division VIIIc.

4. Descriptions of Deep-Water Fisheries by Sub-area

In **ICES Sub-area II** there is a directed bottom and pelagic trawl fishery for greater silver smelt. This species is also caught as a by-catch in the *Pandalus* fishery and in industrial trawl fisheries. There is also a directed fjord fishery for roundnose grenadier. There are directed longline fisheries for ling and tusk. Roughhead grenadier are taken in the gillnet fishery for Greenland halibut.

In **ICES Sub-area III** there is a targeted trawl fishery for greater silver smelt and this species is also a by-catch in the *Pandalus* fishery. Roundnose grenadier is caught as a by-catch in both these fisheries.

In **ICES Sub-area IV** there is a by-catch of both species of argentines (greater silver smelt and the lesser silver smelt *Argentina sphyraena*) in the industrial trawl fishery. There is a longline fishery for tusk and ling with roughhead grenadier as a by-catch.

In **ICES Sub-area V** there are trawl fisheries which target blue ling, redfish and occasionally orange roughy. By-catch species are typically roundnose grenadier, roughhead grenadier, black scabbardfish, anglerfish (*Lophius piscatorius*), bluemouth, Mora, greater forkbeard, greater silver smelt, deep-water cardinal fish and rabbitfish. The traditional longline fisheries are for ling, tusk and blue ling. Roughhead grenadier is a by-catch in the Greenland halibut fisheries. There have been trap fisheries for the deep-water red crab.

In **ICES Sub-areas VI and VII** there are directed trawl fisheries for blue ling, roundnose grenadier, orange roughy, black scabbardfish and the deepwater sharks Portuguese dogfish and Leafscale gulper shark. By- catch species include bluemouth, Mora, greater forkbeard, greater silver smelt, deep-water cardinal fish and rabbitfish. In some years there are considerable by-catches of greater silver smelt in the blue whiting fishery and the former have been targeted in some years. There are directed longline fisheries for ling and tusk and also for hake. Deep-water sharks are a by-catch in the longline fisheries. There are targeted fisheries for sharks in Sub-area VII.

In **ICES Sub-area VIII** there is a longline fishery which mainly targets deep-water sharks but is occasionally directed at mora and greater forkbeard. There are also some trawl fisheries targeting species such as hake, megrim, anglerfish and *Nephrops* which have a by-catch of deep-water species. These include ling, blue ling, *Phycis phycis*, greater forkbeard, red (=blackspot) seabream, conger eel (*Conger conger*), bluemouth, wreckfish and *Beryx* spp.

In **ICES Sub-area IX** most deep-water species are a by-catch in the trawl fisheries for crustaceans. Typical species are bluemouth, greater forkbeard, conger eel, blackmouth dogfish (*Galeus melastomus*), kitefin shark and leafscale gulper shark. There is a directed longline fishery for black scabbardfish with a by-catch of the leafscale gulper shark.

In **ICES Sub-area X** the main fisheries are by handline and longline and the main species landed are red (=blackspot) seabream, wreckfish, conger eel, blue-mouth, golden eye perch and alfonsino. There is also a directed fishery for kitefin shark by hand line and gillnet.

In **ICES Sub-area XII** there are new trawl fisheries on the Mid-Atlantic Ridge for golden eye perch, orange roughy, deep-water cardinal fish, black scabbardfish and wreckfish.

In **ICES Sub-area XIV** roughhead grenadier is a by-catch (which is not usually landed) in the Greenland halibut and redfish fisheries.

5. Landings data

The data provided on landings by ICES Sub-areas and Divisions are given in (Table 3.12.6.1). The data were compiled from the database of statistics officially reported to ICES, national data supplied by study group members and some published data. The data for 1995 are provisional. It should be noted that some corrections have been made to the French data reported previously. There have also been corrections to the landings of the greater forkbeard in Sub-area X. Landings by country are given in Tables 3.12.6.3-16.

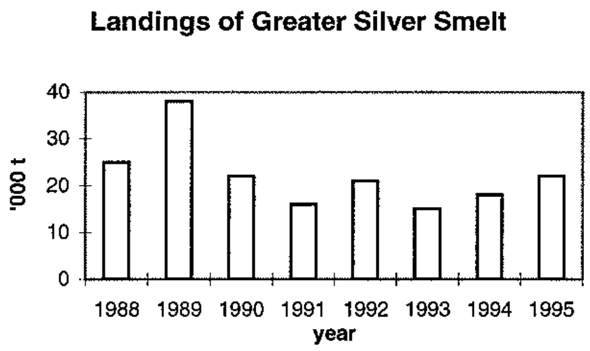
6. Biological Information

New biological information provided for deepwater species is listed in Table 3.12.6.2.

7. Description of the fisheries by species and state of stocks

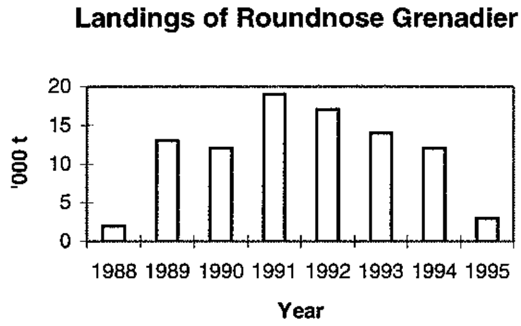
Greater silver smelt

Directed fisheries on greater silver smelt are pelagic trawling in Sub-areas II and VI as well as bottom trawling in Sub-areas II and III. This species is taken as by-catch in the industrial fisheries in Sub-areas II and III, in the trawl fishery on blue ling and redfish in Sub-area V, in the directed trawl fisheries on blue ling, roundnose grenadier, black scabbardfish and deepwater sharks in Sub-areas VI and VII. In these sub-areas considerable by-catches of argentines may occur in some years in the blue whiting fishery.



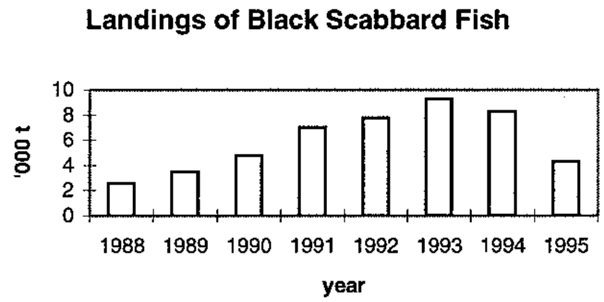
Roundnose grenadier

There is a directed fjord fishery on roundnose grenadier in Sub-area II and a directed trawl fishery in Sub-areas VI and VII. In the period 1974 to 1984 there was also a directed fishery in Sub-area XII. Roundnose grenadier is caught as by-catch in the argentine and *Pandalus* fishery in Sub-area III and in the blue ling and redfish trawl fishery in Sub-area V.



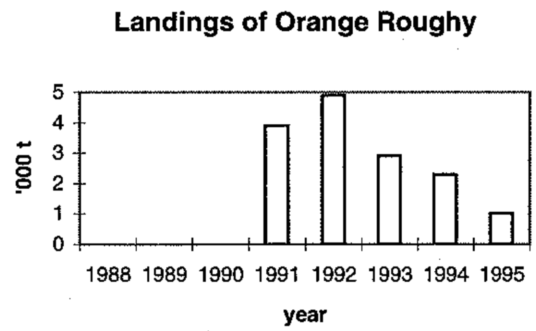
Black scabbardfish

There are directed trawl fisheries in Sub-areas VI and VII and directed longline fisheries in Sub-areas VIII and IX. In Sub-area XII a new directed trawl fishery developed recently. Black scabbardfish is caught as by-catch in the trawl fisheries on blue ling and redfish in Sub-area V.



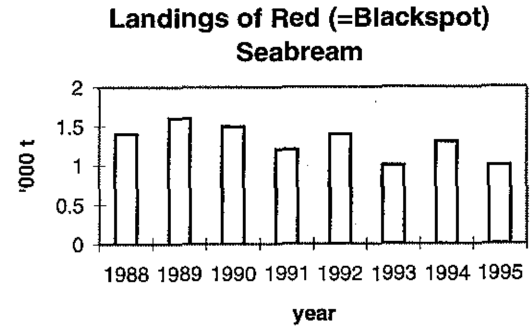
Orange roughy

There are directed trawl fisheries on orange roughy in Sub-areas VI and VII, and occasionally in Sub-area V and a new fishery on the Mid-Atlantic ridge in Sub-area XII.



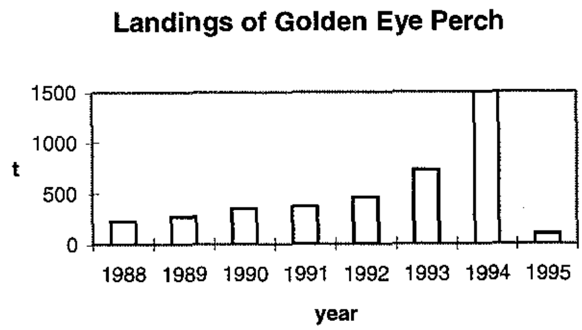
Red (=blackspot) seabream

There is a directed handline and longline fishery in Sub-area X. Red seabream appears as by-catch in the trawl fishery on hake, megrim, angler and *Nephrops* in Sub-area VIII. By far the highest landings are from Sub-area X.



Golden eye perch

Golden eye perch is caught by handlines and longlines in Sub-area X. Recently a directed trawl fishery developed in Sub-area XII. Golden eye perch appears as by-catch in the trawl fishery on hake, megrim, anglerfish and *Nephrops* in Sub-area VIII.



In general there is as yet nothing known on stock identity of the deep-water species in the north-eastern Atlantic. In most cases the available data are not sufficient to describe the state of the stocks and level of exploitation. For two species (black scabbardfish and red seabream in Sub-area X), however, assessments were attempted but not yet considered as reliable. Landings of red seabream in Sub-areas VI, VII and VIII have declined dramatically in recent years and this part of the resource appears to be overexploited.

8. Assessment

Very few time series exist of data based on the regular sampling of commercial landings. Basic statistics on catches and effort are of poor quality and in some cases lacking. There is often little information on the general biology of these species, in particular on age and growth, seasonal behaviour, migration, and stock discrimination. The possibilities for traditional age-structured assessments are therefore very limited, although VPAs have been attempted for red seabream in the Azores area and black scabbardfish in Sub-area IX. In other cases available biological and fisheries information have been used to the extent possible as the basis for advice.

Advice on management would be strengthened by development and application of models using biological data, and by improved fisheries and biological data. Developments in acoustic survey techniques may lead to biomass estimates for some species. In the shorter term the use of trawl surveys may be the best method for monitoring some of these stocks.

9. Management considerations

Experience from other parts of the world shows that there is no doubt that deep-sea stocks can be depleted very quickly and that recovery will be slow. Unexploited populations have a high proportion of fish of great age, their fecundities are low, and growth rates can be very slow. Some species, such as orange roughy, golden eye perch and alfonsinos aggregate in shoals, often associated with seamounts, and can be subjected to high catch rates once the shoals are located. A danger for these species is that high catch rates can be maintained by moving from one concentration to another and progressively depleting the stock. Regeneration and growth are so slow that stock numbers may not increase in the depleted areas in the short or medium term. Furthermore, many deep-sea fisheries are on mixtures of species, making it difficult, and often inappropriate, to manage the component species individually.

Very little information is currently available on the state of deep-water species. Fisheries for deep-water species are developing in areas inside and outside national jurisdictions. As a result exploitation must be increasing on a number of species, as fishing extends into deeper waters or new areas, but the actual exploitation rates are unknown. Moreover, in some recently developed fisheries, information is being withheld for commercial reasons. The quantities that are recorded are probably not well estimated, and some landings are reported in grouped categories because of difficulties in separating species. In many cases significant proportions of the catch are discarded at sea and not recorded. All these factors mean it is not possible, at present, to determine whether exploitation is exceeding optimal levels.

The survival rates of discards and of fish encountering gears and escaping are unknown, but most species are expected to be very vulnerable to injury.

The impact of fishing gears on the sea bottom in deep-water is unknown.

Management advice: It is not possible to advise on whether the stocks can sustain current levels of exploitation or not, but because of the vulnerable nature of the stocks **ICES recommends that the precautionary principle should be adopted.**

To enable sustainable fisheries to be established on these species **ICES recommends that fishing effort should be kept at a low level until sufficient information is gathered from existing fisheries to enable scientifically-based management decisions.**

To monitor the exploitation of the stocks **ICES recommends that a comprehensive data collection system should be urgently initiated and that research on the stocks should be increased to provide the data necessary for assessment.**

ICES therefore recommends that provision should be made for reporting landings to ICES at the species level for all species, including sharks, and that provision should be retained, or made, for reporting at genus and higher grouped levels to allow for reports of landings which have not been sorted to the species level. In this context a hierarchical system of reporting should be put in place.

Special Comments: Assessment and the provision of management advice on these stocks will be difficult. It will be necessary to devote substantial time and expertise to the study of these stocks if the necessary information is to be provided.

If some species which are landed and reported at the genus or group level become sufficiently important it is likely that biological sampling of the landings will be initiated. At the sampling stage it should be possible to identify fish to species level, thus providing a means of apportioning landings of mixed species into the quantities of each species separately. This approach is already adopted, for example, for redfish, anglerfish and megrim.

Source of information: Report of the Study Group on the Biology and Assessment of Deep-Sea Fisheries Resources, February 1996 (CM 1996/Assess 8).

3.12.6 a Deep-water fisheries in waters inside and beyond coastal state jurisdiction (answer to request from NEAFC)

Landings data for ICES Sub-areas and Divisions by species and country are given in Tables 3.12.6.3–16 and 3.12.7.a-c.1. The species included are:

Black scabbardfish	(*Aphanopus carbo*)
Greater silver smelt	(*Argentina silus*)
Alfonsinos	(*Beryx* spp.)
Roundnose grenadier	(*Coryphaenoides rupestris*)
Orange roughy	(*Hoplostethus atlanticus*)
Silver scabbardfish	(*Lepidopus caudatus*)
Roughhead grenadier	(*Macrourus berglax*)
Moridae, Mora	(mainly *Mora moro*)
Red (=blackspot) seabream	(*Pagellus bogaraveo*)
Greater forkbeard	(*Phycis blennoides*)
Wreckfish	(*Polyprion americanus*)
Deep-water sharks	
Rabbitfish	(*Chimaera monstrosa*)
Ling	(*Molva molva*) (See Section 3.12.7b)
Tusk	(*Brosme brosme*) (See Section 3.12.7c)
Blue ling	(*Molva dypterygia*) (See Section 3.12.7a)

No data were available for deep-water crabs. Relevant tables for anglerfish are given in Sections 3.7.7, 3.9.14 and 3.11.4.

There are no data to indicate the proportion of the fishery and catch taken from inside and beyond coastal state jurisdiction. Information was insufficient to apportion landings to gear type. However, a little information is available for some individual countries.

The updated descriptions of deep-water fisheries by ICES Sub-areas and by species are given in Section 3.12.6 items (4) and (7) of this report respectively and the status of stocks is described also in item (7).

3.12.7 Blue Ling, Ling and Tusk in Sub-areas V, VI and XIV

3.12.7 a Blue Ling

Catch data (Table 3.12.7a.1):

Year	ACFM catch
1988	25
1989	20
1990	15
1991	15
1992	15
1993	17
1994	5
1995	6[1]
1996	

[1]Preliminary. Weights in '000 t.

Historical development of the fishery: Landings from Division IIa are mainly taken in a gillnet fishery off mid-Norway. The relatively minor landings from Sub-area III and Division IVa are by-catches in trawl fisheries. In Division Va blue ling have mainly been taken by trawlers in the redfish and Greenland halibut fisheries in recent years. In this division a directed fishery was carried out from 1980 to 1984 in a very limited area on spawning concentrations. In 1993 a fishery on spawning concentrations was conducted on the Reykjanes Ridge at the border between Division Va and Sub-area XIV. The fishery in Division Vb is mainly a bottom trawl fishery on spawning aggregations. The trawl fishery is also predominant in Sub-area VI.

State of the stock : unknown

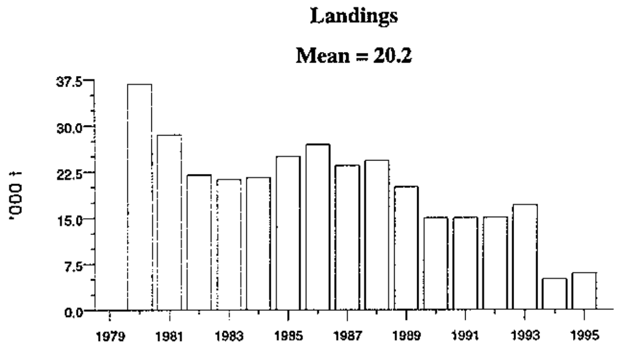
Special comments: In these fisheries it was expected that fishing down spawning aggregations might deplete local populations resulting in long periods before spawning aggregations reappear. This should be considered in the management of the fishery, for instance monitoring spawning aggregations and subsequent enforcement of limitations on the fishery.

There are indications of two stocks in the ICES area, one in Sub-area XIV and Division Va with a component in Division Vb and another in Sub-area VI and adjacent waters of Division Vb.

Data and assessment: Available data not sufficient for an assessment.

Source of information: Report of the Study Group on the Biology and Assessment of Deep-Sea Fisheries Resources, February 1996 (CM 1996/Assess:8).

Details in Table 3.12.7a.2



3.12.7 b Ling

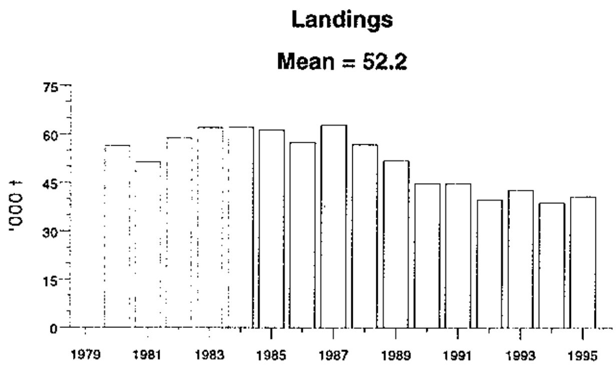
Catch data (Table 3.12.7b.1):

Year	ACFM catch
1988	54
1989	52
1990	45
1991	45
1992	40
1993	43
1994	39
1995	41[1]
1996	

[1] Preliminary Weights in '000 t.

Historical development of the fishery: The major fishery in Division IIa is the Norwegian longline fishery. This fishery also operates in other divisions. The catches in Division Va are by-catches in longline, gillnet and bottom trawl fisheries. In Division Vb the majority of the catches are taken by longliners rather than trawlers. In Sub-areas VI and VII trawl fisheries are predominant.

Details in Table 3.12.7b.2



State of the stock: The state of the stock is uncertain. However, there are indications that exploitation is high and the stock is declining.

Special comments: There is currently no evidence of separate stocks within the ICES area.

Data and assessment: Catch-curve and CPUE series analysis.

Source of information: Report of the Study Group on the Biology and Assessment of Deep-Sea Fisheries Resources, February 1996 (CM 1996/Assess:8).

3.12.7 c Tusk

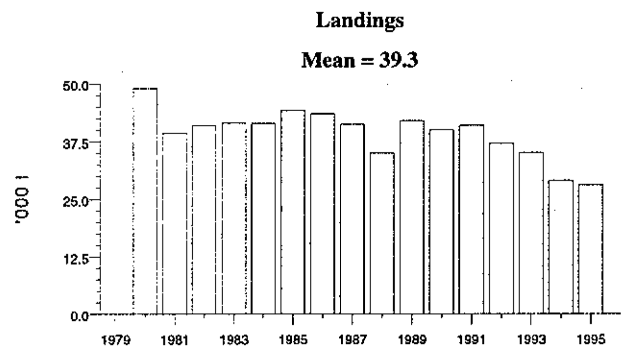
Catch data (Table 3.12.7c.1):

Year	ACFM catch
1988	34
1989	42
1990	40
1991	41
1992	37
1993	35
1994	29
1995	28[1]
1996	

[1]Preliminary. Weights in '000 t.

Historical development of the fishery: Landings are mainly by-catches in longline fisheries directed at ling and blue ling in Divisions IIa,Va, Vb and VIa. In Division Vb tusk is also taken as a by-catch in trawl fisheries.

Details in Table 3.12.7c.2



State of the stock: The state of the stock is uncertain. However, there are indications that exploitation is high and the stock is declining.

Special comments: There is currently no evidence of separate stocks within the ICES area.

Data and assessment: Catch-curve and CPUE analysis

Source of information: Report of the Study Group on the Biology and Assessment of Deep-Sea Fisheries Resources, February 1996 (CM 1996/Assess:8).

3.13 Stocks in the Baltic

3.13.1 Overview

The main fisheries for cod in the Baltic are those using demersal trawls, high opening trawls (operating both pelagically and demersally) and gillnets. There has been an increase in gillnet fisheries in the 1990s and the share of the total catch of cod taken by gillnets is now about 50%. The Baltic herring is exploited mainly by pelagic trawls, demersal trawls and trap nets/pound-nets during the spawning season. The main body of the sprat catch is taken by pelagic pair trawling and used for industrial purposes. Baltic salmon is exploited by drift net, trapnet and longline fisheries.

An overview of catches of fish in the Baltic is given in Section 3.13.2 (not included in this extract).

Baltic **cod** is managed as one unit covering all Sub-divisions 22–32. However, ICES considers the stocks in Sub-divisions 22–24 and Sub-divisions 25–32 as separate stocks. **As in previous reports ICES recommends that the two cod stocks in the Baltic should be managed separately.**

For **cod**, unusually strong year classes in 1976, 1979 and 1980 formed the basis for an increase in the stock and an expansion in the fisheries. Catch levels more than doubled and the fishery attracted vessels from other Baltic fisheries and from fleets normally operating outside the Baltic. In almost all years landings have been far above the levels recommended by ICES. The decline in stock size and landings started around 1984 and continued up to 1992. The fleet capacity and fishing effort have not been reduced at the same rate and the fishing mortality has increased during the stock decline. Improved recruitment in the early 1990s has resulted in spawning stock biomasses increasing above the 1992 minimum and this increase has been seen especially in the western Baltic cod stock. The recovery of the eastern Baltic cod stock has been slower.

The success of cod reproduction is, among other things, dependent on certain minimum levels of salinity and oxygen concentration for the fertilisation and survival of the eggs and larvae. The unusually long period with low influx of North Sea water from 1977–1991 coincided with low recruitment. New influxes since 1991 have resulted in improved environmental conditions which allow the possibility of improved recruitment but do not ensure it. The effect of an intrusion of North Sea water into the Baltic Sea is usually sufficient to support better environmental conditions at maximum for two spawning seasons (about 1.5 years) because after that period the oxygen content is not sufficient for the survival of cod eggs in the deep water layers.

The recent improvement in recruitment and reversal of the downward trend in spawning stock biomass have been seen in both the western (Sub-divisions 22 and 24) and eastern (Sub-divisions 25–32) stocks. However, fishing mortalities are still estimated to be very high. It is therefore considered that a precautionary approach including reductions in fishing effort is needed if these stocks are to recover on a more permanent basis.

The actual stock and exploitation levels cannot be estimated with the accuracy needed for making forecasts of future catches and stock sizes due to a dramatic deterioration in the data on recent catches.

There have been increasing difficulties in monitoring the fisheries exploiting Baltic cod in recent years. **Since 1992 catch data from the cod fisheries have been unreliable as a result of mis- and underreporting**. ICES is concerned about the deterioration of the quality of catch and effort data from a number of important fisheries. As a consequence, ICES is unable to provide reliable estimates of current stock sizes and forecasts of future catch levels. Trends in stock size and the overall state of the stocks can to some extent be evaluated from research vessel surveys but such information alone is not sufficient to give the short-term TAC advice usually requested.

In the **herring and sprat fisheries,** herring are mainly caught in the open sea by trawls (pelagic single- and pair-trawls) and in coastal waters during spawning time both by pound-nets and gillnets. Sprat are fished by pelagic trawls mainly for industrial purposes.

Unfavourable market conditions for herring have been reflected in decreased landings for human consumption but the landings of both herring and sprat for industrial purposes have increased markedly during the last few years. Sprat is used mainly for human consumption when landed in the countries on the eastern Baltic coasts, but for production of fishmeal and oil in the countries on the west coast.

Herring in the Baltic is, as in former years, assessed as four stocks. This is to be regarded as a compromise between using the larger number of stocks/populations that have been identified on biological grounds and the practical aspects such as in what units catch figures are available and possibilities for correctly allocating individual fish to particular stocks.

Sprat is considered to be one stock in the whole Baltic and is consequently assessed as one unit.

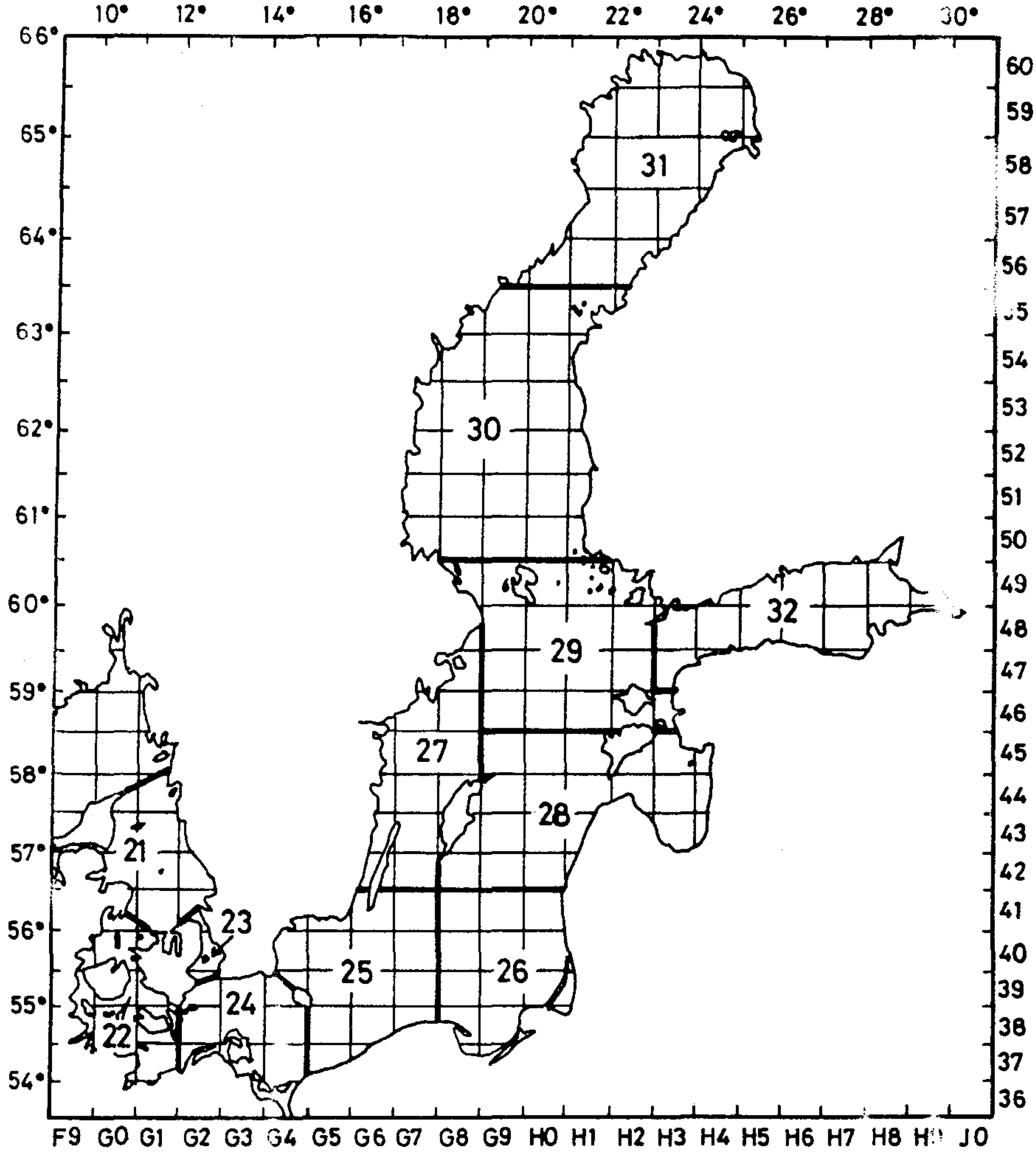
The pelagic stocks in the Baltic are exploited at a low or medium level and the stock biomasses are at or above their respective long-term average levels. They are regarded to be within safe biological limits.

It has, for several reasons, been difficult to estimate the absolute levels of stock size for the pelagic stocks, whereas the development of stock sizes in relative terms is better described. Low fishing mortality in comparison with the natural mortality, which makes the catch analysis less reliable, inconsistencies between years in the results from acoustic surveys and low precision in the estimates of species composition in the mixed fisheries have contributed to the variation in stock estimates given during the latest years.

The spring-spawning stock of herring in Sub-divisions 22–24 and Division IIIa migrates after the spawning season into the Kattegat, Skagerrak and the eastern parts of the North Sea, where it mixes with the North Sea herring stock during the feeding period. Difficulties in allocating catches to the Baltic spring-spawning stock and to the considerably larger North Sea stock, uncertain catch statistics and conflicting trends in survey indices have resulted in no reliable assessment being available for the spring-spawning stock of herring in Sub-divisions 22–24 and Division IIIa.

For **Baltic salmon and sea trout** reference is made to the overview in Section 3.13.11.

A chart showing the Sub-divisions of the Baltic is shown on the following page.



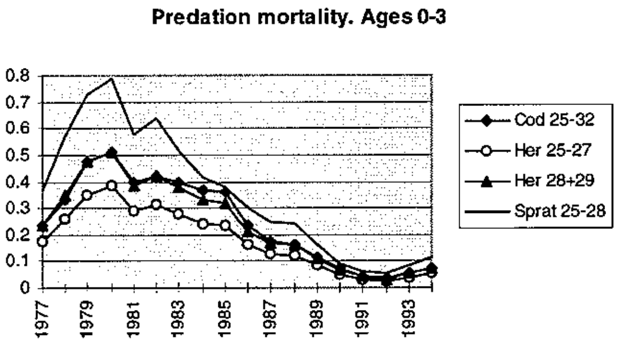
Baltic Fishing Areas

3.13.1 a Biological Interaction between Cod, Herring and Sprat Stocks

Answer to a request from the IBSFC to "identify and evaluate the interaction between cod, herring, sprat and salmon stocks" (Item d in request from IBSFC).

ICES has explored the interaction between cod, herring and sprat by means of Multispecies Virtual Population Analysis (MSVPA) in terms of the mortality caused by predation. An important input to this model is information on food composition. A large number of cod stomachs (more than 40,000) have been analysed in order to describe the diet of this major predator species.

Results of the MSVPA (for the Central Baltic) show that predation mortality can be high on both sprat and young herring, particularly for juveniles.



It is evident that the level of predation mortality varies with the size of the cod stock (see figure in previous column). Thus predation mortality on these species in the Baltic is low at present and would be expected to increase if the cod stock rebuilds. Predation mortality is only one source of mortality on the prey, however, and population responses of the prey may not follow population changes in the cod stock in a precise way. Other important sources of mortality on young fish in the Baltic Sea are associated with environmental conditions which are outside our ability to manage.

The cod stomach analyses and the MSVPA have also shown that cannibalism may cause a rather high mortality on young cod (age groups 0 and 1).

Studies of stomach contents of herring and sprat have demonstrated that sprat is a large consumer of cod eggs.

These findings are of potential importance for the species interactions. It has, however, still not been possible to estimate what contribution egg predation could make to the mortality during the early life history stages of cod.

The inclusion of species interactions has clear effects on the medium- and long-term predictions. The development of one stock in response to variation in recruitment and exploitation will influence the development of the other stocks.

3.13.2 Nominal Catches in the Baltic Area

Officially reported catches in the Baltic are given in Tables 3.13.2.1-5. These are the catches officially reported to ICES by national statistical offices for publication in the *ICES Fishery Statistics.*

In the assessments, the working groups try to estimate discards and slipped fish, landings which are not officially reported, and the composition of by-catches. These amounts are included in the estimates of total catch for each stock and are used in the assessments; thus, they appear in the tables and figures produced by working groups. These estimates vary considerably between different stocks and fisheries, being negligible in some cases and constituting important parts of the total removals from other stocks. Further, the catches used by the working groups are broken down into sub-divisions, whereas the officially-reported by some countries figures are reported by the larger Divisions IIIb, c, and d. The trends in Tables 3.13.2.1-5 may not, therefore, correspond with those on which assessments have been based, and are presented for information only, without any comment from ACFM.

The 1990 catches listed under the Federal Republic of Germany and the German Democratic Republic refer to catches by vessels from the respective former territories during the whole of 1990, before and after political union. Thus, catches taken by vessels registered in the former German Democratic Republic in the months after unification are included in the German Democratic Republic figures.

The catch data used in the assessments are given in other tables.

3.13.3 Herring

Catches of herring in the Baltic are given by country and Sub-division for 1994 and 1995 in Table 3.13.3.1.

3.13.3.a Herring in Sub-divisions 22–24 and Division IIIa (spring-spawners)

Catch data: Catches of herring (spring-spawners and North Sea autumn-spawners) are given for Sub-divisions 22–24 and Division IIIa in Table 3.13.3.a1. Catches of Baltic spring-spawners are given in the table below and in Table 3.13.3.a2.

Year	ICES advice	Corresp. catch	Agreed TAC	ACFM catch of stock		
				22-24	IIIa	Total[1]
1987	Reduction in F	224		102	59	175
1988	No increase in F	196		99	129	251
1989	TAC	174		95	71	186
1990	TAC	131		78	118	204
1991	TAC	180		70	113	192
1992	TAC	180		85	75	168
1993	Increased yield from reduction in F; reduction in juvenile catches	188		81	81	171
1994	TAC	130–180		66	84	164
1995	If required, TAC not exceeding recent catches	168–192		74	90	173
1996	If required, TAC not exceeding recent catches	164–171				

[1]Including catches of Baltic spring spawners in North Sea. Weights in '000 t

Historical development of the fishery: Herring are taken in Division IIIa and Sub-divisions 22-24 in a directed fishery by trawlers and purse seiners (fleet c) and in Division IIIa as by-catch in a fishery for Norway Pout and sandeel (fleet e) and in the "mixed clupeoid fishery" (fleet d). After a period of high landings in the early 1980s the landings have decreased to the long-term average.

State of stock: The state of the stock is uncertain as available information is conflicting. Results from research surveys indicate intermediate to high levels of total mortalities.

Forecast for 1997: Not available.

Management advice: ICES recommends that the fisheries on herring in Division IIIa should be managed in accordance with the management advice given in Section 3.5.8a for fleets c, d and e.

If a precautionary TAC is required for Sub-divisions 22-24, ICES advises that it should not exceed recent catch levels in that area.

Special comments: A considerable part of the landings of juvenile herring in Division IIIa originate from the North Sea stock.

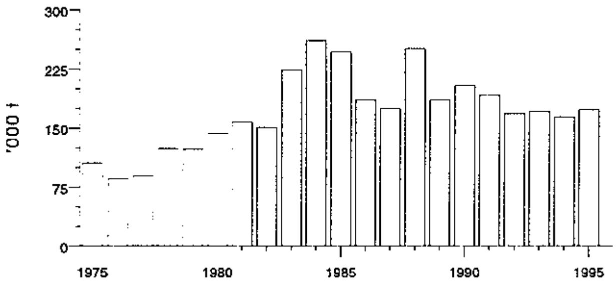
Data and assessment: Catch-at-age data are uncertain due to low sampling intensity of landings, particularly in Division IIIa. The situation improved in 1995 compared to previous years. There are problems with stock separation in historical data and with independent survey indices.

Source of information: Report of the Herring Assessment Working Group for the Area South of 62°N, April 1996 (CM 1996/Assess:10).

Details in Table 3.13.3.a2

Landings

Mean = 171



3.13.3 b Herring in Sub-divisions 25–29 (including Gulf of Riga) and 32

Catch data (Table 3.13.3.b1):

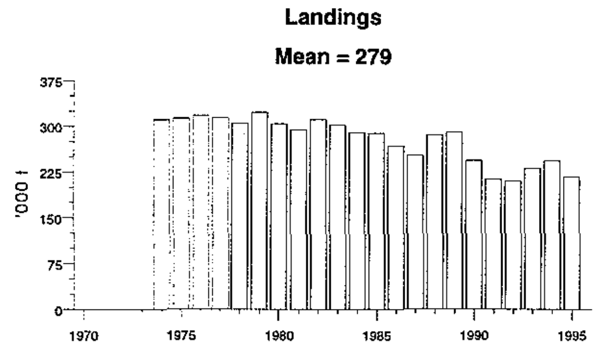
Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM catch
1987	TAC for SD 25–27; reduce F towards $F_{0.1}$ in SD 32	200	399	252
1988	$F_{0.1}$ in SD 25–27; no advice SD 28 and 29S; reduce F towards $F_{0.1}$ in SD 32	204	399	286
1989	TAC for SD 25–27; no advice SD 28 and 29S; reduce F towards $F_{0.1}$ in SD 32	176	399	290
1990	TAC, no advice for SD 28 and 29S, TAC for SD 32	112	399	244
1991	TAC for entire area	293	402	213
1992	F near present level	343	402	210
1993	Increase in yield at higher F	371	560	231
1994	Increase in yield at higher F	317–463	560	243
1995	TAC	394	560	217
1996	TAC	394	560	

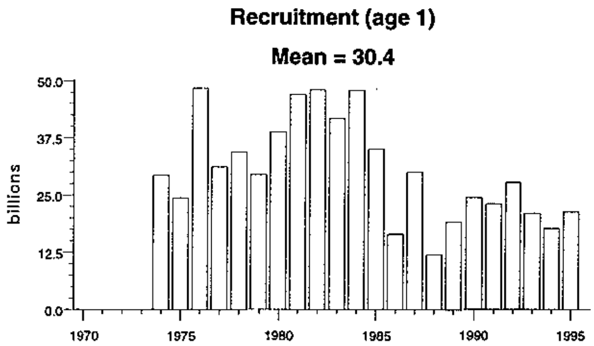
[1] For Sub-divisions 22–29,32. Weights in '000 t.

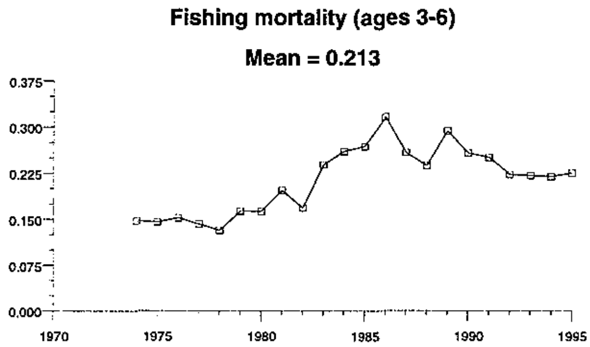
Historical development of the fishery: From the beginning of the 1970s to 1985 annual landings fluctuated around 300,000 t. Due to market problems the landings decreased and in the last four years have been at a level somewhat higher than 200,000 t. Traditionally the fishery was dominated by trapnets, gillnets and bottom trawls; recent development is towards a dominance of pelagic trawls. The proportion of the catches used for industrial purposes has increased during the last few years.

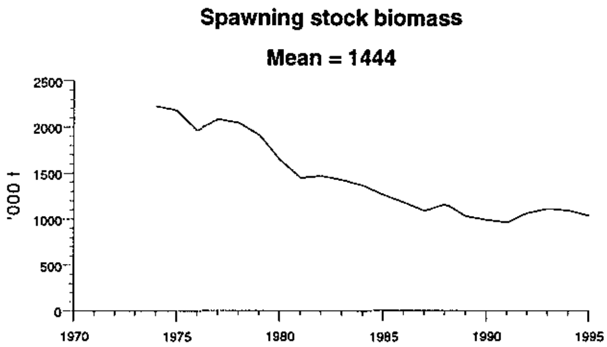
State of the stock: The stock is considered to be within safe biological limits. After a decline in stock size during the period 1975 to the end of 1980's the stock has been stable at around 1 million tonnes. Fishing mortality has for most years (1974–1995) been below or around the $F_{0.1}$ level (0.23). Details in Table 3.13.3 b2.

Forecast for 1997: The forecast assuming *status quo* exploitation level indicates an increase in catches for both









1996 and 1997, with the spawning stock also increasing. If the catches in 1996 increase to the 394,000 t advised, fishing mortality would have to increase by 50%.

F(96) = 0.23, Basis: F(96) = F(95), Catch(96) = 276, Landings(96) = 276, SSB(96) =1289

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4 F(95)	0.09	1361	118	118	1524
B	0.6 F(95)	0.14	1342	174	174	1450
C	0.8 F(95)	0.18	1322	228	228	1380
D	1.0 F(95)	0.23	1303	280	280	1314
E	1.2 F(95)	0.27	1284	329	329	1251

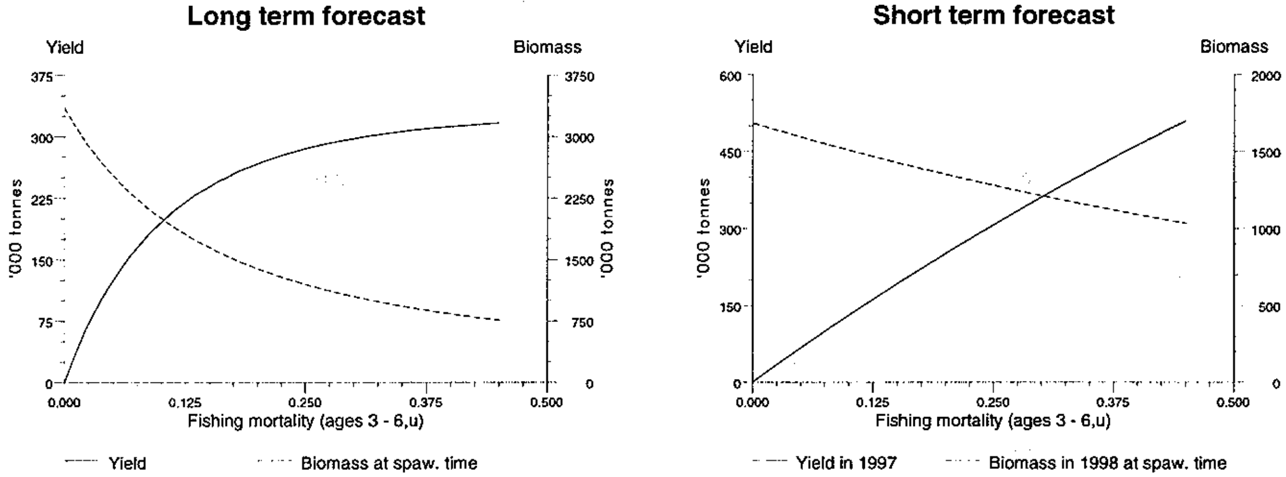
Weights in '000 t.

Special comments: There has been a decrease in mean weight at age for herring. This may be linked to the increasing proportion in the catches of slow growing fish from the Gulf of Finland and Gulf of Riga. In 1994 ACFM advised that an increase in fishing mortality was considered to be within safe biological limits. The present assessment indicates that the stock is presently exploited around the $F_{0.1}$ level and there is thus little scope for increasing long-term yield by increasing fishing mortality.

Data and assessment: The assessment of this stock is imprecise due to a complex stock structure with a broad spectrum of sizes at age, uncertainties in catch levels owing to insufficient sampling of especially the industrial fisheries, and large variabilities associated with the results from the acoustic surveys.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

Yield and Spawning Stock Biomass



Herring in the Gulf of Riga

In previous assessments ICES was unable to assess the Gulf of Riga component separately because of the incomplete information on the extent of fisheries on this stock outside the area. Catches of Gulf of Riga herring outside the area are considered to be relatively minor and ICES consequently presents a separate assessment (Table 3.13.3 b3).

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987	Reduce F towards $F_{0.1}$	8	-	13
1988	Reduce F towards $F_{0.1}$	6	-	17
1989	F should not exceed present level	20	-	17
1990	F should not exceed present level	20	-	15
1991	No separate advice for this stock component	-	-	15
1992	No separate advice for this stock component	-	-	22
1993	No separate advice for this stock component	-	-	22
1994	No separate advice for this stock component	-	-	24
1995	No separate advice for this stock component	-	-	33
1996	No separate advice for this stock component	-	-	-

Weights in '000 t.

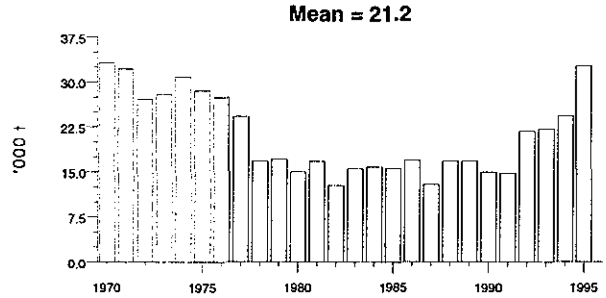
Historical development of the fishery: Herring catches in the Gulf of Riga include both Gulf herring and open-sea herring which enter the Gulf from April to May for spawning. The herring fishery in the Gulf of Riga is performed by Estonia and Latvia. The landings, which were about 30,000 t in the early 1970s, decreased to the level of 12,000–15,000 t in the 1980s. Since 1992 the catches have increased, reaching 33,000 t in 1995. The structure of the fishery has remained unchanged in recent decades: approximately 70% of the catches are taken by the trawl fishery and 30% by the trapnet fishery on the spawning grounds.

The two stock components are separated in the landings by means of otolith structure. Only the so-called Gulf herring component is included in this assessment.

Details in Table 3.13.3 b4.

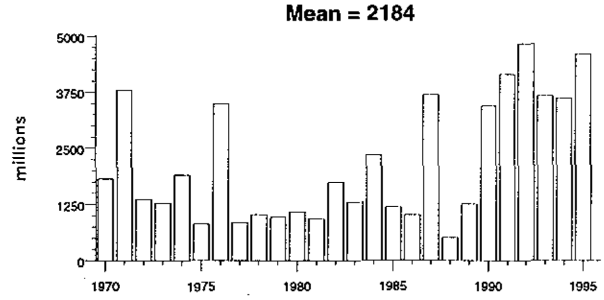
Landings

Mean = 21.2



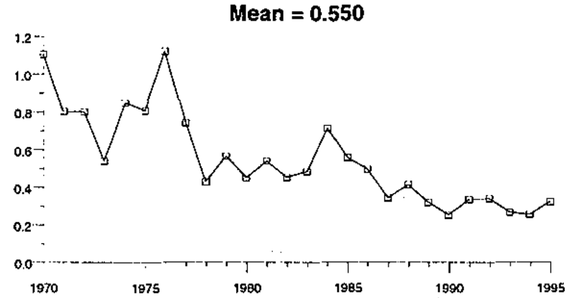
Recruitment (age 1)

Mean = 2184



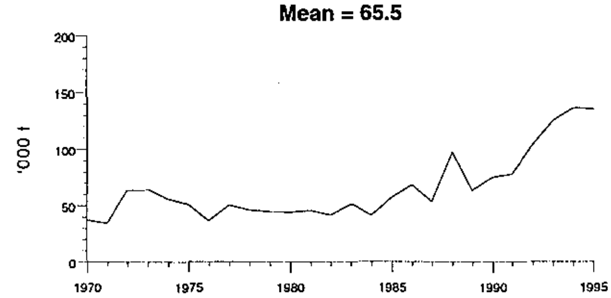
Fishing mortality (ages 3-7)

Mean = 0.550



Spawning stock biomass

Mean = 65.5



State of the stock: This stock component is considered to be within safe biological limits. The SSB has been at record high levels since 1994. Recruitment has been at a high level since 1990. Details in Table 3.13.3 b4.

Forecast for 1997: F(96) = 0.32, Basis: F(96)=F(95), Catch(96) = 36, Landings(96) = 36, SSB(96) = 145

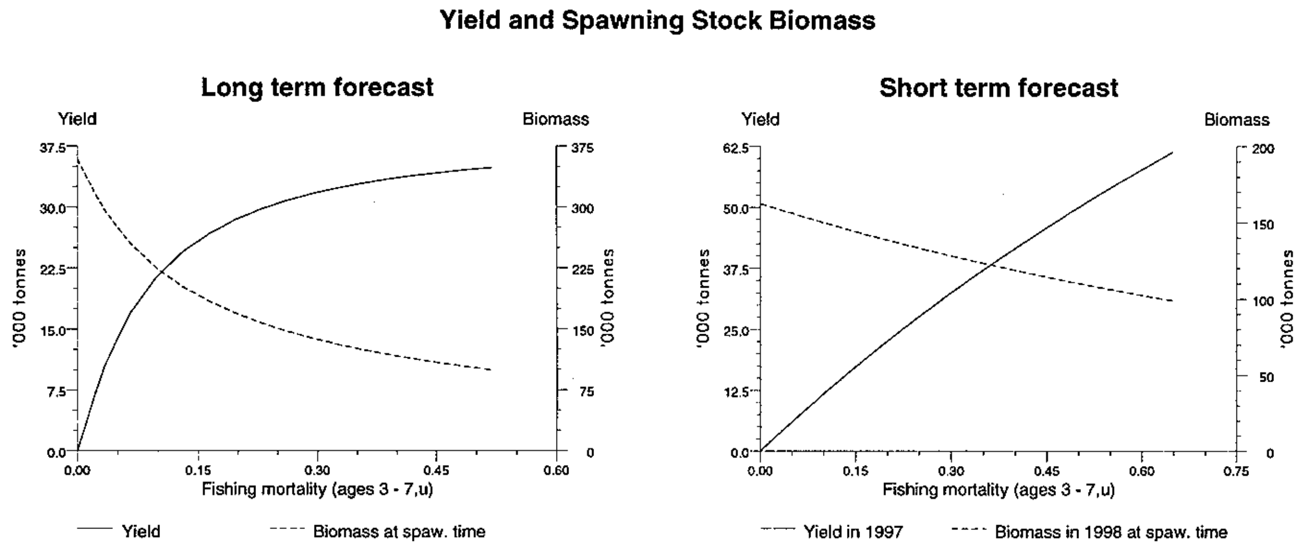
Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4F(95)	0.13	153	15	15	146
B	0.6F(95)	0.19	152	22	22	138
C	0.8F(95)	0.26	151	29	29	132
D	1.0F(95)	0.32	150	35	35	126
E	1.2F(95)	0.39	149	41	41	120

Weights in '000 t.

Management advice for 1997: At the present exploitation rate this stock component is expected to remain within safe biological limits.

Data and assessment: Analytical assessment based on catch data and CPUE series. This is a component of the herring in Sub-divisions 25–29 and 32.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).



3.13.3 c Herring in Sub-division 30, Bothnian Sea

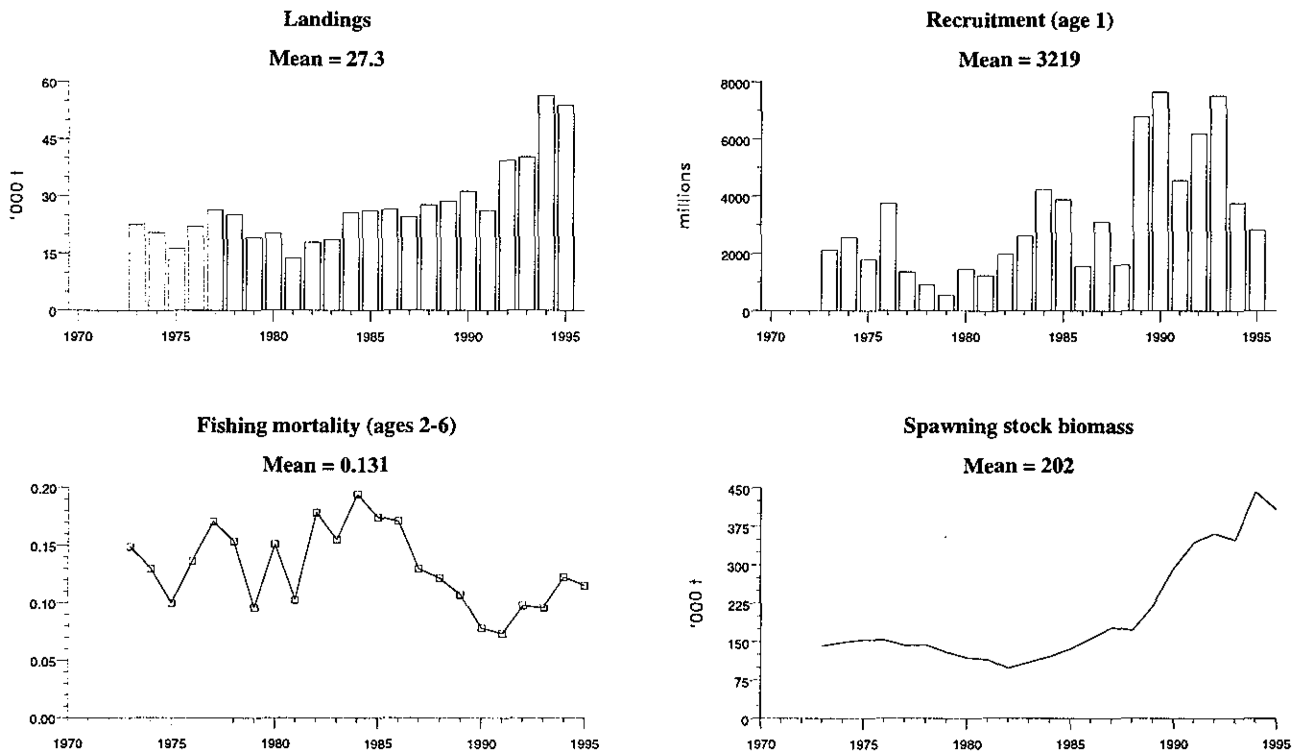
Catch data (Table 3.13.3 c1):

Year	ICES advice	Catch corresp. to advice	ACFM catch
1987			25
1988			28
1989			29
1990			31
1991	TAC for eastern part of SD, allowance for western part	32+	26
1992	*Status quo* F	39	39
1993	*Status quo* F	39	40
1994	No specific advice	41[1]	56
1995	TAC	73	54
1996	TAC	73	

[1]Catch at $F_{0.1}$. Weights in '000 t.

Historical development of the fishery: Landings have increased significantly in the last four years and are now at the highest level since 1973 (twice the long-term average). A shift from trapnets and bottom trawls to pelagic trawls has occurred during recent times. A large, but varying proportion of the catches are used as animal fodder.

State of the stock: The stock is considered to be within safe biological limits. SSB is close to the record high level of 1994. The fishing mortality is at a level lower than the natural mortality. Recruitment was above average in 1989–1993, but the 1993 and later year classes are probably at the average level. Details in Table 3.13.3 c1.



Forecast for 1997:
F(96) =0.12, Basis: F(96)=F(95), Catch(96) = 56, Landings (96) = 56, SSB(96) = 403

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.6F(95)	0.07	388	35	35	406
B	0.8F(95)	0.09	387	46	46	393
C	1.0F(95)	0.12	385	57	57	382
D	1.2F(95)	0.14	383	68	68	370
E	1.4F(95)	0.16	381	78	78	359

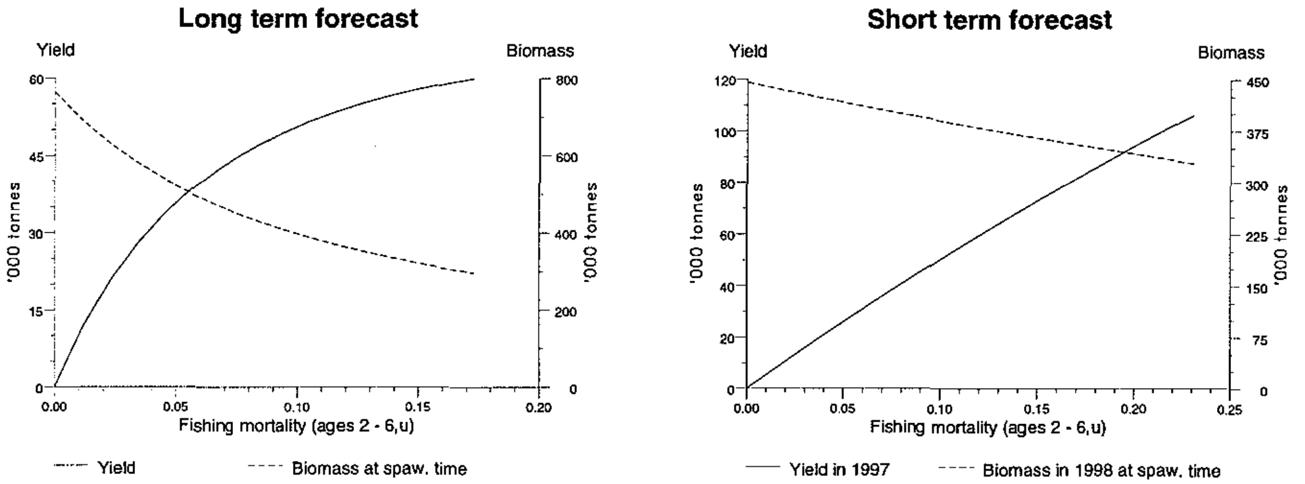
Weights in '000 t.

Management advice for 1997: With a 40% increase in fishing mortality the stock should remain within safe biological limits.

Data and assessment: The assessment is based on catch data and CPUE series from bottom trawls. Although the relative changes in stock biomass are considered to be informative the absolute biomass estimates are uncertain due to the low fishing mortalities.

Source of information : Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

Yield and Spawning Stock Biomass



3.13.3 d Herring in Sub-division 31, Bothnian Bay

Catch data (Table 3.13.3 d1)

Year	ICES advice	Catch corresp. to advice	ACFM catch
1987		9	8.1
1988		13	8.8
1989		7	4.4
1990		9	7.8
1991	TAC for eastern part of SD, allowance for western part	9+	6.8
1992	*Status quo* F	8	6.5
1993	Increase in yield by increasing F	-	9.2
1994	Increase in yield by increasing F	-	5.8
1995	TAC	18.4	4.3
1996	TAC	18.4	

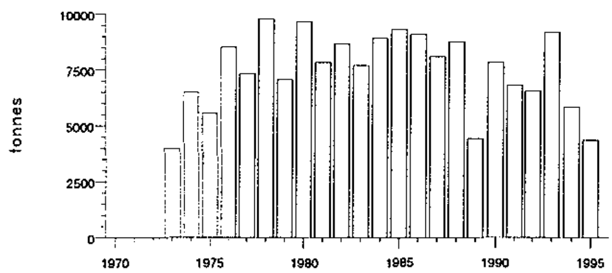
Weights in '000 t.

Historical development of the fishery: Within the last 10 years landings have fluctuated without trend, and are now at the lowest value since 1974. The fishery has changed from bottom trawl and trap-net to be more dominated by pelagic trawl. The major part of the catches are used for animal fodder.

State of the stock: The stock is considered to be within safe biological limits. The assessment of this stock is very uncertain and the actual level of SSB and fishing mortality is not known. The fishing mortality is low and the stock is considered to be almost unexploited. Details in Table 3.13.3 d1.

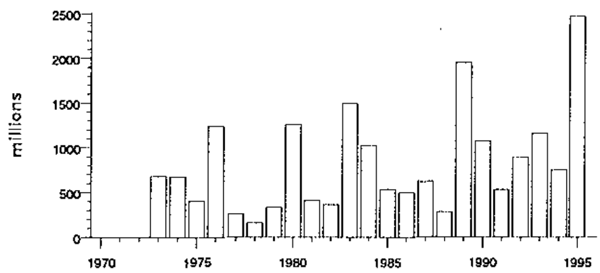
Landings

Mean = 7463



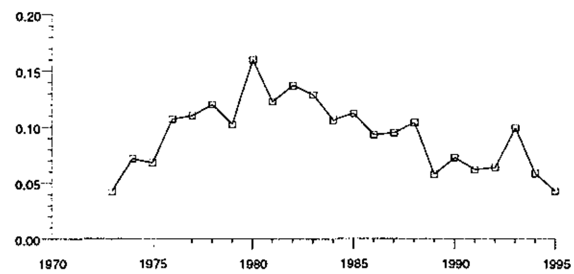
Recruitment (age 1)

Mean = 831



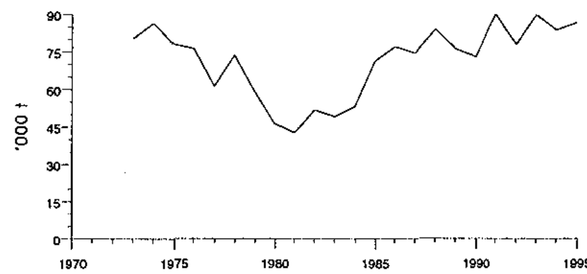
Fishing mortality (ages 2-6)

Mean = 0.093



Spawning stock biomass

Mean = 71.4



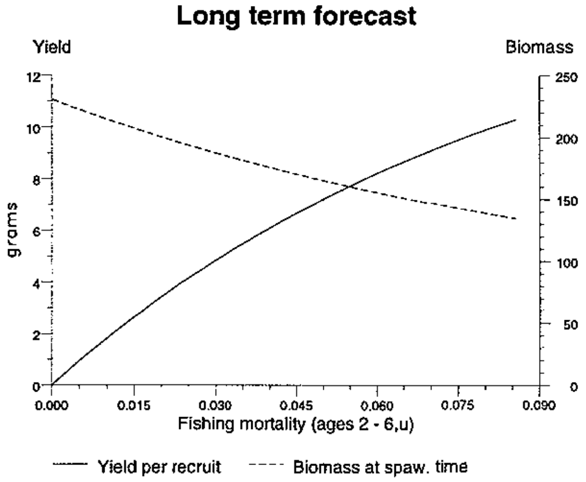
Forecast for 1997: Under *status quo* conditions (unchanged fishing mortality and average recruitment) the catch is predicted to be 5,600 t in 1997.

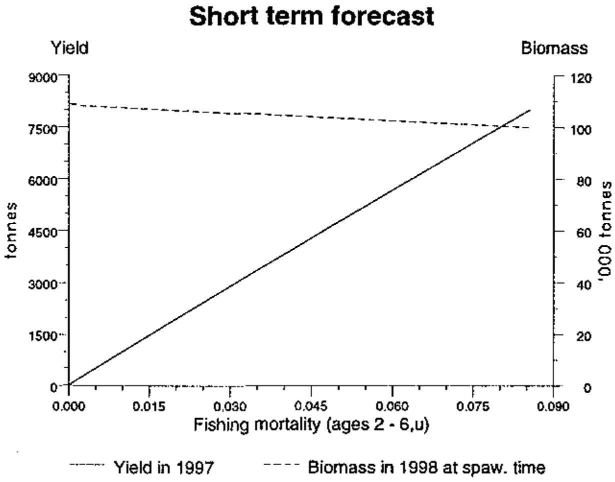
Management advice for 1997: The advice given in 1994 for 1995 and 1996 is maintained: "The stock is hardly exploited and ICES considers that yield can be increased by increasing fishing mortality."

Data and assessment: Analytical assessment based on catch and CPUE data.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

Yield and Spawning Stock Biomass





3.13.3 e The Effects of Fishing for Herring for Purposes other than Human Consumption

Answer to a request from the Government of Finland concerning the effects of fishing herring for purposes other than human consumption.

Analysis of the size and age composition of landings from Swedish and Finnish fisheries for herring in the Baltic shows no difference between landings destined for human consumption and other markets. It can therefore be concluded that the effect on the herring stocks is proportional to the tonnage of fish removed irrespective of its subsequent use.

The assessments of these herring stocks are presented in Sections 3.13.3 a–d.

3.13.3 f The Potential for Multispecies and Multiannual Catch Options for Herring and Sprat

Answer to a request from the IBSFC to "evaluate the potential for multispecies and multiannual catch options for herring and sprat" (Item e in IBSFC request for advice).

ICES has to postpone the reply to this request until next year and will then undertake the appropriate analyses and report the results in 1997.

3.13.4 Sprat in Sub-divisions 22–32

Catch data (Tables 3.13.4.1–3.13.4.2):

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ACFM catch
1987			117.2	88
1988	Catch could be increased in SD 22–25	-	117.2	80
1989		72	142	86
1990		72	150	86
1991	TAC	150	163	103
1992	*Status quo* F	143	290	142
1993	Increase in yield by increasing F	-	415	178
1994	Increase in yield by increasing F	-	700	291
1995	TAC	205	500	304
1996	Little gain in long-term yield at higher F	279	550	

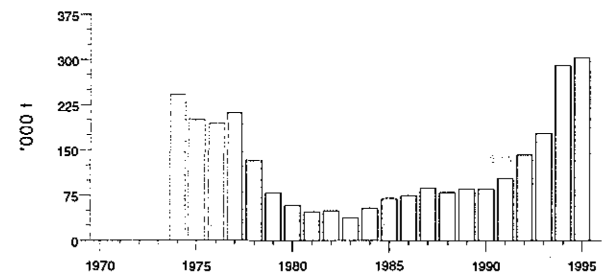
Weights in '000 t.

Historical development of the fishery: Landings increased from 1983 to 1995. The increase in landings since 1992 is due to the development of an industrial pelagic fishery. The catches in this fishery consist mainly of sprat (about 70%) and herring. Sprat is fished with pelagic trawls during the first half and in the last few months of the year. Most catches used for human consumption are taken in mixed fisheries for herring and sprat.

State of the stock: The stock is considered to be within safe biological limits. SSB has increased in recent years and is at its highest historical level. Fishing mortality increased from 1993 to 1995, but is estimated to be in the same order as natural mortality and is therefore not precisely estimated. The 1994 year class is well above average and the 1995 year class is estimated to be at the average level. (Details in Table 3.13.4.3).

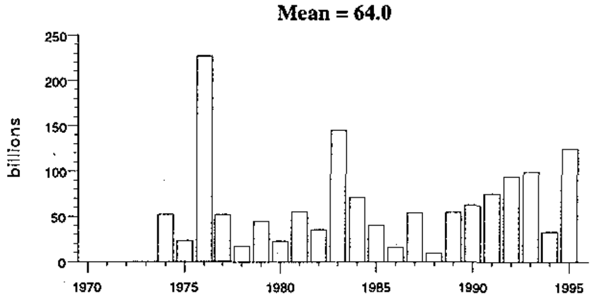
Landings

Mean = 128



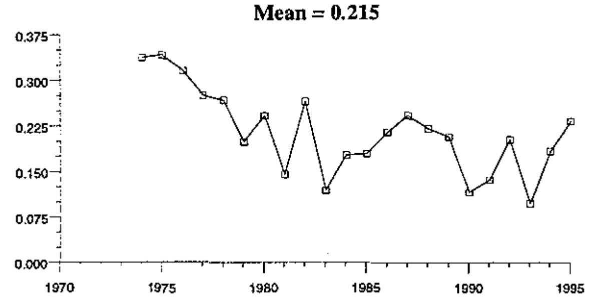
Recruitment (age 1)

Mean = 64.0



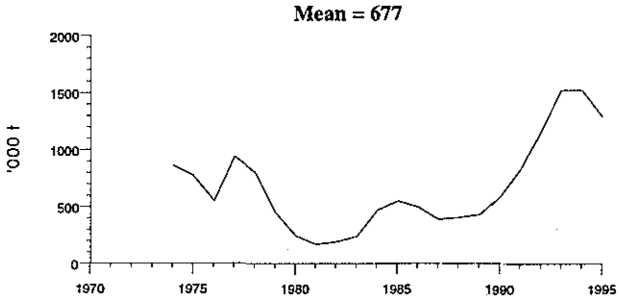
Fishing mortality (ages 3-5)

Mean = 0.215



Spawning stock biomass

Mean = 677



Forecast for 1997:

F(96) = 0.18, Basis: F(96) = 0.8*F(95), Catch(96) = 320, Landings(96) = 320, SSB(96) = 1497

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.6F(95)	0.14	1523	243	243	1542
B	0.8F(95)	0.18	1494	317	317	1455
C	1.0F(95)	0.23	1465	387	387	1374
D	1.2F(95)	0.27	1437	454	454	1298
E	1.4F(95)	0.32	1409	518	518	1227

Weights in '000 t.

In the above predictions the spawning stock will remain at high levels. The stock biomass is high and catches as high as 500,000 t in 1997 would still leave the spawning stock large in relation to historical levels.

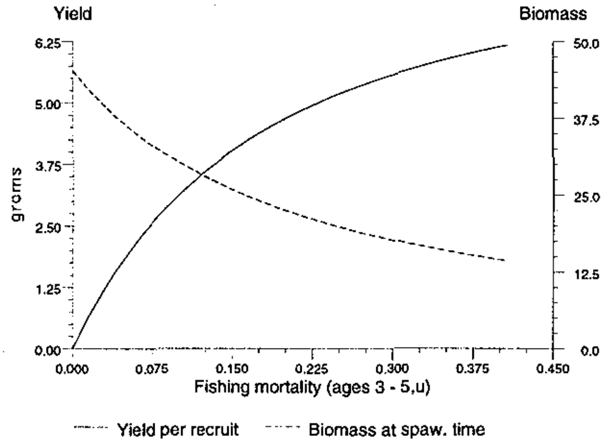
Special comments: The fishing mortality this stock can sustain is dependent on natural mortality which is linked to the abundance of cod. At present the sprat SSB is at a high level due to strong recruitment and low predation in recent years. Under these conditions the stock can support a high fishing mortality, but as the cod stock recovers a much lower exploitation level on sprat is implied.

Data and assessment: The assessment is based on catch data and acoustic surveys. The assessment is considered very uncertain due to the low exploitation level in some years and uncertainties concerning the composition of industrial catches which made up 90% of the catch in recent years. The historical trends in stock biomass, fishing mortalities and recruitment are considered to be informative.

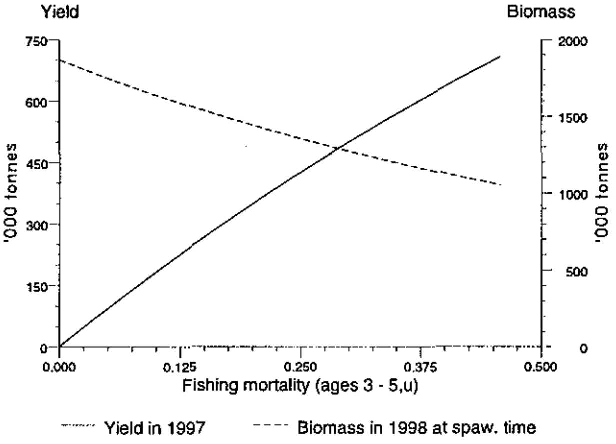
Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

Yield and Spawning Stock Biomass

Long term forecast



Short term forecast



3.13.5 Cod

Catches of cod in the Baltic are given by country in Table 3.13.5.1 and by country and Sub-division in Table 3.13.5.2.

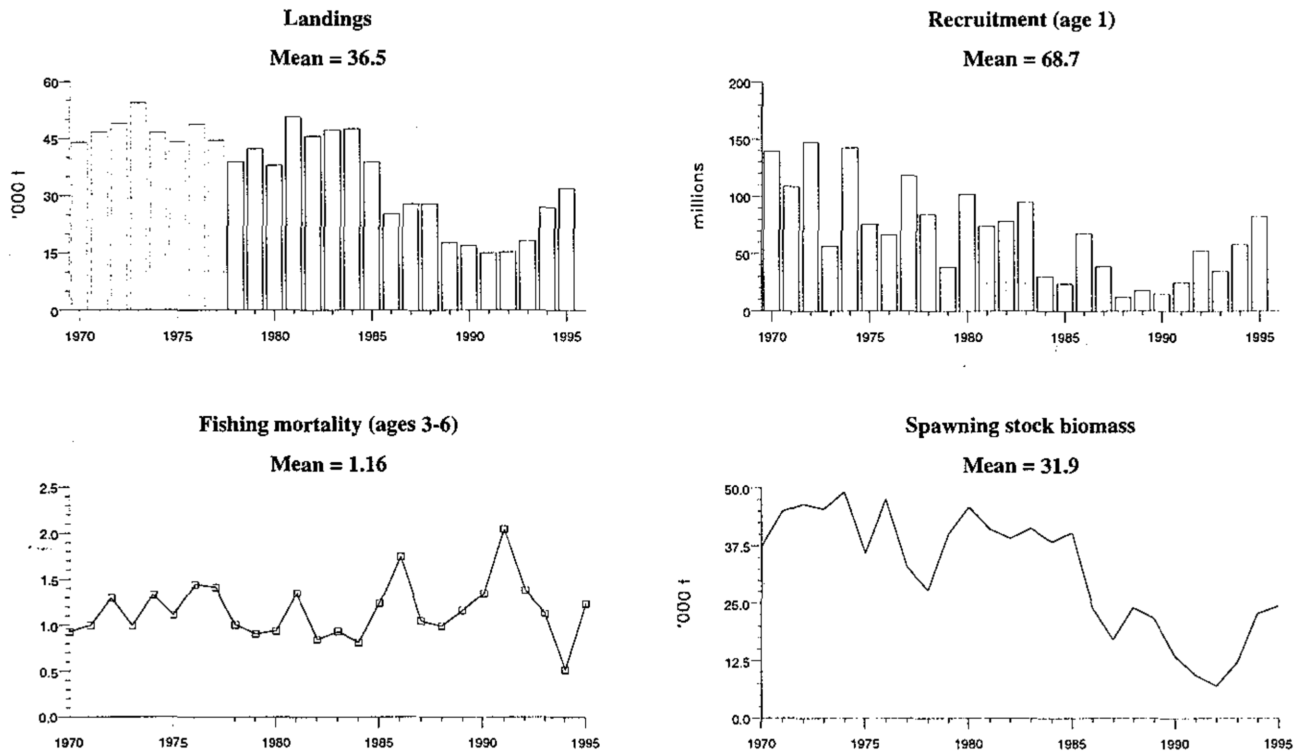
3.13.5 a Cod in Sub-divisions 22 and 24

Catch data (Table 3.13.5 a1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	Disc. slip.	ACFM catch
1987	TAC	9		3	28
1988	TAC	16			28
1989	TAC	14			18
1990	TAC	8			17
1991	TAC	11			15
1992	Substantial reduction in F	-			15
1993	F at lowest possible level	-			18
1994	TAC	22			27
1995	30% reduction in fishing effort from 1994 level	-			32
1996	30% reduction in fishing effort from 1994 level	-			

[1] Included in TAC for total Baltic.
Weights in '000 t.

Historical development of the fishery: From 1965 to 1984 the landings varied between 40–50,000 t. They thereafter decreased to below 20,000 t in the period 1989-1991. Particularly since 1992 the level of landings is uncertain due to incomplete reporting. It is nevertheless likely that landings have increased further. The best available estimate of total landings for 1995 is 32,000 t.



State of the stock: The stock is probably within safe biological limits. Although ICES has confidence in the trends in the stock, there is considerable uncertainty in the estimates of stock size and in the level of fishing mortality. The stock is rebuilding from its historically low level in 1992. The exploitation rate is most probably high but with strong recent recruitment (especially from the 1994 year class), the spawning stock biomass is expected to continue to increase to average levels in the short term. Details in Table 3.13.5 a2.

Forecast: Not available. Uncertainties in the data especially for recent years make the estimates of stock size and exploitation level for recent years very variable and not useful for catch predictions.

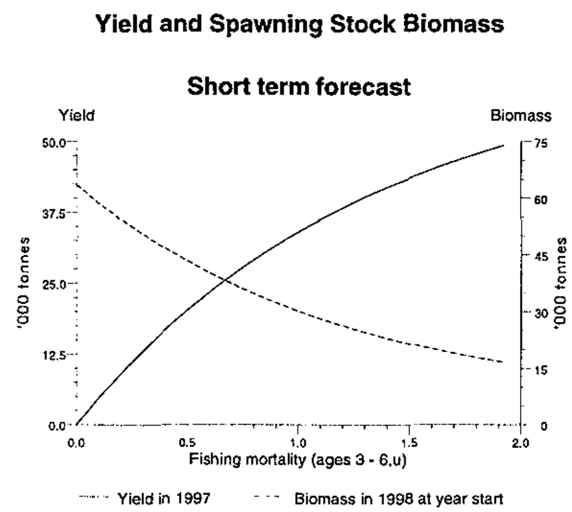
Management advice for 1997: ICES recommends that fishing effort in 1997 should not be allowed to increase above the level in recent years.

Special comments: Due to the recent improvement in recruitment the SSB is rebuilding. The indications are that this has now developed to the level where the stock is within safe biological limits.

There is considerable uncertainty regarding recent exploitation levels. Fleet reductions in one country have occurred, however.

Data and assessment: The data from the commercial fisheries in recent years are rather uncertain. This holds true for both landings, effort and biological data. The results from the catch analysis become unreliable for the most recent years.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).



3.13.5 b Cod in Sub-divisions 25–32

Catch data (Table 3.13.5 b1):

Year	ICES advice	Catch corresp. to advice	Agreed TAC[1]	ACFM catch
1987	Reduce towards F_{max}	245		217
1988	TAC	150		194
1989	TAC	179	220	179
1990	TAC	129	210	154
1991	TAC	122	171	122
1992	Lowest possible level	-	100	105[2]
1993	No fishing	0	40	96[2]
1994	TAC	25	60	107[2]
1995	30% reduction in fishing effort from 1994 level	-	120	126[2]
1996	30% reduction in fishing effort from 1994 level	-	165	

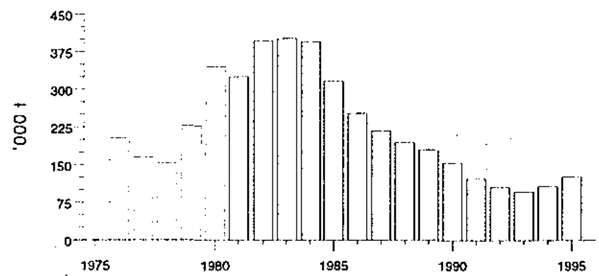
[1]For total Baltic. [2]Based on survey results in recent years and relation between historical surveys and catch data. Weights in '000 t.

Historical development of the fishery: The landings increased from about 150,000 t in the mid 1970s to around 360,000 t in the early 1980s, but decreased thereafter. The fisheries developed during the 1970s with more fleets entering in the early 1980s, and the intensity of the fishery increased further by the introduction of a gillnet fishery in the end of the 1980s and beginning of the 1990s. The level of reported landings in recent years (1992–1995) is known to be incorrect due to incomplete reporting and the landings have therefore been estimated. The extent of unreported landings since 1992 reflects a chaotic situation in the fishery, with problems in enforcing regulations. Landing statistics improved in 1995 and the amount of unallocated landings seems to have decreased.

State of the stock: ICES considers the stock to be outside safe biological limits. The spawning stock declined from a historically high level of around 900,000 t during 1982–1983 to the lowest recorded level in 1992. The spawning stock has increased since then, but is still well below the

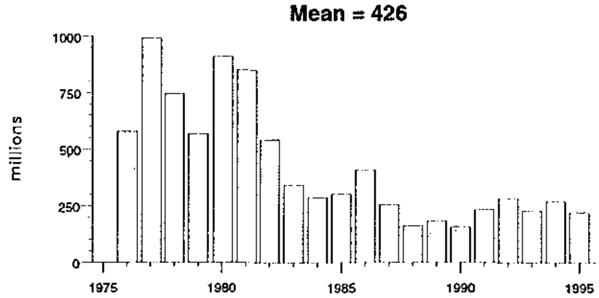
Landings

Mean = 224



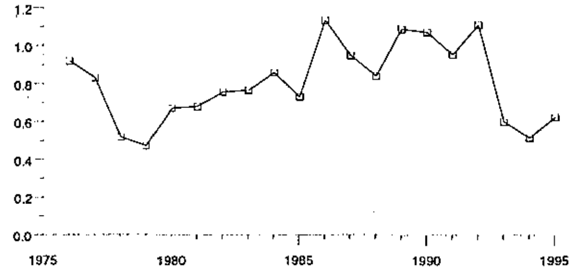
Recruitment (age 1)

Mean = 426



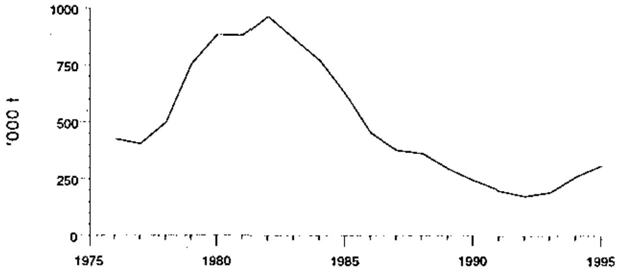
Fishing mortality (ages 4-7)

Mean = 0.804



Spawning stock biomass

Mean = 497



long-term average. The 1991 and 1993 year classes are more abundant than the sequence of poor year classes in 1987–1990 and are now contributing to an increase in spawning stock biomass. The decrease of the stock was due to poor recruitment and an increase in fishing mortality in the late 1980s. Fishing mortalities since 1992 have been lower than the long-term average. Preliminary information from the Baltic young fish surveys indicates that the 1995 year class is poor. This year-class will influence the SSB level in 1998. Details are given in Table 3.13.5 b2.

Forecast: A forecast has been produced based on the estimated catches in 1992–1995.

F(96) =0.62, Basis: F(96)=F(95), Catch(96) = 157, Landings (96) = 157, SSB(96) = 341

Option	Basis	F (97)	SSB (97)	Catch (97)	Lndgs (97)	SSB (98)
A	0.4F(95)	0.25	342	72	72	437
B	0.6F(95)	0.37	342	102	102	399
C	0.8F(95)	0.50	342	130	130	365
D	1.0F(95)	0.62	342	154	154	335
E	1.2F(95)	0.75	342	177	177	308

Weights in '000 t.

Management advice for 1997: ICES recommends that fishing mortality in 1997 should be reduced by 20% from the 1995 level corresponding to a TAC of 130,000 t.

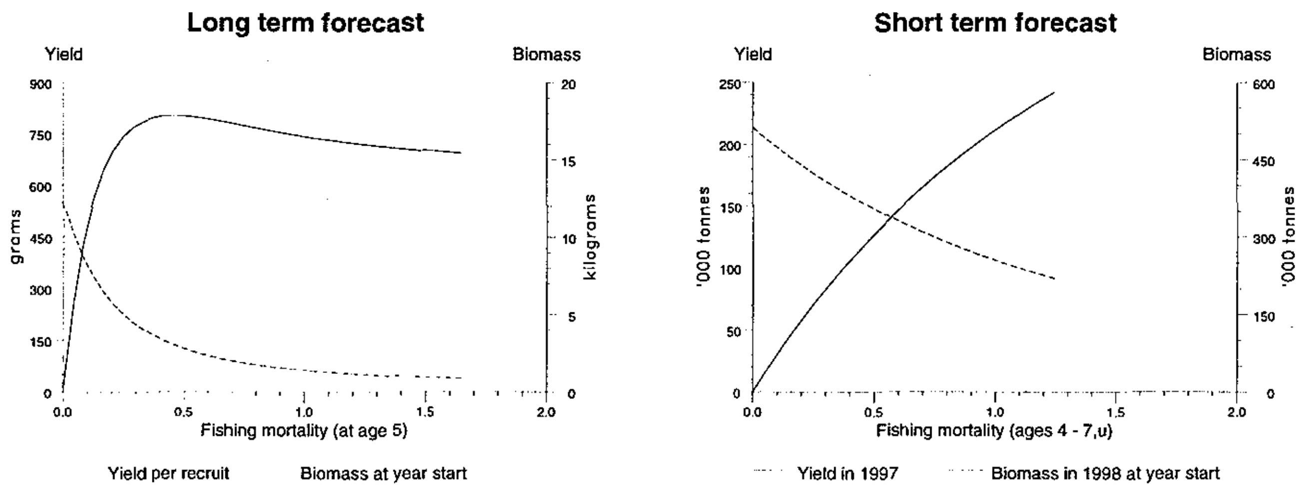
Special comments: Fishing mortality needs to be reduced in 1997 if the rebuilding of the SSB is to continue.

ICES used data from research vessel surveys from 1982 to 1996 to make annual relative estimates of fishing mortality, yield, and stock size over the period. When reported catches were compared to the estimated relative yields, there was a consistent relationship between 1984 and 1991, but reported catches in 1982-1983 and 1992-1995 appeared to be too low. ICES used the relationship between estimated yield and reported catches to develop improved estimates of catch. Estimated catches between 1984 and 1991 were very similar to reported catches in those years. Estimated catches exceeded reported catches by about 20,000 t in 1994 and 1995, and by between 50,000 and 85,000 t in 1982, 1983, 1992 and 1993. ICES concludes that these estimated catches take better account of unreported catches than did catches estimated by the methods used in previous years, and therefore used the new estimated catches in the assessment.

Data and assessment: The information on catches, landings and effort from the commercial fisheries in the years 1992–1994 is regarded as highly unreliable. The 1995 landings are more reliable but still uncertain. The results from the catch analysis therefore become imprecise for the most recent years. The reliability of the catch data should be improved as soon as possible.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

Yield and Spawning Stock Biomass



3.13.5 c Selectivity and Mesh Size for Cod in the Baltic

This section addresses two requests from the IBSFC.

I. Provide a review and summary of the results of the experiments and studies made so far on the selection properties of gears used in the Baltic Sea fisheries for cod and on the survival rate of cod escaping through the meshes (Item f in IBSFC request for advice).

Data sets were reviewed from over 35 studies conducted by Denmark, Sweden, Russia, Poland and Germany. In the studies measurements were made using the alternate haul technique, unhooped cod-end covers and topside cod-end covers. The ranges of the more important variables which may affect selectivity are summarised in the table at the foot of the page.

The windows have been inserted in cod-ends of nominal 105 mm mesh sizes. The mesh sizes quoted in columns 3, 4 and 5 are those of the windows, and were converted to the equivalent of wedge gauge measurements where necessary.

Description of Gears Examined:

The mesh sizes examined in standard diamond mesh codends ranged from 102-140 mm. Several configurations of escape windows were also examined:

Danish Exit Window Codends: The windows are located in the sides of the cod-end below the selvedges and are made of normal netting material turned to form a square mesh configuration. They terminate 2 to 2.5 m ahead of the codline. Most of these windows are made of double twine netting with mesh sizes from 102 to 125 mm inserted in cod-ends of nominally 105 mm mesh size.

Swedish Exit Window Codends: The netting is made from specially treated single twine nylon netting mounted such that the meshes have some rigidity and maintain a wide opening. Like Danish windows they are mounted in cod-ends of 105 mm nominal mesh size and are located in the sides of the cod-end. The Swedish design terminates only 40 to 50 cm from the codline. Mesh sizes of 97 to 117 mm have been tested.

Square mesh exit windows made of normal netting material have also been inserted in the upper panel of the cod-end, either covering the whole upper panel or terminating 2.0 to 2.5 m from the codline. Window mesh sizes of 90 to 119 in standard 105 mm cod-ends mm have been used.

Measurements have also been made of the selectivity of cod-ends fitted with other designs of square mesh window which are of restricted length and positioned either towards the forward or aft end of the cod-end. Although they too suggest improvement in selectivity there are too few data sets and numbers of hauls to allow more detailed analysis.

Summary of all trials during 1994 and 1995

	Standard diamond cod-end	Danish window	Swedish window	Other windows
Number of hauls	113	61	72	22
Mesh size (mm)	102-140	102-125	97-117	90-119
Number of vessels	6	4	3	3
Vessel HP	217-1180	217-1000	898-1180	217-300
Twine type of main body of cod-end	3.1dPA 4.0sPE 4.0dPE	3.0sPA 4.0sPE 4.0dPA 6.0sPA	3.1dPA 4.0dPE	4.0sPE 3.0sPA 3.5dPA
Catch size (kg)	199-1483	169-1430	359-1267	100-182

Results of studies on selection properties of gears

The commercial fishing fleet in the Baltic is dominated by vessels in the engine power range up to 400 HP.

1 Diamond mesh cod-ends

No data from vessels in the power range 301 to 897 HP are available.

a) A mesh size of 126 mm (95% confidence interval 120-134 mm) is required to achieve an L50 of 38 cm for a standard diamond mesh cod-end.

b) A cod-end with the current minimum mesh size of 120 mm has an L50 of 36 cm (95% confidence interval 34-38 cm).

c) A cod-end with the previous minimum diamond mesh size of 105 mm has an L50 of 32 cm (95% confidence interval of 30-33 cm).

2 Danish exit window cod-ends

Data were available from three low-powered vessels (up to 300 HP) and one high-powered research vessel (1000 HP).

a) A window mesh size of 124 mm (95% confidence interval 116–134 mm) is required in a nominal 105 mm diamond mesh cod-end to achieve an L50 of 38 cm.

b) A window mesh size of 118 mm (95% confidence interval 110–128 mm) in a nominal 105 mm diamond mesh cod-end will generate an L50 equivalent to that of a 120 mm standard diamond mesh cod-end.

3 Swedish exit window cod-ends

All the data on Swedish windows were gathered on vessels of 898 to 1180 HP.

a) A window mesh size of 108 mm (95% confidence interval 104-112 mm) is required in a nominal 105 mm diamond mesh cod-end to achieve an L50 of 38 cm.

b) A window mesh size of 103 mm (95% confidence interval 99-106 mm) in a nominal 105 mm diamond mesh cod-end will generate an L50 equivalent to that of a 120 mm standard diamond mesh cod-end.

4 Top exit window cod-ends

No conclusions are offered for these designs because only four data sets are available. They do, however, suggest that selectivity of this design is slightly lower than that of the Swedish exit window design but significantly above that of the Danish design.

Several factors not accounted for in the studies may be important to performance of these gears. Differences in vessel size (HP or tonnage) or vessel type (side trawler or stern trawler) may be associated with changes in selectivity of the cod-ends which they tow, even though the cod-ends may be similar. There are several factors which may cause these changes, such as the design and hence performance of the gear ahead of the cod-end, the operation of the gear (e.g. towing speed, hauling technique) or the interaction between vessel and gear (e.g. in rough weather). The studies reviewed include estimates of selectivity parameters from three types of trawlers (stern, side, and a new form with properties of both). However, differences among the vessel types are not apparent and may be masked by the effect of other factors.

Some studies have indicated that fish condition, season, sex, maturity state, and similar factors may affect gear selectivity. However, when all data are considered from all vessel types, netting material, and catch sizes, no consistent effect emerges.

It has been shown recently in selectivity experiments in other areas that catch size has a significant influence on selectivity parameters. Catch size effects were not investigated in any of the reports of the experiments described here. Also the choice of twine type for both the cod-end and the window may affect the selectivity of that part of the gear, but the effects of twine characteristics on selectivity have not been investigated systematically. Finally, one of the studies reviewed investigated the effect of sea state on selectivity, but found no significant effects.

II. For Cod fisheries, advise on appropriate mesh sizes in different exit windows installed in cod-ends of trawls with 105 mm and in cod-ends with standard diamond meshes, corresponding to a L50 of 38 cm (Item g in IBSFC request for advice).

Advice regarding mesh sizes corresponding to an L50 of 38 cm, and selectivity properties of gears:

1 Standard diamond mesh cod-ends

A mesh size of 126 mm (95% confidence interval 120–134 mm) is required to achieve an L50 of 38 cm for a standard diamond mesh cod-end.

2 Danish exit window cod-ends

A window mesh size of 124 mm (95% confidence interval 116–134 mm) is required in a nominal 105 mm diamond mesh cod-end to achieve an L50 of 38 cm.

3 Swedish exit window cod-ends

A window mesh size of 108 mm (95% confidence interval 104–112 mm) is required in a nominal 105 mm diamond mesh cod-end to achieve an L50 of 38 cm.

4 Selection range

A slight variation of selection range with mesh size is indicated by these data, given by:

selection range (cm) = 5.2 + 0.02771 mesh size (mm)

The following summary table gives mean values and 95% confidence intervals (in brackets). The window mesh sizes have been quoted for the window cases and used to determine their selection factors.

	Diamond mesh cod-ends	Danish exit window cod-ends	Swedish exit window cod-ends
Mesh size to give L50 of 38 cm	126 (120-134)	124 (116-134)	108 (104-112)
Mean selection factor (L50/mesh size)	3.01 (3.17-2.85)	3.06 (3.29-2.83)	3.52 (3.64-3.40)
Mean selection range (L75-L25)	8.7	8.6	8.2
Mesh size to give L50 as for 120 mm diamond cod-end	120	118 (110-128)	103 (99-106)

Results and Advice regarding Escape Mortality

Mortality of Baltic cod escaping from trawl cod-ends equipped with two different types of 95-mm exit windows was investigated during May-June 1994 in the southern Baltic Sea. A total of 261 cod (24–50 cm in length) which had escaped from gears were held in cages for periods of 10 to 14 days. Only two escapees (34 and 36 cm) died during the experiment; both during their first day in the cage. Scale loss was observed in 27% of the cod that had escaped through exit window cod-ends. The average injured area was 2.5% of the total skin area. For the open extension escapees, 35% of fish examined exhibited scale loss, and the average injured area was 2.3% of the total skin area. No clear relationship existed between the degree of skin injury and fish size. Most of the observed skin injuries were probably caused by mechanical abrasion while fish were inside the trawl.

These findings are encouraging and support the concept of conservation of undersized Baltic cod by allowing them to escape through cod-end meshes. Nevertheless, caution is still needed when interpreting these results for management purposes. The fish studied were not subjected to the full range of stresses and damage that may occur during commercial fishing operations. Finnish-Swedish experiments that will focus on estimating escapee mortality of Baltic cod at commercial catch sizes and towing durations are under way in the southern Baltic, and first results will be available in autumn 1996.

3.13.5 d The Effects of a Ban on using Pelagic Trawls for catching Cod during April and May

Answer to a request from the IBSFC to "evaluate the effects of a ban on the pelagic trawl fishery for cod in April–May on spawning stock biomass and yield" (Item h in IBSFC request for advice).

According to available information the catches of cod taken with pelagic trawls in April and May comprised 300 t in 1994 and 1,700 t in 1995. This should be seen in relation to the total catches of cod for those years reported to be 74,000 and 120,000 t respectively. The effects of a ban will thus be small.

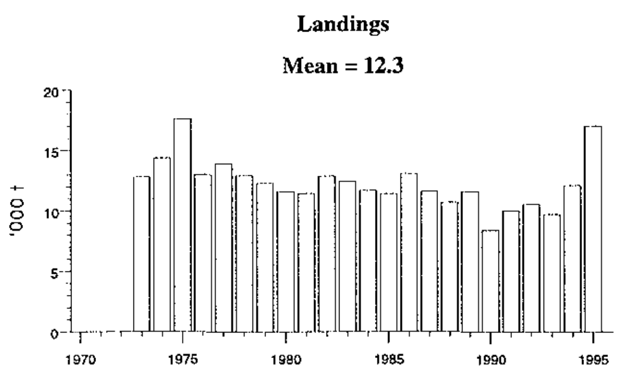
3.13.6 Flounder

(Details in Table 3.13.6.1)

Flounder is mainly taken as a by-catch in cod fisheries but there are also directed trawl fisheries for this species. The total catch of flounder has remained stable for about 20 years (Table 3.13.6.1) with the majority of catches being taken in Sub-divisions 22–25. There has, however, been some change between areas with decreasing catches in the eastern (Sub-divisions 26–32) part of the Baltic. There are not sufficient data available to present analytical assessments and catch forecasts. Indications from analysis of the catch and survey data available are that the stock is moderately exploited and that the stock size is stable or slightly increasing in the eastern part of the Baltic.

The 1993 and 1994 year classes were estimated on young fish surveys in Sub-divisions 24–25 (Oder Bank area) to be low.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

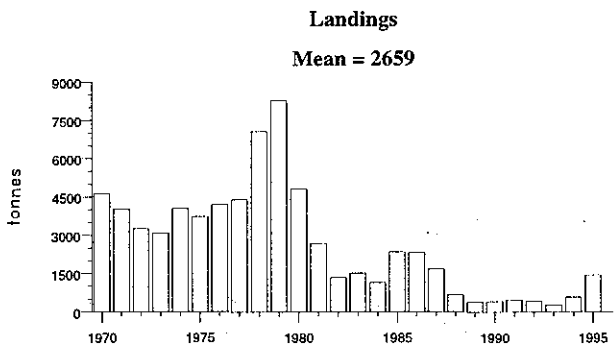


3.13.7 Plaice

(Details in Table 3.13.7.1).

Sub-divisions 22–24 are the most important areas for the plaice fishery in the Baltic. The total catches of plaice (Table 3.13.7.1) were high in the 1970s but have decreased since the early 1980s. Catches are now at 10–15% of the level in the 1970s.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

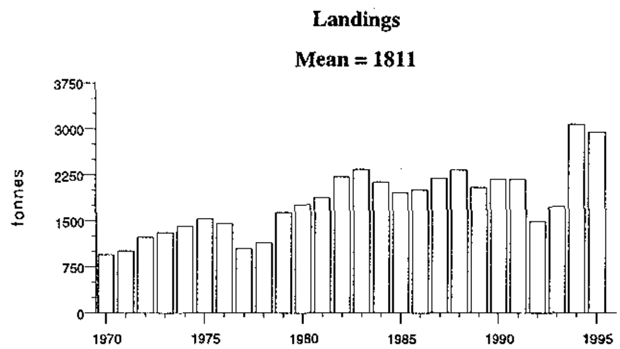


3.13.8 Dab

(Details in Table 3.13.8.1).

The total catches of dab (Table 3.13.8.1) were rather stable at around 2,000 t per year in the 1980s and up to 1993. The catches in 1994 increased to 3,000 t. The majority of the catches are taken in Sub-division 22.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

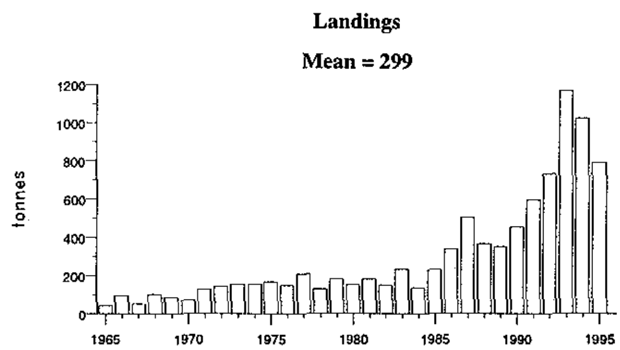


3.13.9 Turbot

(Details in Table 3.13.9.1).

The total catches of turbot in the Baltic (Table 3.13.9.1) have been increasing since 1984 to a level above 1,000 t in 1993–1994. A directed gillnet fishery is developing in Sub-division 25.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).

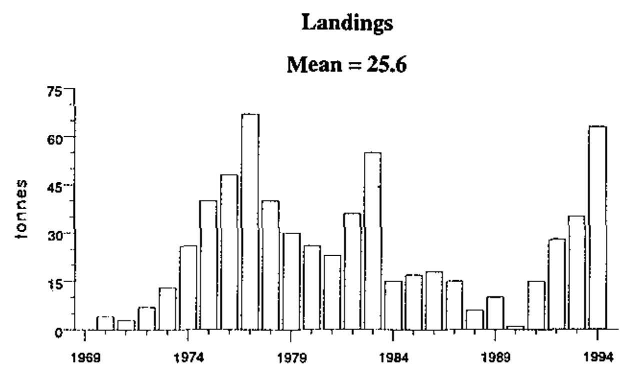


3.13.10 Brill

(Details in Table 3.13.10.1).

The catches of brill are presented in Table 3.13.10.1. There are gaps in information and the total catch figures are preliminary.

Source of information: Report of the Baltic Fisheries Assessment Working Group, April 1996 (CM 1996/Assess:13).



3.13.11 Salmon and Sea Trout

3.13.11 a Overview

Salmon

There are salmon stocks with a significant proportion of natural reproduction in 35-40 rivers in the Baltic area. An estimate of the smolt run in 1994 suggested that approximately 0.6 million wild smolts migrated. This was a small improvement compared to the smolt run in 1993. In 1995 and 1996 the estimated smolt production was 0.3 million smolts. Many rivers have been dammed and spawning and nursery areas have disappeared. To compensate, hatcheries have been built on these rivers and reared stocks are released. Normally these fish feed in the sea and migrate back to rivers as spawners where they are taken and used for broodstocks. The fish are reared in the hatchery to the smolt stage and released. However, in Finland hatchery-reared stocks are kept in hatcheries for their entire life span and are used as broodstock. The broodstock is genetically strengthened by frequently introducing spawning fish returning from the sea. A total of 4.5 million hatchery-reared smolts were released in rivers and at coastal release sites in 1995.

While feeding in the sea, salmon are caught by drift nets and long lines and during the spawning run they are caught along the coast mainly in trap nets. In the river mouths set gill nets and trap nets are used. There is also a traditional recreational angling fishery in the rivers and a trolling fishery occurs in coastal areas. The offshore fishery and most of the coastal fisheries exploit both wild and reared salmon. Wild salmon cannot be easily distinguished from reared fish and it is therefore only possible to exploit reared fish separately during the homing migration when salmon approach their release sites near rivers that do not support wild salmon populations. Total annual catches of reared and wild salmon by country and area are given in Table 3.13.11.1.

Status of stocks

The numbers of wild salmon returning to some of the rivers in the Gulf of Bothnia are so low that the stocks are on the verge of extinction and, furthermore, all the stocks are severely affected by the M74 syndrome. Thus, in recent years these wild salmon stocks have been considered to be outside safe biological limits. At present only 12 of the original 44 wild salmon stocks in the rivers discharging into the Gulf of Bothnia still exist. In the Gulf of Finland only six stocks remain and in the Main Basin approximately 15 stocks remain. The estimated production of wild smolts in the Gulf of Bothnia decreased from 416,000 in 1994 to 155,000 in 1995 and 151,000 in 1996. The estimated production in the Gulf of Bothnia in 1997 is approximately 220,000. Production in the Gulf of Finland and in the Main Basin has also declined (Table 3.13.11.2).

The salmon stocks in the Main Basin are in a better state than those in the Gulf of Bothnia and Gulf of Finland. The sharp reduction in parr production since 1994 indicates that the gradual increase in the stocks in recent years will not continue and the stocks are likely to decline. The smallest stocks are at risk of extinction but the larger stocks and those in the Main Basin are not so sensitive to temporal variations in the size of the spawning stock. The continued existence of these small Main Basin stocks has probably been possible because they are not as heavily exploited by the coastal fishery as the Gulf of Bothnia stocks and because river fisheries have not been permitted on these stocks. The combination of decreased spawning stock and low survival of fry due to the high M74 mortality may result in the loss of future salmon generations in some of the rivers currently supporting naturally reproducing stocks.

The M74 syndrome

The M74 syndrome has been well described previously. It causes mortality among newly-hatched yolk-sac fry from sea-run females. The incidence of M74 in the Baltic has varied from year to year, and for many years it did not give rise to any major problems. In 1992, however, the frequency of M74 increased dramatically, and the figures in 1993 were even higher (Table 3.13.11.3). The incidence of M74 has remained at a high level since 1992 and preliminary figures in three Swedish hatcheries in 1996 show that the mortality due to M74 remains high. Although M74 has affected reared stocks seriously, the influence of M74 on wild stocks is of greater concern because of the value placed on wild stocks and because no remedial measures are possible for them. In 1989-1991 the 0+ parr density in the river Ume/Vindelälven, Sub-division 31, was correlated to the estimated egg deposition, but in 1993-1995 the parr densities were low (Figure 3.13.11.1). The escapement leading to the 1995 egg deposition was one of the highest recorded since 1974 but, nevertheless, the resulting parr density was very low. This indicates that a very high mortality took place in the period between egg deposition and the estimation of parr densities.

Sea trout

Most of the sea trout stocks in the Baltic make short migrations into coastal water but Polish stocks and some Swedish stocks from rivers flowing into the Main Basin migrate into the offshore areas. Coastal stocks are mainly taken in directed fisheries using anchored floating nets or traps. The stocks entering the offshore area are exploited by salmon drift netting and long lines. Sea trout are important for the recreational fishery in coastal areas and rivers.

Status of stocks

Naturally-reproducing sea trout stocks exist in approximately 250 rivers and brooks. Stocks in at least 24 rivers are in good condition with parr densities at optimal levels. The stocks in the Gulf of Bothnia, however, and particularly those in Sub-division 31, are in a poor state. Several of these stocks are probably overexploited to the extent that they now exist mainly as non-migratory brown trout populations which produce some sea trout smolts. A rough estimate of the wild production is around 0.5 million smolts taking into account that there are a number of stocks that have not been surveyed.

Hatchery-reared smolt production, including enhancement, increased in 1995 to a level of 3.6 million and is expected to be approximately 3.5 million in 1996. Most of the sea trout catch is based on smolt releases. Sea trout stocks are affected by M74 or a syndrome resembling it, but the incidence of this syndrome is normally much lower than in salmon. However, densities of sea trout in two Swedish rivers in the Main Basin have decreased to the same extent or higher than the salmon parr densities in these rivers, which may indicate that the influence of M74 on sea trout stocks has been underestimated.

The M74 syndrome

There is now unequivocal evidence that sea trout are affected by M74 or a syndrome resembling it. There is no full description of the etiology of the syndrome in sea trout but hatchery managers and pathologists see clear similarities but some differences. A high proportion of sea trout alevins do not die at an early phase of the outbreak of M74 as in the case of salmon, but instead they wither away slowly as they seem to lack the motivation to start feeding.

All Swedish stocks in the northern part of the Gulf of Bothnia are largely unaffected by the syndrome and only sea trout from the River Dalälven, the southernmost Swedish stock in the Gulf of Bothnia, are affected by M74 to a small extent. Sea trout at Åland, only 150 km from the River Dalälven, exhibit an incidence of M74 which is considerably higher. Sea trout from the Gulf of Finland are also affected by M74 to some extent.

The situation is less well known with regard to stocks in rivers in the Main Basin area. Sea trout from the small Swedish River Åvaån in Sub-division 29N experienced mortalities of 10-20% in the early 1990s with a higher incidence in 1992-93 arising from the syndrome. In 1995 all the sea trout in the hatchery on the river Åvaån were treated with thiamine and no losses of fish were experienced in that year. The incidence of M74 in the widely migrating sea trout stocks in the River Emån and Mörrumsån is not known, but electrofishing surveys have shown that juvenile sea trout densities have decreased to a similar or even greater degree than salmon densities in these rivers. There is no evidence that River Vistula sea trout in Poland have been affected by M74, though it is a widely migrating fish.

3.13.11 b Salmon in the Main Basin and the Gulf of Bothnia (Sub-divisions 24–31)

Catch data (Table 3.13.11.1):

TACS

Year	ICES advice	Catch corresp. to advice '000 t	Rec TAC '000 fish	Agreed TAC[1] '000 t	Agreed TAC[1] '000 fish
1987	No increase in effort	-	-		
1988	Reduce effort	<3.00			
1989	TAC	2.90	850		
1990	TAC	1.68			
1991	Lower TAC	-[2]	-[2]	3.35	
1992	TAC		688	3.35	
1993	TAC		500[3]		650
1994	TAC		500[3]		600
1995	Catch as low as possible in offshore and coastal fisheries	-	-		500
1996	Catch as low as possible in offshore and coastal fisheries	-	-		450

Landings

Year	Rivers	Coast	Offshore	Coast and offshore[4]		Total	
	'000 t	' 000 t	'000 t	'000 t	'000 fish[5]	'000 t	'000 fish[5]
1987	0.05	0.39	3.21	3.59	891	3.64	897
1988	0.06	0.41	2.43	2.85	784	2.90	791
1989	0.07	0.65	3.27	3.92	1035	4.00	1049
1990	0.12	1.31	3.65	4.96	1113	5.07	1131
1991	0.11	1.03	3.00	4.03	757	4.14	775
1992	0.11	1.24	2.66	3.90	710	4.01	726
1993	0.11	0.83	2.57	3.40	642	3.51	656
1994	0.09	0.58	2.25	2.82	579	2.92	594
1995[6]	0.11	0.65	1.89	2.54	553	2.65	571

[1]TAC does not include river catch. [2]TAC much below present levels. [3]Equivalent to 2.25-2.70 thousand t. [4]For comparison with TAC. [5]Catch in numbers before 1993 based on estimates. [6]Preliminary.

Historical development of the fishery: The salmon fishery in the Baltic is mainly based on reared fish. The salmon are exploited in offshore areas by longlining and drift net fleets during their feeding migration and by traps and nets on their return to coastal areas. A non-commercial fishery occurs in coastal areas and in rivers. The landings in both the offshore fishery and the coastal and river fisheries peaked in 1990 and have since declined. The largest catches are taken in the offshore fisheries in the Main Basin and in the Gulf of Bothnia. The proportion of the total catch taken by the coastal and river fisheries increased in 1990, but subsequently reverted towards a higher proportion being taken by the offshore fishery.

The wild salmon populations are at extremely low levels and in recent years reared fish have constituted about 90% of the catch. This makes the management of the fishery difficult as wild fish cannot easily be distinguished from reared fish. The only fisheries that do not exploit wild salmon are those in rivers and to a lesser extent in the mouths of rivers which do not support wild stocks.

There has been a single TAC in operation for all the marine fisheries (rivers excluded) for salmon since 1991. Until 1992 the TAC was expressed in weight and subsequently it has been expressed in numbers of fish.

State of stocks: Salmon smolt production in the Gulf of Bothnia and Baltic Main Basin are shown below (in millions):

Year	Wild[1]	Reared	Total
1987	0.43	5.55	5.98
1988	0.42	5.67	6.09
1989	0.43	5.23	5.66
1990	0.42	4.39	4.81
1991	0.43	4.09	4.52
1992	0.47	4.70	5.17
1993	0.51	5.37	5.88
1994	0.58	3.95	4.53
1995	0.29	4.49	4.78
1996[2]	0.31	4.80	5.11

[1]Older data on wild smolt production mainly guesses; since 1990s to a larger extent based on annual surveys. Smolt production measured only for rivers Tornionjoki and Simojoki (10–30% of total production).[2] Preliminary data. Figures in the text table revised compared to the previous year's report.

Wild stocks: At present only 12 of the original 44 wild salmon stocks in rivers discharging into the Gulf of Bothnia remain in existence. These stocks are considered to be outside safe biological limits for the following reasons. The numbers of fish returning to some of these rivers are so low that the stocks are on the verge of extinction and, furthermore, all stocks in that area are severely affected by M74. Only in the Main Basin is the situation somewhat better and some of the stocks in this area are within safe biological limits. The production of wild salmon has been below optimal levels for many years. Preliminary data suggest that the production of wild smolts will remain at a very low level in 1996. The reduction in TAC has resulted in an increase in escapement. In some rivers the 1995 escapement was the highest since 1974. However, this high escapement is not expected to result in an increase in the stock status due to the negative impact of the M74 syndrome.

The combined effect of low survival of eggs/fry and the expected decrease in the spawning stocks will increase the risk of extinction of wild salmon in several rivers, particularly the smaller stocks producing only some hundreds or thousands of smolts annually. In addition there is an increased risk of reduction in genetic diversity.

Detailed data on the historical development of Latvian salmon stocks are not available, but recent parr surveys suggest that these stocks are apparently not affected by M74 to any great extent and they are in better condition than stocks in the Gulf of Bothnia.

Reared stocks: The production of reared salmon smolts has been about 5 million for several years. The existence of M74 in Swedish broodstocks reduced production in 1994-1995 but not in 1996. Reared smolt production in other countries may decrease slightly for other reasons. Reared smolt production in Latvia is not influenced by M74.

Forecast for 1997: *Wild stocks:* Surveys of juvenile salmon around the Baltic suggest that the wild smolt runs in 1994 were the highest for many years (0.6 million smolts) but this is still only a fraction of the present potential production. In 1995 the production decreased to 0.3 million smolts. The current low densities of parr in Finnish and Swedish rivers suggest that the production in these rivers will be similar in 1996 and 1997. This will result in a significant decrease in returns of adult wild salmon beginning in 1997.

Reared stocks: The forecast production of reared smolts in 1996 is 4.57 million smolts. Reared production was reduced by M74 in some countries in 1994–1995 and this will result in a decrease in stocks of reared adult salmon in 1996–1997.

Management advice: ICES advises that the objective of preventing further decrease in naturally-produced smolts cannot be achieved by TAC management. In 1997 the level of TAC for wild salmon should be zero (see Section 3.13.11 d, item j). With respect to the objective of increasing natural production of wild Baltic salmon to at least 50% of the natural production capacity of each river by 2010, ICES advises that the calculated TAC for 1997 would be 407,000 salmon under moderate impact of M74 and 65,000 fish under heavy impact of M74. This is an aggregate calculation and does not take into account the state of individual rivers and it assumes relatively constant conditions (including natural mortality) over this period (see Section 3.13.11 d, item k).

In order to safeguard wild stocks, and particularly to minimise the risk of extinction of individual stocks, ICES recommends that the offshore and coastal fisheries should be closed.

Reared fish should be harvested close to their points of release where this can be achieved without fishing wild salmon (i.e. in the mouths of rivers which support no wild stocks and at certain coastal release sites).

Special comments: The M74 syndrome caused high mortalities among the offspring of sea-run females in 1992–1995 and is expected to do so again in 1996. Thus the risk that more of the wild Baltic salmon stocks may become extinct can only be reduced by major changes in the current management policy. It is vitally important that as many wild fish as possible are allowed to spawn in order to maintain a reasonable level of juvenile salmon production and redress the current situation of critically low juvenile numbers.

Because current information suggests that the state of Latvian wild salmon stocks is relatively good, a fishery not exceeding the present magnitude may be allowed in the Gulf of Riga. However, intensified annual surveys of the wild stocks are necessary to justify the continuation of this fishery.

The presence of M74 has made it necessary to monitor the status of wild stocks in a greater number of rivers to provide an assessment of the status of wild stocks. At the same time the large annual variation in natural mortality of smolts leaving the rivers is an additional source of variation.

Data and assessment: Area and temporal assessment based on age-disaggregated catch data and tagging data.

Estimates of wild smolt production are available for each region, but many estimates are based on limited surveys. Unreported catches and discards are not included in the assessment. Predation by seals on salmon in fishing gears has increased. Salmon caught in fishing gears and eaten by seals constitute an increasing unreported mortality and may in some areas represent 10–30 % of the reported catches.

Source of information: Report of the Baltic Salmon and Trout Assessment Working Group, April 1996 (CM 1996/Assess: 12).

3.13.11 c Salmon in the Gulf of Finland (Sub-division 32)

Catch data (Table 3.13.11.1):

TACs

Year	ICES advice	Catch corresp. to advice '000 fish	Agreed TAC '000 t	Agreed TAC '000 fish
1987	No advice	-		
1988	No advice	-		
1989	No advice			
1990	No advice			
1991	No advice		0.43	
1992	No advice		0.43	
1993	TAC for reared stock	109[1]		109
1994	TAC for reared stock	65[2]		120
1995	Catch as low as possible in offshore and coastal fisheries	-		120
1996	Catch as low as possible in offshore and coastal fisheries	-		120

[1]Equivalent of 600 t. [2]Equivalent of 400 t.

Landings

Year	Coast & Rivers '000 t	Off-shore '000 t	Coast & off-shore '000 t	Coast & off-shore '000 fish	Total '000 t
1987	0.06	0.29	0.35		0.35
1988	0.11	0.16	0.27		0.27
1989	0.15	0.25	0.40		0.40
1990	0.38	0.18	0.55		0.55
1991	0.40	0.25	0.65		0.65
1992	0.42	0.11	0.53		0.53
1993	0.32	0.13	0.44	111	0.45
1994	0.15	0.11	0.25	57	0.26
1995[1]	0.20	0.05	0.24	56	0.25

[1]Preliminary. Table revised because of additional data.

Historical development of the fishery: From the 1950s to the 1970s there was a small offshore long-line fishery in the Gulf of Finland based on wild salmon production and releases of reared smolts in the former USSR. With the growth of smolt-rearing programmes in Finland in the 1980s this fishery expanded and a coastal trap net fishery developed.

A TAC was introduced in 1991. In 1994–1996, the TACs were 120 thousand fish.

State of stocks: Salmon smolt production in the Gulf of Finland is shown below (in thousands):

Year	Wild[1]	Reared	Total
1987	15	593	608
1988	15	569	584
1989	15	432	447
1990	15	573	588
1991	15	501	516
1992	15	415	430
1993	15	558	573
1994	15	609	649[3]
1995	10	699	720[3]
1996[2]	10	570	580

[1]Data on wild smolt production assumed until 1994. 1995 figures based on surveys. [2]Preliminary data. [3]Including enhancement.

Wild stocks: There are wild salmon stocks in 5-6 rivers in the Gulf of Finland, but information on these is very limited. Surveys have shown that parr occur in five of the rivers.

Reared stocks: Hatchery production in the Finnish rearing programme has been stable at around 400,000 smolts annually. In Finland broodstocks are retained in hatcheries for their entire life span (egg to adult) but every second or third year offspring from sea-run fish are added to the broodstock. In 1994, as in previous years, offspring from these sea-run females had a high mortality due to M74.

Forecast for 1997: *Wild stocks:* The estimated smolt production in 1995–1996 was reduced from the previously assumed level on the basis of low parr densities in surveys in 1995–1996. The most recent estimate of wild production of 10,000 smolt represents less than 2 percent of the wild and reared smolt production. It is probable that wild stocks are severely depleted and some may be close to extinction.

Reared stocks: The smolt production in the Finnish programme increased to 550,000 in 1995 and is expected to be at the same level in 1996.

A *status quo* projection for Sub-division 32 gives a catch prediction for 1997 of 233 t or 44,000 fish. This may be compared to the TAC of 120,000 fish in 1996.

Management advice: ICES advises that the objective of preventing further decrease in naturally-produced smolts cannot be achieved by TAC management. In 1997 the levels of TAC for wild salmon should be zero (see Section 3.13.11 d, item j). **ICES recommends that in order to safeguard the wild stocks, the offshore and coastal fisheries should be closed in 1997. If fishing is permitted, the catch should be as close to zero as possible.**

Reared fish should be harvested close to their points of release where this can be achieved without fishing wild salmon (i.e. in the mouths of rivers which support no wild stocks and at certain coastal release sites).

Special comments: M74 caused high mortalities among offspring from sea-run females in Finnish hatcheries in 1992-1995 and will probably also do so in 1996.

Surveys should be undertaken to improve the data on the occurrence and status of wild stocks in this region. No data are available on the current status of salmon stocks in the area of the Russian Federation.

Data and assessment: Analytical assessment based on catch at age estimated from tag recoveries. Recruitment of smolts from reared salmon and estimates of wild production based on limited surveys not including all rivers.

Source of information: Report of the Baltic Salmon and Trout Assessment Working Group, April 1996 (CM 1996/Assess: 12).

3.13.11 d Requests from IBSFC

In this section, a number of specific requests for information from IBSFC are addressed. For ease of reference, these are numbered as in the IBSFC request.

j) **Advice on necessary management measures on Baltic Salmon for 1997 including a TAC in numbers, which would prevent any decrease in the natural production of smolts from the average level in 1992–1994.**

TAC Management in recent years has resulted in increases in escapement and, until 1994, in smolt production. Unfortunately, the high incidence of M74 has increased mortality which has offset these benefits. The smolt run during the period 1992–1994 was about 500,000. In 1995 smolt production decreased to 300,000 and parr surveys indicate that smolt production may decrease further due to the M74 syndrome.

As a result, the objective of preventing further decrease in the numbers of naturally produced smolts cannot be achieved by TAC Management (the levels of TAC for wild salmon should be zero).

k) **Advice on management measures for 1997 and subsequent years which would gradually increase the production of wild Baltic salmon to attain by 2010 at least 50% of the natural production capacity of each river with current or potential natural production of salmon. This advice should include consideration of the use of a TAC, of restricting fishing to areas where only reared salmon occur and of delaying opening the coastal fisheries until the homing wild salmon have passed through the respective fishing areas. All measures considered should be subject to the requirement of maintaining the catch at as high a level as possible.**

The production capacity of Baltic rivers

Populations of salmon have been severely reduced or eliminated in most Baltic rivers due to the combined effects of fishing and habitat loss.

Salmon populations currently remain in only 45-50 rivers, and in 12 of these the stocks are maintained entirely by rearing. Thirty-five to 40 rivers have significant wild salmon runs - but most are maintained at present by enhancement rearing programmes. In only 16 rivers are there completely wild salmon populations (Table 3.13.11d.1).

Over 20 rivers currently lacking wild salmon runs were identified as having potential for re-establishment of wild populations (Table 3.13.11d.2).

Improvement of the natural production capacity requires both increasing production in rivers with existing wild populations, and re-establishment of wild populations in rivers currently lacking wild runs.

Increasing production in rivers with existing wild populations

Based on combined rivers in the Gulf of Bothnia, where the natural production is currently lowest compared with potential, it seems that production could be increased to the target of 50% of capacity by 2010 in all areas - but only with severe restriction in fishing pressure and subject to limited increase in the impact of M74. Freshwater habitat does not appear to be a limitation for the area as a whole.

Re-establishment of wild populations

It appears that habitat is available and that introductions could be attempted in the candidate rivers listed in Table 3.13.11d.2. This would be expected to be best accomplished with salmon from native stocks in close proximity. The M74 syndrome and the current level of fishing pressure would make the objective more difficult to obtain.

In order to accomplish the rebuilding and re-establishment targets it seems necessary to eliminate fishing mortality on the wild stocks and on reared fish returning as part of rehabilitation programmes.

It would be possible (and indeed desirable) to have fisheries on reared fish that are not part of rehabilitation programmes and where fisheries can be executed without mortality on wild stocks.

Use of TAC Management

TACs are of limited use in managing these salmon stocks to attain the objective specified above because of the conflict in management of wild and reared components.

Wild stocks need complete protection (i.e. no fishery) but the reared stocks can be fished at an extremely high rate.

A simulation model, based on the current levels of wild and reared fish in the Gulf of Bothnia and Main Basin undertaken with the objective of attaining a gradual increase in production to 2010, while maintaining a fishery at as high a level as possible, implies calculating the level of TAC that would allow escapement of sufficient numbers of spawners to provide a smolt production at the desired level by 2010. The TAC calculated in this manner for 1997 would be 407,000 fish under moderate impact of M74 and 65,000 fish under heavy impact of M74. This is an aggregate calculation and does not take into account the state of individual rivers. It assumes relatively constant conditions including natural mortality over this period.

Restricting fishing areas

The ICES advice from last year describes the complications of restricting fishing to areas where only reared salmon occur. With current information it is not possible to identify sites where it is possible to fish only reared salmon. A fin clipping programme would provide further useful information on this aspect (see item p).

Delayed opening

There appears to be little scope for development of a fishery for reared stocks based on run timing. Limited data to date show substantial overlap in the timing of wild and reared salmon runs. A fin clipping programme would help to define this further.

l) Advice on the appropriateness of employing a fixed balance between reared and wild salmon smolts as a management objective and, if appropriate, on the level at which that balance should be set.

If the management objective is to safeguard wild stocks, then any hatchery releases which support fisheries make it more difficult to achieve that objective. If the management objective is to maximize catches, then hatcheries can operate at as high a level of output as practical. There is no fixed ratio of hatchery to wild smolt production which provides an optimal balance between the two objectives of safeguarding wild stocks and maintaining high catches. Details of each fishery, characteristics of the fisheries management plans, and local variability of production from wild stocks would all influence the appropriate ratio to allow some progress towards each objective.

m) Advice on the relationship between the numbers of salmon smolts released and the TAC level.

For reared stocks, which are not part of re-establishment programmes, it is reasonable to fish all of the stock, except the small amount required for brood stock. The yield, based on experience to date on returns of adults from smolt releases, should be in the order of 10-30% of the number released. The difficulty arises in implementation of such a strategy without negative impact on wild stocks.

n) Examine the possible effects of increased mesh sizes in drift net fisheries on the salmon stocks and fisheries, and in particular on the wild salmon component.

Wild and reared salmon are approximately the same size and are taken together in the gill net fishery. At present, the fishery takes wild salmon prior to spawning as ages A1+ and A2. A small increase in mesh size would result in a higher proportion of A2 but would still take wild salmon prior to spawning. An increase to more than 200 mm is required to avoid age A2 spawners. There is no way to fish reared salmon selectively by mesh size changes.

An increase in mesh size would change the selection of the fishery and would change the size composition of the spawning stock toward younger and smaller fish.

o) Examine the feasibility and usefulness of employing the delayed released technique as a means of achieving the objective stated in k).

Experiments with delayed release have not been successful in increasing returns to target rivers. While survival was enhanced, these fish exhibited a higher degree of straying. With respect to the use of this technique as the basis for a fishery it would be desirable only if it can result in a fishery that does not impact wild stocks.

p) Advice on the use of adipose fin-clipping of reared salmon smolts as a tool in the assessment of wild and reared stocks and in the development of management strategies.

Adipose fin-clipping of reared fish, if carried out throughout the Baltic, would provide vital information on several aspects of management of reared and wild salmon, including catch composition, migration, and run timing. It would make it possible to determine whether fishery management measures such as area and time closures, delayed releases etc., could be used to pursue discrete fisheries without impact on the wild stocks.

ICES recommends that the introduction of a full scale fin-clipping programme for reared fish over the entire Baltic should be considered to:

- **determine, whether it will be possible to operate fisheries on reared salmon which will not impact on wild salmon.**

- **allow the release of wild salmon from fisheries where they are taken inadvertently.**

3.13.11 e Sea trout

Catch data[2] (Table 3.13.11 e1):

Year	Baltic Main Basin	Gulf of Bothnia	Gulf of Finland	Total
1987	319	150	184	653
1988	331	282	290	903
1989	460	331	298	1089
1990	794	432	337	1563
1991	613	463	297	1373
1992	611	469	322	1402
1993	901	250	718	1869
1994	769	198	648	1615
1995[1]	648	227	119	994

[1]Preliminary data. [2]No catch advice is given for sea trout. Weight in t. Catch figures do not include recreational fisheries in all countries.

Historical Development of the fishery: Sea trout stocks in the Baltic exhibit two types of migration pattern. Most of the stocks migrate in the coastal area within about 200 km of the point of release, but particularly those from Poland and a few from southern Sweden move further into offshore areas. The fish that migrate only short distances are mainly exploited in coastal and river fisheries, while those that migrate offshore are also taken as a by-catch in the offshore salmon fishery.

The exploitation pattern is rather variable in different areas. In Sub-division 31, Gulf of Bothnia, sea trout are to a large extent caught in gill nets for whitefish and to a minor extent in a recreational fishery using nets or in trap nets. Sea trout from stocks that migrate into the offshore areas in the Main Basin are exposed to gears used in the salmon fishery, but on the other hand they are not available to coastal gears which may catch them at smaller sizes.

State of stocks: *Wild stocks:* Currently approximately 250 rivers in the Baltic support wild stocks of sea trout. There are no estimates of the original number of sea trout stocks or the current level of natural smolt production. However, stocks in several rivers in the Main Basin are thought to be in good condition with nursery areas well utilized. The stocks in the Gulf of Bothnia, particularly in Sub-division 31, are in a poor state. Several of these stocks are probably overexploited to the extent that they now mainly exist as non-migratory brown trout populations which produce some sea trout smolts.

Reared stocks: Sea trout smolt production is shown below (in thousands):

Year	Baltic Main Basin	Gulf of Bothnia	Gulf of Finland	Total
1987	994	1081	358	2433
1988	1312	1083	226	2621
1989	1537	906	198	2641
1990	1237	1035	237	2509
1991	665	1186	259	2110
1992	1023	1247	314	2584
1993	1576	1171	251	2998
1994	1485	985	285	2755
1995	1967	1243	378	3588
1996[1]	2064	1090	350	3504

[1]Preliminary data.

Hatchery production in the Main Basin has increased in recent years, while the smolt production in the Gulf of Bothnia has been rather stable.

Forecast for 1997: Not available.

Management advice: The stocks remaining in coastal waters are only exploited in local fisheries and should therefore be managed on a national or local basis. Management of local sea trout stocks must take account of the recommended zero catch of wild salmon. The stocks moving into offshore areas would benefit from any regulation restricting salmon catches.

Special comments: It is not known to what extent stocks in southern Sweden migrate to offshore areas or remain in coastal waters. The management of many of these stocks would benefit from knowledge of their migration pattern.

As in the case of wild salmon, sea trout stocks in the Gulf of Bothnia are severely depleted. Changes in local fishery regulations are necessary to improve the status of these stocks.

Some of the Baltic sea trout stocks are affected by M74 or a syndrome resembling it. The effects on sea trout seem to be less serious than for salmon populations, but in some cases the real situation is not clear because of lack of data.

Source of information: Report of the Baltic Salmon and Trout Assessment Working Group. April 1996 (CM 1996/Assess:12).

3.13.12 Baltic Fisheries Research Requirements

Within the present report, ICES has endeavoured to answer the large number of requests for information and advice from the International Baltic Sea Fishery Commission. However, it is recognized that the responses to these requests may be incomplete. In some cases further analysis in future years may enable ICES to provide fuller answers. In most cases, however, the impediment to providing more complete and more helpful answers lies in the lack of appropriate research and data. The number and complexity of questions directed to ICES, moreover, has grown in recent years out of all proportion to the resources available to the scientists contributing to the work carried out by ICES. ICES therefore strongly urges the Commission to review its needs for advice in relation to the availability of resources for research within its Contracting Parties.

Within the context of the present report, ICES is itself in the process of reviewing its research priorities. An important development has been the establishment of a Baltic International Fisheries Survey Working Group whose responsibility it is to coordinate fish surveys in the Baltic, to develop standard survey procedures and to establish a database for use by ICES scientists.

ICES also wishes to stress that the new objectives established by the Commission for the management of salmon stocks create the need for new types of research, particularly into requirements for individual salmon stocks and rivers. The need for this additional research has major implications for research funding.

Table 3.8.2.1 Nominal catch (tonnes) of COD in Division VIIa, 1983–1995, as officially reported to ICES, and Working Group estimates of annual landings.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995[1]
Belgium	139	135	185	222	344	269	467	310	78	174	169	121	187
France	815	912	1,782	1,480	1,717	2,406	352[1]	201[1]	320[1]	927[1]	505[1]	188[1]	111
Ireland	4,032	2,885	4,121	3,991	5,017	5,821	3,656	2,800	2,364	2,260	1,328	1,506	1,414
Netherlands	34	38	104	-	-	-	-	-	-	-	-	-	-
UK (Engl.& Wales)[3]	1,405	1,253	1,200	847	1,922	2,667	6,320	4,752	3,562	3,529	3,244	2,274	...
UK (Isle of Man)	103	98	119	80	44	118	39	48	175	129	57	26	n/a
UK (N. Ireland)[3]	3,463	2,658	2,541	2,992	3,565	4,080							...
UK (Scotland)[3]	336	669	1,038	446	574	472	465	1,767	515	393	453	326	...
UK[4]													2,701
Total	10,327	8,648	11,090	10,058	13,183	15,833	11,283	9,855	7,014	7,412	5,756	4,441	4,413
Unallocated	-312	-265	-607	-206	-289	-1,665	1,468	-2,476	81	323	1,799	961	174
Total figures used by Working Group for stock assessment	10,015	8,383	10,483	9,852	12,894	14,168	12,751	7,379	7,095[2]	7,735[2]	7,555[2]	5,402[2]	4,587

[1]Preliminary.
[2]Revised.
[3]1989–1994 revised. N. Ireland included with England and Wales.
[4]UK (NI) (SCOT) (E & W) combined landings reported for 1995.
n/a = not available.

Table 3.8.2.2 COD in the Irish Sea (Division VIIa).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-5
1968	6.78	13.96	8.54	0.748
1969	8.85	12.74	7.99	0.876
1970	15.20	8.99	6.43	0.668
1971	5.10	10.75	9.25	0.593
1972	14.04	13.84	9.23	0.528
1973	3.29	18.18	11.82	0.774
1974	11.36	14.90	10.25	0.651
1975	3.61	15.61	9.86	0.806
1976	5.36	11.78	10.25	0.713
1977	5.60	12.07	8.05	0.781
1978	12.11	8.53	6.27	0.561
1979	14.38	9.21	8.37	0.713
1980	8.13	10.14	10.78	0.706
1981	3.57	14.68	14.91	0.767
1982	5.36	17.35	13.38	0.941
1983	7.94	14.31	10.02	0.819
1984	8.07	10.29	8.38	0.784
1985	6.55	10.38	10.48	0.852
1986	18.84	9.96	9.85	0.923
1987	8.91	10.71	12.89	0.956
1988	3.88	10.46	14.17	1.005
1989	5.02	12.41	12.75	1.182
1990	5.75	7.89	7.38	1.088
1991	9.12	5.59	7.10	0.988
1992	1.80	6.06	7.74	1.354
1993	5.97	4.76	7.56	1.116
1994	4.24	5.60	5.40	1.058
1995	5.46	4.56	4.59	0.688
Average	7.65	10.92	9.42	0.844
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.8.3.1 Nominal landings of HADDOCK in Division VIIa, 1982–1995, as officially reported to ICES.

Country	1982	1983	1984	1985	1986	1987	1988
Belgium	+	2	3	4	5	10	12
France	30	7	38	31	39	50	47
Ireland	167	224	199	341	275	797	363
UK (England & Wales)	37	15	29	28	22	41	74
UK (Isle of Man)	11	2	2	5	4	3	3
UK (N. Ireland)	29	26	38	215	358	230	196
UK (Scotland)	29	23	78	104	23	156	52
Total	303	299	387	728	726	1,287	747

Country	1989	1990	1991	1992	1993	1994	1995*
Belgium	4	4	1	8	18	22	32
France				73*	41*		
Ireland	215	80	254	251	252	246	320
UK (England & Wales)[1]	252	177	204	244	260	301	...
UK (Isle of Man)	3	5	14	13	19	24	n/a
UK (N. Ireland)[1]							...
UK (Scotland)[1]	86	316	143	114	140	66	...
United Kingdom							404
Total	560	582	616	703	730	659	756

*Preliminary.
[1]1989–1994 revised. Northern Ireland included with England and Wales.

Table 3.8.3.2 Haddock in the Irish Sea (Division VIIa).

Year	Landings
1972	2,204
1973	2,169
1974	683
1975	276
1976	345
1977	188
1978	131
1979	146
1980	418
1981	445
1982	303
1983	299
1984	387
1985	728
1986	726
1987	1,287
1988	747
1989	560
1990	582
1991	616
1992	703
1993	730
1994	659
1995	855
Average	674
Unit	tonnes

Table 3.8.4.1 Nominal catch (tonnes) of WHITING in Division VIIa, 1984-1995, as officially reported to ICES and Working Group estimates of human consumption and discards.

Country	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995[1]
Belgium	99	100	70	109	90	92	142	53	78	50	80	92
France	930	956	770	826	1,063	533[1]	528[1]	611[1]	512[1]	255[1]	367[1]	210
Ireland	4,276	5,521	3,101	4,067	4,394	3,871	2,000	2,200	2,100	1,440[2]	1,418	1,840
Netherlands	5	30	-	-	-	-	-	-	-	-	-	-
UK (Engl.& Wales)[4]	1,224	1,379	1,004	1,529	1,202	6,652	5,202	4,250	4,089	3,859	3,724	...
UK (Isle of Man)	68	57	25	14	15	26	75	74	53	55	44	n/a
UK (N. Ireland)[4]	5,660	8,382	4,940	4,858	4,621							...
UK (Scotland)[4]	275	368	129	281	107	154	236	223	274	318	206	...
UK												3,275
Total human consumption	12,537	16,793	10,039	11,684	11,492	11,328	8,183	7,411	7,106	5,977	5,839	5,417
Unallocated human consumption	-891	-786	+16	-1,020	-1,537	-65	-211	-129	+1,435	+551	+971	-526
Estimated discards from *Nephrops* fishery[3]	3,589	2,229	2,360	3,754	1,901	2,015	2,684	2,664	4,250	2,702	1,180	2,153
Total figures used by the Working Group for stock assessment	15,235	18,236	12,415	14,418	11,856	13,408	10,656	9,946	12,791	9,230	7,936	7,044

[1]Preliminary.
[2]Revised.
[3]Based on UK (N. Ireland) and Ireland data.
[4]1989–1994 revised. Northern Ireland included with England and Wales.
n/a = not available.

Table 3.8.4.2 Whiting in the Irish Sea (Division VIIa).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-4
1980	121.13	17.13	16.79	0.824
1981	63.64	23.37	20.61	0.938
1982	67.56	19.10	18.11	1.133
1983	186.63	11.94	12.35	1.083
1984	135.48	10.09	15.24	1.087
1985	113.59	14.68	18.24	1.237
1986	176.90	11.09	12.42	1.389
1987	92.99	11.17	14.42	1.156
1988	101.78	13.51	11.86	0.978
1989	130.88	11.42	13.41	1.676
1990	128.48	8.77	10.66	1.203
1991	236.58	9.53	9.95	1.128
1992	48.36	11.97	12.79	1.708
1993	101.42	16.65	9.23	1.145
1994	100.20	11.97	7.94	1.380
1995	109.38	11.43	7.04	1.157
Average	119.69	13.36	13.19	1.201
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.8.5.1 Nominal landings (t) of PLAICE in Division VIIa, 1981–1995, as officially reported to ICES.

Country	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995[1]
Belgium	231	130	195	118	285	384	403	243	265	301	138	321	128	332	327
France	51	60	99	38	110	165	87	58	11[1]	105[1]	20[1]	42[1]	19[1]	11[1]	7
Ireland	1,243	923	1,384	1,420	2,000	1,858	2,132	2,009	1,406	1,350	900	1,355	654	547	557
Netherlands	40	29	73	30	1,091	-	-	-	-	-	-	-	-	-	-
UK (Eng. & Wales)[2]	2,117	1,868	1,666	2,301	2,295	1,774	2,366	1,630	2,409	1,959	1,584	1,381	1,119	1,082	...
UK (Isle of Man)	27	12	11	11	26	12	9	12	18	27	51	24	13	14	n/a
UK (N. Ireland)[2]	132	159	183	203	198	272	332	286							...
UK (Scotland)[2]	64	47	42	86	118	119	243	127	76	219	104	70	72	63	...
UK (Total)															1,102
Total	3,906	3,228	3,653	4,207	6,123	4,584	5,572	4,365	4,185	3,961	2,797	3,193	2,005	2,049	1,993
Discards	-	-	-	-	-	250	270	220	0	0	0	0	0	0	0
Unallocated	0	9	-14	34	-1,048	-28	378	420	187	-686	-243	74	-9	17	-132
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	2,554	3,267	1,996	2,066	1,861

[1]Provisional
[2]1989–1994 revised. N. Ireland included with England and Wales
n/a = not available
{UK (Total) excludes Isle of Man data}

Table 3.8.5.2 Plaice in the Irish Sea (Division VIIa).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1964	32.80	8.30	2.88	0.312
1965	16.94	9.51	3.66	0.371
1966	15.43	10.36	4.27	0.429
1967	12.38	10.93	5.06	0.512
1968	14.25	10.19	4.70	0.486
1969	21.15	9.45	4.39	0.468
1970	19.66	8.54	3.58	0.404
1971	13.48	8.33	4.23	0.636
1972	9.99	9.46	5.12	0.607
1973	13.34	7.72	5.06	0.755
1974	13.14	5.83	3.72	0.760
1975	11.01	6.02	4.06	0.764
1976	17.13	4.16	3.47	0.897
1977	19.04	3.22	2.90	0.812
1978	23.00	3.71	3.23	0.718
1979	20.94	4.34	3.43	0.596
1980	15.66	4.87	3.90	0.683
1981	8.37	5.96	3.91	0.556
1982	21.37	5.77	3.24	0.524
1983	21.37	5.06	3.64	0.669
1984	22.60	5.84	4.24	0.530
1985	16.29	7.05	5.08	0.571
1986	19.90	8.04	4.81	0.583
1987	21.66	7.74	6.22	0.804
1988	13.22	7.21	5.01	0.750
1989	7.55	6.92	4.37	0.576
1990	12.19	6.22	3.28	0.561
1991	10.58	5.09	2.55	0.444
1992	10.43	4.86	3.27	0.679
1993	11.00	4.16	2.00	0.496
1994	9.59	4.36	2.07	0.465
1995	9.87	4.49	1.86	0.368
Average	15.79	6.68	3.85	0.587
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.8.6.1 Irish Sea SOLE. Division VIIa. Nominal landings (tonnes), 1983–1995, as officially reported to ICES.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	544	425	589	930	987	915	1,010	786	371	531	495	706	675
France	3	10	9	17	5	11*	5*	2*	3*	11*	8*	8*	3
Ireland	203	187	180	235	312	366	155	170	198	164	98	226	176
Netherlands	224	113	546	-	-	-	-	-	-	-	-	-	-
UK (Eng. & Wales)[1]	219	230	269	637	599	507	613	569	581	477	338	409	...
UK (Isle of Man)	10	6	12	1	3	1	2	10	44	14	4	5	n/a
UK (N. Ireland)[1]	33	38	36	50	72	47						-	...
UK (Scotland)[1]	29	17	28	46	63	38	38	39	26	37	28	14	...
United Kingdom													428
Total	1,265	1,026	1,669	1,916	2,041	1,885	1,823	1,576	1,223	1,234	971	1,368	1,282
Unallocated	-96	32	-523	79	767	114	10	7	-9	25	52	1	48
Total used by Working Group in assessment	1,169	1,058	1,146	1,995	2,808	1,999	1,833	1,583	1,214	1,259	1,023	1,369	1,330

*Preliminary
[1]1989–1994 revised. N. Ireland included with England and Wales.

Table 3.8.6.2 Sole in the Irish Sea (Division VIIa).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-7
1970	11.38	5.86	1.79	0.378
1971	3.56	5.79	1.88	0.393
1972	14.12	5.33	1.45	0.390
1973	6.85	4.45	1.43	0.364
1974	7.51	5.04	1.31	0.401
1975	4.62	5.04	1.44	0.358
1976	18.10	4.67	1.46	0.418
1977	10.51	4.24	1.15	0.361
1978	9.71	5.22	1.11	0.345
1979	5.89	5.57	1.61	0.416
1980	4.91	5.31	1.94	0.540
1981	2.68	5.07	1.67	0.396
1982	6.52	4.53	1.34	0.394
1983	17.78	3.69	1.17	0.400
1984	18.81	3.68	1.06	0.339
1985	27.37	5.27	1.15	0.314
1986	4.49	6.46	2.00	0.423
1987	4.25	7.54	2.81	0.763
1988	5.12	6.20	2.00	0.488
1989	6.77	5.19	1.83	0.453
1990	14.74	3.82	1.58	0.494
1991	5.70	3.26	1.21	0.390
1992	7.26	4.31	1.26	0.379
1993	6.00	3.61	1.02	0.416
1994	4.03	3.90	1.37	0.443
1995	7.39	3.69	1.33	0.450
Average	9.08	4.87	1.51	0.419
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.8.7.1 Irish Sea HERRING (Division VIIa(N)). Catch in tonnes by country, 1982-1995. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1982	1983	1984	1985	1986	1987	1988
France	-	48	-	-	-	-	-
Ireland	300	860	1,084	1,000	1,640	1,200	2,579
UK	3,375	3,025	2,982	4,077	4,376	3,290	7,593
Unallocated	1,180	-	-	4,110	1,424	1,333	-
Total	4,855	3,933	4,066	9,187	7,440	5,823	10,172

Country	1989	1990	1991	1992	1993	1994	1995
France	-	-	-	-	-	-	-
Ireland	1,430	1,699	80	406	0	0	0
UK	3,532	4,613	4,318	4,864	4,408	4,828	5,076
Unallocated	-	-	-	-	-	-	-
Total	4,962	6,312	4,398	5,270	4,408	4,828	5,076

Table 3.8.7.2 Herring in the North Irish Sea (Manx plus Mourne VIIa North).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1976	263.46	12.96	21.25	0.938
1977	325.47	9.67	15.41	0.915
1978	249.40	11.26	11.08	0.787
1979	140.34	10.00	12.34	0.814
1980	161.57	5.97	10.61	0.978
1981	234.57	8.23	4.38	0.451
1982	243.11	13.82	4.86	0.292
1983	247.52	20.60	3.93	0.166
1984	142.58	25.69	4.07	0.144
1985	163.21	20.31	9.19	0.349
1986	194.65	20.65	7.44	0.290
1987	338.97	20.55	5.82	0.226
1988	147.96	21.90	10.17	0.405
1989	204.96	22.46	4.95	0.203
1990	171.30	23.58	6.31	0.239
1991	135.01	23.11	4.40	0.168
1992	232.18	20.12	5.27	0.213
1993	174.60	25.59	4.41	0.146
1994	539.44	27.72	4.83	0.153
1995	298.72	37.84	5.08	0.107
Average	230.45	19.10	7.79	0.399
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.2.1 Nominal landings of Celtic Sea and Western Channel cod as used by the Working Group in 1996.

Divisions VIIf, VIIg and VIIh.

Year	Belgium	France	Ireland	UK (England and Wales)	Others	Total
1971						4647
1972						3807
1973	524	2413	64	196	30	3227
1974	197	1954	24	154		2329
1975	377	2657	15	130	30	3209
1976	226	3535	13	97	1	3872
1977	107	2272	17	62		2458
1978	88	2744	30	69		2931
1979	110	3469	72	86		3737
1980	172	5187	246	209	7	5821
1981	285	7806	108	317		8516
1982	174	6391	142	338		7045
1983	262	7013	274	199		7748
1984	240	4569	204	316		5329
1985	456	5632	198	398		6684
1986	374	7473	226	345		8418
1987	216	7187	380	437		8220
1988	542	12065	612	400		13619
1989	891	14298	1003	482		16674
1990	615	8612	177	689		10093
1991	297	5750	246	590		6883
1992	193	6417	340	655		7605
1993	386	7650	331	604		8971
1994	397	6947	966	480		8790
1995*	388	7397	820	539		9143

* provisional

Divisions VIIe

Year	Belgium	France	Ireland	UK (England and Wales)	Others	Total
1981	34	779		222		1035
1982	42	653		262		957
1983	21	567		292		880
1984	15	390		236		641
1985	12	359		243	1	615
1986	8	1305		406	66	1785
1987	10	1122		524		1656
1988	12	1899		839		2750
1989	19	1453		727	2	2201
1990	6	654		610	9	1279
1991	6	341		408		755
1992	2	331		365		698
1993	5	307		274	2	587
1994	1	308		309	2	620
1995*	12	458		348		818

* provisional

Divisions VIIe,f,g,h

Year	Belgium	France	Ireland	UK (England and Wales)	Others	Total
1988	554	13964	612	1239	0	16369
1989	910	15751	1003	1209	2	18875
1990	621	9266	177	1299	9	11372
1991	303	6091	246	998	0	7638
1992	195	6748	340	1020	0	8303
1993	391	7957	331	878	2	9558
1994	398	7255	966	789	2	9410
1995*	399	7855	820	888	0	9961

* provisional

Table 3.9.2.2 Cod in the Celtic Sea (Divisions VIIf, VIIg and VIIh).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-5
1971	2.70	7.43	4.65	0.634
1972	0.51	5.63	3.81	0.550
1973	1.46	6.46	3.23	0.600
1974	0.44	5.37	2.33	0.409
1975	3.26	5.46	3.21	0.800
1976	1.02	3.66	3.87	0.582
1977	1.46	5.87	2.46	0.400
1978	1.42	6.00	2.93	0.407
1979	3.45	6.55	3.74	0.553
1980	6.22	5.86	5.82	0.788
1981	2.63	6.00	8.52	0.892
1982	1.07	9.61	7.05	0.695
1983	3.78	9.77	7.75	0.910
1984	3.70	4.96	5.33	0.544
1985	3.16	8.84	6.68	0.551
1986	2.65	10.02	8.42	0.804
1987	13.30	8.38	8.22	0.835
1988	6.01	8.33	13.62	0.678
1989	2.08	19.23	16.67	0.917
1990	2.33	13.82	10.09	0.998
1991	5.66	7.30	6.88	0.996
1992	5.84	5.38	7.61	0.875
1993	1.43	8.80	8.97	0.871
1994	6.51	11.47	8.79	0.858
1995	3.02	7.26	9.14	0.858
Average	3.40	7.90	6.79	0.720
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.2.3 COD in Division VIIe, VIIf, VIIg and VIIh.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-5
1988	7.80	9.17	16.37	0.651
1989	2.27	22.06	18.88	0.930
1990	2.49	15.84	11.37	0.998
1991	6.42	7.99	7.64	0.983
1992	6.37	5.79	8.30	0.877
1993	1.53	9.32	9.56	0.854
1994	7.76	12.13	9.41	0.842
1995	4.49	7.80	9.96	0.823
Average	4.89	11.26	11.44	0.870
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.3.1 Whiting in the Celtic Sea and Western Channel (Divisions VIIe,f,g,h)
Nominal catches used by the Working Group in 1996

Divisions VIIf, VIIg and VIIh

Year	Belgium	France	Ireland	UK (E&W)	Netherlands	TOTAL VIIf,g,h	TOTAL VIIe-h
1982	70	7,316	62	191		7,639	9,806
1983	125	8,282	124	165		8,696	10,369
1984	157	6,737	299	231		7,424	8,874
1985	165	7,095	138	192		7,590	8,554
1986	105	6,756	138	136		7,135	8,678
1987	109	8,422	198	289		9,018	11,276
1988	155	9,717	189	354		10,415	13,071
1989	293	10,900	1,334	309		12,836	14,670
1990	304	9,750	174	412		10,640	12,516
1991	290	9,111	190	481		10,072	12,193
1992	106	8,452	236	305		9,099	10,574
1993	143	9,975	654	341		11,113	12,985
1994[1]	226	11,776	1,907	291		14,200	15,937
1995[1]	201	11,867	2,416	392		14,876	16,608

Division VIIe

Year	Belgium	France	UK (E&W)	UK (Scot)	Netherlands	TOTAL
1982	8	1,039	1,052		68	2,167
1983	10	651	1,012			1,673
1984	4	325	723		398	1,450
1985	2	544	418			964
1986	2	788	629		124	1,543
1987	2	1,510	746			2,258
1988	4	1,485	1,167			2,656
1989	3	915	911	5		1,834
1990	4	479	1,352	41		1,876
1991	2	667	1,431	21		2,121
1992	1	543	931			1,475
1993	2	625	1,240	5		1,872
1994[1]	2	716	1,019			1,737
1995[1]	3	702	1,027			1,732

[1]Preliminary

Table 3.9.3.2 WHITING in Divisions VIIe, VIIf, VIIg and VIIh.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-5
1982	20.58	16.29	9.81	1.091
1983	35.67	12.92	10.37	1.458
1984	28.65	13.45	8.87	1.295
1985	32.08	14.12	8.55	1.122
1986	42.60	15.62	8.68	1.066
1987	79.39	16.82	11.28	1.328
1988	64.72	27.05	13.07	1.109
1989	19.62	32.62	14.67	1.009
1990	31.47	21.84	12.52	0.997
1991	60.60	16.54	12.19	1.261
1992	89.83	20.08	10.57	0.908
1993	62.83	34.09	12.99	0.603
1994	28.44	36.14	15.94	0.690
1995	11.55	31.02	16.61	0.860
Average	43.43	22.04	11.87	1.057
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.4.1 Celtic Sea PLAICE. Nominal landings (tonnes) in Divisions VIIf+g, as used by the Working Group.

Year	Belgium	France	Ireland	UK (Engl. & Wales)	Others	Total reported	Unallocated	Total as used by WG
1977	214	365	28	150	0	757	0	757
1978	196	527	0	152	0	875	0	875
1979	171	467	49	176	0	863	0	863
1980	372	706	61	227	7	1,373	0	1,373
1981	365	697	64	251	0	1,377	0	1,377
1982	341	568	198	196	0	1,303	0	1,303
1983	314	532	48	279	0	1,173	-27	1,146
1984	283	558	72	366	0	1,279	-69	1,210
1985	357	493	91	466	0	1,407	345	1,752
1986	544	598	59	324	21	1,546	145	1,691
1987	576	708	122	495	0	1,901	0	1,901
1988	635	687	164	630	0	2,116	0	2,116
1989	835	649	195	472	0	2,151	0	2,151
1990	777	642	167	496	0	2,082	0	2,082
1991	479	533	94	395	0	1,501	0	1,501
1992	326	455	106	301	0	1,188	0	1,188
1993	396	342	87	290	0	1,114	0	1,114
1994	357	281	182	250	0	1,070	0	1,070
1995	337	250	153	284	0	1,023	0	1,023

N.B.: 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 3.9.4.2 PLAICE in the Celtic Sea (Divisions VIIf and VIIg).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1977	3.64	1.12	0.76	0.632
1978	5.10	0.97	0.88	0.673
1979	8.29	1.27	0.86	0.667
1980	5.46	1.68	1.37	0.541
1981	2.21	1.77	1.38	0.486
1982	3.74	2.09	1.30	0.633
1983	9.02	1.92	1.15	0.549
1984	9.95	2.04	1.21	0.644
1985	8.10	2.47	1.75	0.493
1986	8.06	2.82	1.69	0.459
1987	11.95	3.08	1.90	0.657
1988	7.30	3.77	2.12	0.694
1989	3.03	3.09	2.15	0.681
1990	2.23	3.26	2.08	0.764
1991	5.11	2.57	1.50	0.640
1992	4.59	2.61	1.19	0.541
1993	3.08	1.84	1.11	0.451
1994	5.51	1.93	1.07	0.506
1995	4.57	2.05	1.02	0.588
Average	5.84	2.23	1.39	0.595
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.5.1 Celtic Sea SOLE. Divisions VIIf and VIIg. Nominal landings (tonnes), 1983-1995. Data used by the Working Group

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995[1]
Belgium	871	786	786	1,092	704	725	660	689	839	516	512	612	728
France	124	115	126	92	72	89	97	100	80	136	103	86	86
Ireland	48	4	13	12	9	15	32	41	N/A	4	28	47	45
UK(Engl.& Wales)	330	361	403	404	437	317	203	359	395	325	285	264	294
Others	-	-	-	-	-	-	-	-	10	-	-	-	-
Total	1,373	1,266	1,328	1,600	1,222	1,146	992	1,189	1,324	981	928	1,009	1,153
Unallocated	-	-	-	-	-	-	-	-	-217	-	-	-	-
Total used by Working Group in Assessment	1,373	1,266	1,328	1,600	1,222	1,146	992	1,189	1,107	981	928	1,009	1,153

[1]Preliminary

Table 3.9.5.2 SOLE in the Celtic Sea (Divisions VIIf and VIIg).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-8
1971	9.14	6.15	1.86	0.434
1972	4.27	5.14	1.28	0.314
1973	3.43	4.86	1.39	0.264
1974	3.52	5.06	1.11	0.273
1975	2.92	4.47	0.92	0.233
1976	5.17	4.04	1.35	0.416
1977	4.68	4.01	0.96	0.259
1978	5.56	3.84	0.78	0.197
1979	3.60	3.89	0.95	0.274
1980	5.21	4.37	1.31	0.299
1981	4.91	3.66	1.21	0.357
1982	4.97	3.98	1.13	0.349
1983	6.93	3.84	1.37	0.449
1984	4.83	4.08	1.27	0.389
1985	5.85	3.88	1.33	0.418
1986	3.21	3.87	1.60	0.512
1987	5.80	3.03	1.22	0.548
1988	4.50	3.05	1.15	0.543
1989	3.91	2.50	0.99	0.525
1990	9.23	2.74	1.19	0.650
1991	4.59	2.37	1.11	0.397
1992	5.39	3.15	0.98	0.359
1993	4.85	3.09	0.93	0.414
1994	3.50	2.84	1.01	0.453
1995	4.68	2.91	1.15	0.507
Average	4.99	3.79	1.18	0.393
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.8.1 English Channel PLAICE. Nominal landings (tonnes) in Division VIIe, as used by the WorkingGroup.

Year	Belgium	Denmark	France	UK (Engl. & Wales)	Others	Total reported	Unallocated[2]	Total as used by WG
1976	5	-[1]	323	312	-	640	-	640
1977	3	-[1]	336	363	-	702	-	702
1978	3	-[1]	314	467	-	78	-	784
1979	2	-[1]	458	515	-	975	2	977
1980	23	-[1]	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	-[1]	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[2]	1,708	2	2,247	111	2,358
1990	82	2	N/A[3]	1,873	18	1,975	618	2,593
1991	57	-	251[2]	1,314	16	1,638	210	1,848
1992	25	-	277[2]	1,110	19	1,431	193	1,624
1993	56	-	279[2]	1,079	4	1,417	-	1,417
1994	10	-	148[2]	996	3	1,156	-	1,156
1995	13	-	145[2]	859	-	1,017	-	1,017

[1]Included in Division VIId.
[2]Estimated by the Working Group.
[3]Divisions VIId,e = 14,739 t.

Table 3.9.8.2 PLAICE in the Western English Channel (Division VIIe).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1976	3.77	1.33	0.64	0.436
1977	2.00	1.37	0.70	0.429
1978	3.15	1.51	0.78	0.405
1979	7.02	1.64	0.98	0.534
1980	6.40	1.86	1.08	0.545
1981	2.62	2.57	1.50	0.479
1982	5.89	2.76	1.69	0.544
1983	5.41	2.70	1.50	0.584
1984	6.81	2.55	1.55	0.516
1985	6.64	2.76	1.44	0.536
1986	13.51	2.95	1.81	0.540
1987	11.87	2.67	1.96	0.635
1988	8.48	3.64	2.46	0.451
1989	3.36	4.14	2.36	0.611
1990	3.76	4.10	2.59	0.673
1991	4.09	3.26	1.85	0.590
1992	4.64	2.59	1.62	0.668
1993	2.59	2.15	1.42	0.735
1994	3.71	1.79	1.16	0.662
1995	3.83	1.68	1.02	0.682
Average	5.48	2.50	1.50	0.563
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.9.1 Division VIIe SOLE. Nominal landings (tonnes), 1972–1995 used by the Working Group.

Year	Belgium	France	UK (Engl. & Wales)	Other	Total Reported	Unallocated[2]	Total as used by WG
1972	6	230[1]	201	-	437	-	437
1973	2	263[1]	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[3]	611	7	799	362	1,161
1990	41	81[3]	634	1	757	325	1,082
1991	35	111[2]	480	1	627	104	731
1992	41	122[2]	456	1	620	149	769
1993	59	223	480	-	747	15	762
1994	33	261	546	-	840	-162	678
1995[3]	21	283	562	-	866	-142	724

[1]Estimated from Division VIId,e total by the Working Group.
[2]Estimated by the Working Group.
[3]Provisional

Table 3.9.9.2 SOLE in the Western English Channel (Division VIIe).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1969	1.16	2.28	0.35	0.182
1970	3.08	2.64	0.39	0.189
1971	2.77	2.27	0.43	0.247
1972	2.33	2.94	0.44	0.196
1973	3.49	2.04	0.46	0.262
1974	3.54	2.20	0.43	0.208
1975	3.10	3.06	0.49	0.176
1976	6.88	2.91	0.62	0.188
1977	4.89	3.58	0.61	0.159
1978	4.35	4.33	0.86	0.207
1979	5.10	4.99	1.18	0.246
1980	8.83	5.56	1.27	0.221
1981	4.84	4.79	1.22	0.283
1982	3.98	5.29	1.45	0.336
1983	6.27	4.49	1.50	0.396
1984	6.83	4.19	1.37	0.375
1985	3.81	3.89	1.41	0.399
1986	5.63	3.89	1.37	0.378
1987	3.60	4.17	1.16	0.327
1988	3.82	4.26	1.35	0.380
1989	3.04	3.07	1.16	0.413
1990	6.45	3.01	1.08	0.359
1991	4.17	3.04	0.73	0.232
1992	3.80	3.36	0.77	0.238
1993	2.35	2.94	0.76	0.289
1994	2.66	3.28	0.68	0.213
1995	4.76	3.19	0.72	0.255
Average	4.28	3.54	0.90	0.272
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.10.1 Bay of Biscay sole (Divisions VIIIa,b). International landings and discards used by the Working Group (in tonnes).

Years	Official landings	Unallocated landings	WG landings	WG catches	Discards
1979	2443	176	2619	2866	247
1980	2689	297	2986	3255	269
1981	2694	242	2936	3352	416
1982	1764	2049	3813	4321	508
1983	2669	959	3628	4073	445
1984	3183	855	4038	4402	365
1985	3925	326	4251	4556	305
1986	4567	238	4805	5031	226
1987	4379	707	5086	5676	590
1988	4451	931	5382	6029	647
1989	5790	55	5845	6524	679
1990	5537	379	5916	6471	555
1991	4707	862	5569	6047	478
1992	6360	190	6550	7027	477
1993	6023	397	6420	6791	371
1994	6879	347	7226	7593	367
1995	5858	358	6205	6544	338
Mean	4348	551	4706	5327	428

Table 3.9.10.2 Sole in the Bay of Biscay (Divisions VIIIa,b).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1984	53.06	12.18	4.40	0.314
1985	47.67	13.23	4.56	0.327
1986	51.43	14.48	5.03	0.350
1987	48.17	15.19	5.68	0.375
1988	57.03	14.32	6.03	0.420
1989	56.15	13.28	6.52	0.496
1990	61.69	12.96	6.47	0.451
1991	39.49	13.59	6.05	0.402
1992	40.82	14.86	7.03	0.473
1993	21.65	16.54	6.79	0.444
1994	38.29	15.03	7.59	0.561
1995	46.08	13.12	6.54	0.639
1996	.	9.70	.	.
Average	46.79	13.73	6.06	0.438
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.11.1 Celtic Sea and Division VIIj HERRING landings by calendar year (t), 1986–1995. (Data provided by Working Group members.)

These figures may not in all cases correspond to the official statistics and cannot be used for management purposes.

Year	France	Germany	Ireland	Netherlands	U.K.	Unallocated	Discards	Total
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	1,000	200	700	2,500	20,200
1991	+	100	19,400	1,600	-	600	1,900	23,600
1992	500	-	18,000	100	+	2,300	2,100	23,000
1993	-	-	19,000	1,300	+	-1,100	1,900	21,100
1994	+	200	17,400	1,300	+	-1,500	1,700	19,100
1995[1]	200	200	18,000	100	+	-200	700	19,000

[1]Preliminary

Table 3.9.11.2 Celtic Sea and Division VIIj herring landings (t) by season (1 April–31 March). (Data provided by Working Group members).

These figures may not in all cases correspond to the offical statistics and cannot be used for management purposes.

Year	France	Germany	Ireland	Netherlands	U.K.	Unallocated	Discards	Total
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	500	100	21,400	1,600	-	-100	2,100	25,600
1992/1993	-	-	18,000	1,300	-	-100	2,000	21,200
1993/1994	-	-	16,600	1,300	+	-1,100	1,800	18,600
1994/1995	+	200	17,400	1,300	+	-1,500	1,900	19,300
1995/1996	200	200	20,000	100	+	-200	3,000	23,300

Table 3.9.11.3 Herring South and South West of Ireland (Celtic Sea + VIIj).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings[1]	Fishing Mortality Age 2-7
1958	324.61	94.67	22.98	0.406
1959	1,037.59	107.37	15.09	0.329
1960	294.10	108.65	18.28	0.354
1961	259.29	94.73	15.37	0.199
1962	511.74	90.86	21.55	0.435
1963	274.18	83.05	17.35	0.286
1964	1,037.16	101.69	10.60	0.171
1965	359.84	124.51	19.13	0.237
1966	656.76	117.69	27.03	0.314
1967	688.55	116.65	27.66	0.410
1968	849.32	127.94	30.24	0.353
1969	452.97	119.79	44.39	0.550
1970	241.26	88.86	31.73	0.502
1971	874.17	87.15	31.40	0.709
1972	273.15	76.96	38.20	0.601
1973	312.54	56.10	26.94	0.657
1974	138.28	40.03	19.94	0.633
1975	152.42	29.14	15.59	0.607
1976	202.95	26.30	9.77	0.593
1977	174.05	26.67	7.83	0.412
1978	134.71	26.21	7.56	0.384
1979	237.26	28.22	10.32	0.502
1980	144.88	26.95	13.13	0.724
1981	407.74	30.70	17.10	0.886
1982	658.45	46.85	13.00	0.790
1983	728.92	68.23	24.98	0.660
1984	569.64	61.83	26.78	1.080
1985	532.07	62.03	20.43	0.532
1986	531.50	66.97	25.02	0.568
1987	982.75	74.21	26.20	0.781
1988	429.83	74.27	20.45	0.423
1989	509.68	69.22	23.25	0.573
1990	441.50	65.00	18.40	0.411
1991	197.44	55.74	25.56	0.520
1992	869.57	57.39	21.13	0.915
1993	331.48	55.24	18.62	0.505
1994	876.16	67.84	19.30	0.481
1995	1,135.79	85.20	23.31	0.525
Average	495.64	72.13	21.20	0.527
Unit	Millions	1000 tonnes	1000 tonnes	-

[1]By season 1 April - 31 March of following year

Table 3.9.12.1 Nominal catch of sprat (t) in Divisions VIId,e, 1983-1995.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	3	-	-	-	-	-	-	-	-	-	-	-	-
Denmark	638	1,417	-	15	250	2,529	2,092	608	-	-	-	-	-
France	60	47	14	-	23	2	10	-	-	35	2	1	+
Germany	-	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	1,454	589	-	-	-	-	-	-	-	-	-	-	-
Norway	-	-	-	-	-	-	-	-	-	-	-	-	-
UK (Engl.& Wales	4,756	2,402	3,771	1,163	2,441	2,944	1,319	1,508	2,567	1,790	1,798	3,132	1,535
Total	6,911	4,455	3,785	1,178	2,714	5,475	3,421	2,116	2,567	1,825	1,800	3,133	1,535

[1]Preliminary.

Table 3.9.12.2 Sprat in the English Channel (Fishing Areas VIId,e).

Year	Landings
1974	3,793
1975	1,571
1976	3,724
1977	3,237
1978	4,999
1979	14,833
1980	17,732
1981	13,890
1982	6,612
1983	6,911
1984	4,455
1985	3,785
1986	1,178
1987	2,714
1988	5,475
1989	3,421
1990	2,116
1991	2,567
1992	1,825
1993	1,800
1994	3,133
1995	1,535
Average	5,059
Unit	tonnes

Table 3.9.13.1 Megrim (*L. whiffiagonis*) in sub-areas VII and VIIIa,b. Nominal landings and catches (t) provided by the Working Group.

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
France			4464	4875	5071	5393	4266	3652	4044	3590	3139	3717
Spain			10242	8772	9247	9482	7127	7780	7349	6526	5624	6129
U.K.			2048	1600	1956	1451	1380	1617	1982	2131	2238	2534
Ireland			1563	1561	995	2548	1381	1956	2113	2592	2420	2900
Belgium			202	151	185	288	167	38	58	43	124	217
Total landings	16659	17865	18519	16959	17454	19162	14321	15043	15546	14882	13545	15497
Total discards	2169	1732	2321	1705	1725	2582	3242	3579	3062	3754	2612	3064
Total catches	18828	19597	20840	18664	19179	21744	17563	18622	18608	18636	16157	18561

Table 3.9.13.2 Megrim (*Whiffiagonis*) in Divisions VII and VIII.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1984	234.31	87.68	18.83	0.195
1985	228.68	84.82	19.60	0.213
1986	214.33	87.68	20.84	0.192
1987	200.59	91.22	18.66	0.239
1988	188.90	82.85	19.18	0.244
1989	250.87	68.64	21.74	0.288
1990	310.70	62.94	17.56	0.331
1991	364.25	62.20	18.62	0.473
1992	335.14	67.66	18.61	0.350
1993	268.59	71.10	18.64	0.357
1994	433.58	75.84	16.16	0.277
1995	267.04	90.44	18.56	0.250
Average	274.75	77.75	18.92	0.284
Unit	Millions	1000 tonnes	1000 tonnes	-

Table3.9.14.1. Landings (tonnes) of both species of anglerfish in Divisions VIIb-k and VIIIa,b

Working group estimates

Year	VIIb-k	VIIIa,b	Total
1985	23132	6250	29382
1986*	25987	5897	31883
1987*	22295	7233	29528
1988*	22494	5983	28477
1989*	24730	5276	30006
1990*	23381	5950	29331
1991*	20363	4684	25047
1992*	17537	3530	21066
1993*	16633	3507	20140
1994*	18093	3841	21934
1995**	20999	4034	25033

* revised

** preliminary

Table 3.9.14.2 Landings (tonnes) of L. piscatorius in Divisions VIIb-k and VIIIa,b

Working group estimates

Year	VIIb-k	VIIIa,b	Total
1985	18163	4160	22323
1986*	19544	4122	23666
1987*	17180	4729	21909
1988*	16147	3948	20095
1989*	17581	2889	20470
1990*	16344	3379	19723
1991*	14054	2158	16212
1992*	11442	1362	12804
1993*	11894	1587	13481
1994*	14075	2045	16120
1995**	15918	2524	18442

* revised

** preliminary

Table 3.9.14.3 Landings (tonnes) of L. budegassa in Divisions VIIb-k and VIIIa,b

Working group estimates

Year	VIIb-k	VIIIa,b	Total
1985	4969	2090	7059
1986*	6443	1775	8217
1987*	5115	2504	7619
1988*	6347	2035	8382
1989*	7149	2387	9536
1990*	7037	2571	9608
1991*	6308	2526	8835
1992*	6094	2168	8262
1993*	4739	1919	6659
1994*	4018	1796	5814
1995**	5081	1510	6591

* revised

** preliminary

Table 3.9.14.4 **Lophius piscatorius in Divisions VIIb-k and VIIIa,b**
Nominal landings (in tonnes) by fleet

	VIIb-k												VIIIa,b				
Year	**IRELAND** Trawl (Unit 4)	**IRELAND** Trawl (Unit 5)	**BELGIUM** Beam Trawl (Unit 6)	**UK** Gill-Net (Unit 3)	**UK** Trawl (Unit 4)	**UK** Trawl (Unit 5)	**UK** Beam Trawl (Unit 6)	**FRANCE** Gill-Net (Unit 3)	**FRANCE** Trawl (Unit 4)	**FRANCE** Trawl (Unit 5)	**FRANCE** Neph.Trawl (Unit 8)	**SPAIN** Trawl (Unit 4)	**FRANCE** Neph.Trawl (Unit 9)	**FRANCE** Trawl (Unit 10)	**FRANCE** Trawl (Unit 14)	**SPAIN** Trawl (Unit 14)	**TOTAL** VII +VIII
1986*	582	368	438	429	1349	369	998		6019	2140	1021	5831	746	720	1799	858	23666
1987*	511	357	90	560	904	271	1429		4940	2272	787	5059	1035	542	2378	774	21909
1988*	349	259	156	643	769	345	1658		4403	2500	774	4291	927	534	1668	819	20095
1989*	112	1370	526	481	210	583	1813	300	3873	3306	754	4253	673	444	1147	625	20470
1990*	536	835	211	421	321	380	1495	600	3946	2735	880	3985	410	391	1779	800	19723
1991*	205	821	52	452	700	213	1127	1300	3106	1772	752	3554	284	218	1155	502	16212
1992*	999	50	95	573	913	178	944	1200	1859	1261	887	2484	254	166	646	296	12804
1993*	948	199	223	442	635	234	1058	1300	1650	1692	969	2543	360	278	676	274	13481
1994*	1364	527	582	377	553	246	941	1000	2776	1821	1236	2652	261	198	1105	481	16120
1995**	1095	437	863	410	586	395	1012	1500	3508	2083	1237	2792	468	308	1266	482	18442

* revised
** preliminary

Table3.9.14.5 **Lophius budegassa in Divisions VIIb-k and VIIIa,b**
Nominal landings (in tonnes) by fleet

	VIIb-k												VIIIa,b				
Year	**IRELAND** Trawl (Unit 4)	**IRELAND** Trawl (Unit 5)	**BELGIUM** Beam Trawl (Unit 6)	**UK** Gill-net (Unit 3)	**UK** Trawl (Unit 4)	**UK** Trawl (Unit 5)	**UK** Beam Trawl (Unit 6)	**FRANCE** Gill-net (Unit 3)	**FRANCE** Trawl (Unit 4)	**FRANCE** Trawl (Unit 5)	**FRANCE** Neph.Trawl (Unit 8)	**SPAIN** Trawl (Unit 4)	**FRANCE** Neph.Trawl (Unit 9)	**FRANCE** Trawl (Unit 10)	**FRANCE** Trawl (Unit 14)	**SPAIN** Trawl (Unit 14)	**TOTAL** VII +VIII
1986*	218	44	165	23	507	44	375		1585	260	406	2816	443	150	696	485	8217
1987*	155	86	28	30	275	65	435		888	545	434	2174	483	116	952	953	7619
1988*	144	90	65	34	319	121	686		1293	885	394	2316	435	102	804	695	8382
1989*	58	252	275	25	109	108	945	15	1786	616	515	2445	446	112	1227	602	9536
1990*	291	323	109	23	174	36	773	30	1959	272	653	2393	550	156	1294	571	9608
1991*	169	675	17	23	405	23	362	65	1660	223	507	2180	475	117	1134	799	8835
1992*	765	10	28	30	685	40	273	60	1594	251	594	1763	459	191	982	536	8262
1993*	560	46	68	23	371	19	337	70	1179	363	399	1304	433	101	796	589	6659
1994*	224	66	86	20	246	10	122	50	1091	190	540	1374	232	49	891	624	5814
1995**	566	73	37	15	270	24	52	100	1369	319	615	1642	297	45	705	463	6591

* revised
** preliminary

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Table 3.9.14.6 Anglerfish (*L. Piscatorius*)in Sub-area VII and Divisions VIIIa,b.

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1986	11.65	68.12	23.67	0.312
1987	8.77	61.97	21.91	0.259
1988	9.94	51.49	20.10	0.322
1989	17.62	45.96	20.47	0.379
1990	27.13	44.34	19.72	0.441
1991	29.71	36.69	16.21	0.382
1992	37.45	31.39	12.80	0.298
1993	45.34	30.46	13.48	0.274
1994	34.28	34.63	16.12	0.333
1995	19.89	43.73	18.44	0.320
Average	24.18	44.88	18.29	0.332
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.9.14.7 Anglerfish (*L.budegassa*) in Sub-area VII and Division VIIIa,b.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-8
1986	18.49	61.35	8.22	0.121
1987	16.63	51.97	7.62	0.129
1988	17.44	49.58	8.38	0.157
1989	18.11	50.00	9.54	0.153
1990	18.56	47.40	9.61	0.161
1991	22.15	46.68	8.84	0.177
1992	22.74	44.46	8.26	0.200
1993	12.49	33.85	6.66	0.168
1994	16.12	34.79	5.81	0.162
1995	15.03	35.30	6.59	0.176
Average	17.78	45.54	7.95	0.160
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.10.1.1 Comparison of $F_{current}$ estimates obtained from catch curves for cod, whiting, sole and plaice in ICES divisions VIIb,c and VIIh-k with mean F (1994) of stocks in adjacent areas.

	F_{95}		F_{max}	F_{95}		F_{max}	Anon., 1996/ Assess: 1		Anon., 1996/ Assess: 5		Anon., 1996/ Assess: 5	
Stock	F VIIb,c	Age range		F VIIh-k	Age range		F-VIIg	Age range	F-VIa	Age range	F-VIIa	Age range
COD VIIb,c	1.03	2-6	0.30	1.39	2-6	0.30	0.96	2-6	0.73	2-6	0.96	2-6
WHITING VIIb,c	0.89	2-6	0.60	0.72	2-5	0.50	0.98	2-6	1.06	2-6	1.23	2-5
SOLE VIIb,c	0.24	4-9	0.60	0.20	4-9	0.30	0.46	4-9	-	-	0.49	4-9
PLAICE VIIb,c	0.41	3-7	-	0.54	2-7	0.25	0.76	3-7	-	-	0.50	3-7

Table 3.10.2.1 ICES Divisions VIIb,c nominal international landings (t) as reported to the Working Group

COD Landings, Divisions VIIb,c.

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	591	474	206	112	36	120	156[2]	**75***
Germany, Fed. Rep.	-	1	-	-	-	-	-	**-***
Ireland	388	915	795	612	507	357	462*	**552***
Norway	2	9	29	11	39	+*	7*	**3***
UK (England and Wales) [1]	23	7[2]	12	33[2]	62[2]	17[2]	29	**25**
UK (Scotland)	5	34[2]	300	177[2]	148[2]	73	93	**66**
Total	**1009**	**1440**	**1342**	**945**	**792**	**567**	**747**	**721**

* Preliminary

[1] 1989-1995 N. Ireland included with England and Wales. [2] Revised

Norwegian catches, on Russian quotas are included for 1992 and 1993

WHITING Landings, Divisions VIIb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	113	56	63	40	27	**31**	27[2]	**38***
Germany, Fed. Rep.	+	-	-	-	-	-	-	**-***
Ireland	922	1199	770	540	730	826	1151*	**2084***
UK (England and Wales) [1]	12	2[2]	2[2]	14[2]	14[2]	23[2]	18[2]	**24**
UK (Scotland)	+	32	36[2]	80[2]	155[2]	147	117[2]	**71**
Total	**1047**	**1289**	**871**	**674**	**926**	**1027**	**1313**	**2217**

* Preliminary [1] 1989-1995 N. Ireland included with England and Wales. [2] Revised

SOLE Landings, Divisions VIIb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	2	+*	-*	5*	2*	2*	1	**3***
Ireland	34	38	41	46	43	59	70*	**63***
UK (England and Wales) [1]	2	-	-	-	-	-	-	-
Total	**37**	**38**	**41**	**51**	**45**	**61**	**71**	**66**

* Preliminary [1] 1989-1995 N. Ireland included with England and Wales.

[2] Revised

PLAICE Landings, Divisions VIIb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	9	1*	11*	9*	3*	5[2]	2[2]	**3***
Ireland	157	159	130	179	180	191	209*	**316***
UK (England and Wales) [1]	2	1[2]	2[2]	-[2]	6	1	2	**1**
UK (Scotland)	+	13	90[2]	3	3	2[2]	3	**1**
Total	**168**	**174**	**233**	**191**	**192**	**199**	**216**	**321**

* Preliminary [1] 1989-1995 N. Ireland included with England and Wales. [2] Revised

Table 3.10.2.2 ICES Divisions VIIh-k nominal international landings (t) as reported to the Working Group.

COD Landings, Divisions VIIh-k

Country	1988	1989	1990	1991	1992	1993	1994	1995
Belgium**	102	229	86	51	81	136	115	**129**
Denmark	+	-	-	+	-	-	-	**-***
France	1960	2137	1313	603	1056	866	770[2]	**1222***
Ireland	868	857	1064	1413	872	435	650[2]	**1144***
Norway	-	13	20	-	-	-*	-*	**-***
UK (England and Wales) [1]	104	127[2]	192[2]	188[2]	278[2]	153[2]	199[2]	**287**
UK (Isle of Man)	-	-	-	-	-	-	-	-
UK (Scotland)	2	-	127[2]	20[2]	13	4	6	**8**
Total	**3036**	**3363**	**2802**	**2275**	**2300**	**1594**	**1740**	**2790**

* Preliminary ** Includes ICES Division VIIg

[1] 1989-1995 N. Ireland included with England and Wales. [2] Revised

WHITING Landings, Divisions VIIh-k

Country	1988	1989	1990	1991	1992	1993	1994	1995
Belgium**	19	39	67	43	47	75	50[2]	**52**
Denmark	-	+	-	-	-	-	-	**-***
France	777	753	529	367	306	300	393[2]	**646***
Germany, Fed. Rep.	-	-	+	-	14	-	na	**-***
Ireland	1771	1483	1304	1068	1455	2977	3709[2]	**5193***
UK (England and Wales) [1]	109	116[2]	44[2]	103[2]	168[2]	211	277[2]	**393**
UK (Isle of Man)	-	-	-	-	-	-	-	-
UK (N. Ireland)	-	-	-	-	-	-	-	-
UK (Scotland)	1	-	33[2]	12	8	12	6	**22**
Total	**2677**	**2391**	**1977**	**1593**	**1998**	**3575**	**4435**	**6306**

* Preliminary ** Includes ICES Division VIIg

[1] 1989-1995 N. Ireland included with England and Wales. [2] Revised

SOLE Landings, Divisions VIIh-k

Country	1988	1989	1990	1991	1992	1993	1994	1995
Belgium**	254	252	353	358	312	317	338	**433**
France	53	84*	66*	55*	43[1]*	44*	41*[3]	**52***
Ireland	182	206	266	306	255	237	184*[3]	**218***
UK (England and Wales) [2]	166	177	144	234[3]	215[3]	209	172	**192**
UK (Isle of Man)	-	-	+	-	-	-	-	-
UK (Scotland)	-	-	-[3]	-	2[3]	5	2	**-**
Total	**655**	**719**	**829**	**953**	**827**	**812**	**737**	**895**

* Preliminary ** Includes ICES Division VIIg

[1] Reported as VIIh,j [2] 1989-1995 N. Ireland included with England and Wales. [3] Revised

Table 3.10.2.2 Continued

PLAICE Landings, Divisions VIIh-k

Country	1988	1989	1990	1991	1992	1993	1994	1995
Belgium**	245	403	301	252	246	344	197	**235***
Denmark	+	+	-	+	-	+	-	**+***
France	135	229*	77*	173*	90[1]*	84[3]	46[3]	**54***
Ireland	369	454	338	478	477	383	271*[3]	**321***
UK (England and Wales)[3]	434	73[3]	88[3]	287[3]	264[3]	218	258[3]	**282**
UK (Isle of Man)	-	-	+	1	-	-	-	-
UK (Scotland)	1	-	1	+[3]	6[3]	7	1[3]	**4**
Total	**1184**	**1159**	**805**	**1191**	**1083**	**1036**	**773**	**896**

* Preliminary ** Includes ICES Division VIIg [1] Reported as VIIh,j

[2] 1989-1995 N. Ireland included with England and Wales. [3] Revised

Table 3.10.3.1 Estimated Herring catches in tonnes in Divisions VIa (South) and VIIb,c, 1985–1994. These figures do not in all cases correspond to the official statistics and cannot be used for management purposes.

Country	1985	1986	1987	1988	1989	1990
France	-	-	-	-	-	+
Germany, Fed.Rep.	-	-	-	-	-	-
Ireland	13,900	15,540	15,000	15,000	18,200	25,000
Netherlands	1,270	1,550	1,550	300	2,900	2,533
UK (N.Ireland)	-	-	5	-	-	80
UK (England + Wales)	-	-	51	-	-	-
UK Scotland	-	-	-	-	+	-
Unallocated	8,204	11,785	31,994	13,800	7,100	13,826
Total landings	23,374	28,785	48,600	29,100	28,200	41,439
Discards	-	-	-	-	1,000	2,530
Total catch	23,374	28,785	48,600	29,100	29,200	43,969

Country	1991	1992	1993[1]	1994[1]	1995
France	-	-	-	-	-
Germany, Fed.Rep.	-	250	-	-	11
Ireland	22,500	26,000	27,600	24,400	25,450
Netherlands	600	900	2,500	2,500	1,207
UK (N.Ireland)	-	-	-	-	-
UK (England + Wales)	-	-	-	50	24
UK (Scotland)	+	-	200	-	-
Unallocated	11,200	4,600	6,250	6,250	1,100
Total landings	34,300	31,750	36,550	33,200	27,792
Discards	3,400	100	250	700	-
Total catch	37,700	31,850	36,800	33,900	27,792

[1]Provisional

Table 3.10.3.2 Herring west of Ireland and Porcupine Bank (Fishing Areas VIa South).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1970	403.45	133.79	20.31	0.186
1971	811.55	125.50	15.04	0.172
1972	728.39	131.50	23.47	0.237
1973	528.11	158.36	36.72	0.298
1974	581.53	101.50	36.59	0.453
1975	400.67	91.30	38.76	0.472
1976	675.52	69.50	32.77	0.542
1977	567.74	74.94	20.57	0.339
1978	1,020.05	78.19	19.72	0.274
1979	950.80	102.59	22.61	0.305
1980	511.63	113.83	30.12	0.429
1981	657.89	107.73	24.92	0.322
1982	676.74	111.34	19.21	0.241
1983	2,005.20	109.77	32.99	0.391
1984	974.97	176.01	27.45	0.210
1985	1,186.99	170.63	23.34	0.199
1986	919.68	204.51	28.79	0.205
1987	3,315.15	182.45	48.60	0.409
1988	490.35	285.61	29.10	0.309
1989	675.28	214.02	29.21	0.253
1990	891.01	182.29	43.97	0.271
1991	498.47	172.32	37.70	0.264
1992	557.19	136.00	31.86	0.264
1993	703.03	123.43	36.76	0.361
1994	1,395.33	112.23	33.91	0.323
1995	133.33	117.90	27.79	0.333
Average	856.16	137.97	29.70	0.310
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.11.2.1 HAKE - SOUTHERN STOCK - Landings estimates ('000 t) for the Southern Hake Stock (Divisions VIIIc and IXa) by country and gear as determined by the Working Group, 1972-1995.

YEAR	Spain						Portugal			France	TOTAL STOCK
	Gillnet	Small Gillnet	Longline	**Total Artisanal**	Trawl	**Total**	Artisanal	Trawl	**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	1.2	0.3	4.2	5.7	3.9	9.6	5.0	2.5	7.5	-	17.1
1983	2.1	0.4	6.6	9.0	5.3	14.3	5.2	2.9	8.0	-	22.4
1984	2.3	0.3	7.5	10.1	5.8	16.0	4.3	1.2	5.5	-	21.5
1985	1.8	0.8	4.4	7.0	5.3	12.3	3.8	2.1	5.8	-	18.2
1986	2.1	0.8	3.5	6.4	4.9	11.2	3.2	1.8	4.9	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	5.6	3.7	9.4	4.3	1.7	6.0	0.0	15.4
1989	1.9	0.6	2.0	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	8.6	2.3	1.1	3.4	0.0	12.0
1991	1.4	0.4	2.2	4.0	3.6	7.7	2.7	1.2	4.0	0.0	11.6
1992	1.5	0.4	2.1	3.9	3.8	7.7	3.8	1.3	5.1	-	12.8
1993	1.3	0.4	2.8	4.4	2.7	7.0	3.0	0.9	3.9	-	10.9
1994	1.9	0.4	1.5	3.7	2.7	6.5	2.3	0.8	3.1	-	9.5
1995	1.6	0.4	1.0	2.9	5.3	8.2	2.6	1.0	3.6	-	11.8

Spanish landings for 1982, 83 and 84 were revised

Table 3.11.2.2 HAKE in the Southern Area (Divisions VIIIc and IXa).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-5
1982	126.90	51.72	17.11	0.260
1983	108.93	58.39	22.38	0.345
1984	137.63	58.54	21.49	0.271
1985	98.57	38.80	18.15	0.351
1986	105.69	25.11	16.19	0.429
1987	97.78	24.22	15.23	0.408
1988	84.36	24.56	15.41	0.344
1989	55.48	21.36	12.89	0.363
1990	60.05	21.37	11.99	0.308
1991	67.30	22.25	11.62	0.278
1992	103.45	23.70	12.82	0.348
1993	115.90	22.76	10.94	0.226
1994	45.04	17.57	9.54	0.225
1995	69.23	15.73	11.78	0.302
Average	91.17	30.43	14.82	0.318
Unit	Millions	1000 tonnes	1000 tonnes	-

Table.3.11.3.1 Four Spot Megrim (*L. boscii*) in Divisions VIIIc, IXa. Total landings (t).

	Spain			Portugal	Total
Year	VIIIc	IXa	Total	IXa	VIIIc, IXa
1986	799	197	996	128	1124
1987	995	586	1581	107	1688
1988	917	1099	2016	207	2223
1989	805	1548	2353	276	2629
1990	927	798	1725	220	1945
1991	841	634	1475	207	1682
1992	654	938	1592	324	1916
1993	744	419	1163	221	1384
1994	665	561	1227	176	1403
1995	685	826	1512	141	1652

Table.3.11.3.2 Megrim (*L. whiffiagonis*) in Divisions VIIIc, IXa. Total landings (t).

	Spain			Portugal	Total
Year	VIIIc	IXa	Total	IXa	VIIIc, IXa
1986	508	98	606	53	659
1987	404	46	450	47	497
1988	657	59	716	101	817
1989	533	45	578	136	714
1990	841	25	866	111	977
1991	494	16	510	104	614
1992	474	5	479	37	516
1993	338	7	345	38	383
1994	440	8	448	31	479
1995	173	20	193	25	218

Table 3.11.3.a.1 Megrim (*L.Boscii*) in Divisions VIIIc and IXa.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-4
1986	51.72	4.05	1.12	0.287
1987	45.99	4.72	1.69	0.329
1988	29.31	5.83	2.22	0.359
1989	32.16	5.91	2.63	0.455
1990	30.68	5.67	1.95	0.300
1991	19.84	5.23	1.68	0.247
1992	40.55	4.55	1.92	0.447
1993	33.22	4.72	1.38	0.306
1994	6.36	4.46	1.40	0.288
1995	31.59	4.01	1.65	0.456
Average	32.14	4.92	1.76	0.347
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.11.3.b.1 Megrim (*L. Whiffiagonis*) in Divisions VIIIc and IXa.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-4
1986	8.76	1.82	0.66	0.412
1987	11.69	1.54	0.50	0.356
1988	10.50	1.89	0.82	0.505
1989	9.46	2.00	0.71	0.432
1990	11.86	2.22	0.98	0.447
1991	4.10	1.50	0.61	0.460
1992	8.97	1.35	0.52	0.412
1993	2.38	1.18	0.38	0.347
1994	0.16	0.87	0.48	0.668
1995	3.09	0.50	0.22	0.544
Average	7.10	1.49	0.59	0.458
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.11.4.1 ANGLERFISH (*L. piscatorius*) - Divisions VIIIc and IXa. Tonnes landed by the main fishing fleets for 1978-1995 as determined by the Working Group.

YEAR	DIVISION VIIIc Spain Trawl	Spain Gillnet	TOTAL VIIIc	DIVISION IXa Spain Trawl	Portugal Trawl	Portugal Artisanal	TOTAL IXa	TOTAL VIIIc+IXa
1978	n/a	n/a	n/a	258	0	115	373	373
1979	n/a	n/a	n/a	319	0	225	544	544
1980	2806	1270	4076	401	0	339	740	4816
1981	2750	1931	4681	535	0	352	887	5568
1982	1915	2682	4597	875	0	310	1185	5782
1983	3205	1723	4928	726	0	460	995	5923
1984	3086	1690	4776	578	186	492	1256	6032
1985	2313	2372	4685	540	212	702	1454	6139
1986	2499	2624	5123	670	167	910	1747	6870
1987	2080	1683	3763	320	194	864	1378	5141
1988	2525	2253	4778	570	157	817	1543	6321
1989	1643	2147	3790	347	259	600	1206	4996
1990	1439	985	2424	435	326	606	1366	3790
1991	1490	778	2268	319	224	829	1372	3640
1992	1217	1011	2228	301	76	778	1154	3382
1993	844	666	1510	72	111	636	819	2329
1994	690	827	1517	154	70	266	490	2007
1995	830	572	1403	199	66	166	431	1834

Table 3.11.4.2 ANGLERFISH (L. budegassa), Divisions VIIIc and IXa. Tonnes landed by the main fishing fleets for 1978-1995 as determined by the Working Group

YEAR	DIVISION VIIIc Spain Trawl	Spain Gillnet	TOTAL VIIIc	DIVISION IXa Spain Trawl	Portugal Trawl	Portugal Artisanal	TOTAL IXa	TOTAL VIIIc+IXa
1978	n/a	n/a	n/a	248	0	107	355	355
1979	n/a	n/a	n/a	306	0	210	516	516
1980	1203	207	1409	385	0	315	700	2110
1981	1159	309	1468	505	0	327	832	2300
1982	827	413	1240	841	0	288	1129	2369
1983	1064	188	1252	699	0	428	1127	2379
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	1425	2563
1987	1094	888	1982	813	232	804	1849	3832
1988	1058	1010	2068	684	188	760	1632	3700
1989	648	351	999	764	272	542	1579	2578
1990	491	142	633	689	387	625	1701	2334
1991	503	76	579	559	309	716	1584	2163
1992	451	57	508	485	287	832	1603	2111
1993	516	292	809	627	196	596	1418	2227
1994	542	201	743	475	79	283	837	1580
1995	913	104	1017	615	68	131	814	1831

Table 3.11.6.1 Landings (t) of HORSE MACKEREL in Sub-area VIII by country. (Data submitted by Working Group members).

Country	1980	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	-	446	3,283
France	3,361	3,711	3.073	2,643	2,489	4,305	3,534	3,983
Germany	-	-	-	-	-	-	-	-
Netherlands	-	-	-	-	-[2]	-[2]	-[2]	-[2]
Spain	34,134	36,362	19,610	25,580	23,119	23,292	40,334	30,098
UK (Engl. + Wales)	-	+	1	-	1	143	392	339
USSR	-	-	-	-	20	-	656	-
Unallocated + discards	-	-	-	-	-	-	-	-
Total	37,495	40,073	22,683	28,223	25,629	27,740	45,362	37,703

Country	1988	1989	1990	1991	1992	1993	1994	1995[1]
Denmark	2,793	6,729	5,726	1,349	5,778	1,955	-	340
France	4,502	4,719	5,082	6,164	6,220	4,010	28	-
Germany	-	-	-	80	62	-		-
Netherlands	-	-	6,000	12,437	9,339	19,000	7,272	-
Spain	26,629	27,170	25,182	23,733	27,688	27,921	25,409	28,349
UK (Engl. + Wales)	253	68	6	70	88	123	753	20
USSR	-	-	-	-	-	-		-
Unallocated + discards	-	-	1,500	2,563	5,011	700	2,038	-
Total	34,177	38,686	43,496	46,396	54,186	53,709	35,500	28,709

[1]Preliminary.
[2]Included in Sub-area VII.

Table 3.11.6.2 Annual catches (tonnes) of SOUTHERN HORSE MACKEREL by countries by gear in Divisions VIIIc and IXa. Data from 1984-1995 are Working Group estimates.

Year	Portugal (Division IXa)				Spain (Divisions IXa + VIIIc)					Total VIIIc+IXa
	Trawl	Seine	Artisanal	Total	Trawl	Seine	Hook	Gillnet	Total	
1962	7,231	46,345	3,400	56,976	-	-	-	-	53,202	110,778
1963	6,593	54,267	3,900	64,760	-	-	-	-	53,420	118,180
1964	8,983	55,693	4,100	68,776	-	-	-	-	57,365	126,141
1965	4,033	54,327	4,745	63,105	-	-	-	-	52,282	115,387
1966	5,582	44,725	7,118	57,425	-	-	-	-	47,000	104,425
1967	6,726	52,643	7,279	66,648	-	-	-	-	53,351	119,999
1968	11,427	61,985	7,252	80,664	-	-	-	-	62,326	142,990
1969	19,839	36,373	6,275	62,487	-	-	-	-	85,781	148,268
1970	32,475	29,392	7,079	59,946	-	-	-	-	98,418	158,364
1971	32,309	19,050	6,108	57,467	-	-	-	-	75,349	132,816
1972	45,452	28,515	7,066	81,033	-	-	-	-	82,247	163,280
1973	28,354	10,737	6,406	45,497	-	-	-	-	114,878	160,375
1974	29,916	14,962	3,227	48,105	-	-	-	-	78,105	126,210
1975	26,786	10,149	9,486	46,421	-	-	-	-	85,688	132,109
1976	26,850	16,833	7,805	51,488	89,197	26,291	376[1]	-	115,864	167,352
1977	26,441	16,847	7,790	51,078	74,469	31,431	376[1]	-	106,276	157,354
1978	23,411	4,561	4,071	32,043	80,121	14,945	376[1]	-	95,442	127,485
1979	19,331	2,906	4,680	26,917	48,518	7,428	376[1]	-	56,322	83,239
1980	14,646	4,575	6,003	25,224	36,489	8,948	376[1]	-	45,813	71,037
1981	11,917	5,194	6,642	23,733	28,776	19,330	376[1]	-	48,482	72,235
1982	12,676	9,906	8,304	30,886	-[2]	-[2]	-[2]	-	28,450	59,336
1983	16,768	6,442	7,741	30,951	8,511	34,054	797	-	43,362	74,313
1984	8,603	3,732	4,972	17,307	12,772	15,334	884	-	28,990	46,297
1985	3,579	2,143	3,698	9,420	16,612	16,555	949	-	34,109	43,529
1986	-[2]	-[2]	-[2]	28,526	9,464	32,878	481	143	42,967	71,493
1987	11,457	6,744	3,244	21,445	-[2]	-[2]	-[2]	-[2]	33,193	54,648
1988	11,621	9,067	4,941	25,629	-[2]	-[2]	-[2]	-[2]	30,763	56,392
1989	12,517	8,203	4,511	25,231	-[2]	-[2]	-[2]	-[2]	31,170	56,401
1990	10,060	5,985	3,913	19,958	10,876	17,951	262	158	29,247	49,205
1991	9,437	5,003	3,056	17,497	9,681	18,019	187	127	28,014	45,511
1992	12,189	7,027	3,438	22,654	11,146	16,972	81	103	28,302	50,956
1993	14,706	4,679	6,363	25,747	14,506	16,897	124	154	31,681	57,428
1994	10,494	5,366	3,201	19,061	10,864	22,382	145	136	33,527	52,588
1995	12,620	2,945	2,133	17,698	11,589	23,125	162	107	34,983	52,681

[1]Estimated value.
[2]Not available by gear.

Table 3.11.6.3 Catches (t) of *Trachurus trachurus* and *Trachurus mediterraneus* in Divisions VIIIab, VIIIc and IXa in the period 1989-1995.

	Divisions	Sub-Divisions	1989	1990	1991	1992	1993	1994	1995
T. trachurus	**VIIIab**		2904	4306	4030	3445	2431	1262	815
	VIIIc	VIIIc East	8478	7505	4907	8299	11519	9697	7045
		VIIIc west	17802	17676	18827	15945	13963	14451	20489
		Total	26280	25181	23734	24244	25482	24148	27534
	IXa	IXa North	13028	4065	4275	4059	6198	9380	7442
		IXa C, N & S	25231	19958	14497	22653	25747	19061	17698
		Total	38259	24023	18772	26712	31945	28441	25140
T. mediterraneus	**VIIIab**		23	298	2122	1123	649	1573	2271
	VIIIc	VIIIc East	3903	2943	5020	4804	5576	3344	4585
		VIIIc west	0	0	0	0	0	0	0
		Total	3903	2943	5020	4804	5576	3344	4585
	IXa	IXa North	0	0	0	0	0	0	0
		IXa C, N & S	0	0	0	0	0	0	0
		Total	0	0	0	0	0	0	0

Table 3.11.6.4 Catches (t) and percentages (%) of *Trachurus mediterraneus* in relation to total landings of *Trachurus* spp. in Divisions VIIIab and VIIIc in 1995.

	Divisions	Sub-Divisions	Quarter 1 (t)	Quarter 1 (%)	Quarter 2 (t)	Quarter 2 (%)	Quarter 3 (t)	Quarter 3 (%)	Quarter 4 (t)	Quarter 4 (%)	Total (t)	Total %
Trachurus mediterraneus	VIIIab		356	77.4	452	51.5	38	24.8	1425	89.3	2271	73.6
	VIIIc	VIIIc East	1320	47.0	470	17.3	1046	32.9	1749	59.6	4585	39.4
		East of 3ºW	506	70.2	225	20.4	441	45.5	1044	79.1	2216	53.9
		West of 3ºW	814	39.0	245	15.2	605	27.4	705	43.6	2369	31.5
Trachurus trachurus	VIIIab		104	22.6	426	48.5	115	75.2	170	10.7	815	26.4
	VIIIc	VIIIc East	1487	53.0	2246	82.7	2130	67.1	1188	40.4	7051	60.6
		East of 3ºW	215	29.8	876	79.6	528	54.5	276	20.9	1895	46.1
		West of 3ºW	1272	61.0	1370	84.8	1602	72.6	912	56.4	5156	68.5
Total	VIIIab		460		878		153		1595		3086	
	VIIIc	VIIIc East	2807		2716		3176		2937		11636	
		East of 3ºW	721		1101		969		1320		4111	
		West of 3ºW	2086		1615		2207		1617		7525	

Table 3.11.6.5 Catches (t) of *Trachurus trachurus* and *Trachurus picturatus* in ICES Division IXa, Subarea X, and in CECAF Division 34.1, in the period 1986-1995.

	Divisions	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
***T. trachurus* (*)**	IXa	28,526	19,554	25,125	25,226	19,959	17,497	22,653	25,747	19,061	17,698
T. picturatus	IXa	367	181	2,370	2,394	2,012	1,700	1,035	1,028	1,045	728
	X Azorean area	3,331	3,020	3,079	2,866	2,510	1,274	1,255	1,732	1,778	-
	34.1.1 Madeira's area	2,006	1,533	1,687	1,564	1,863	1,161	792	530	297	-

(*) As estimated by the Working Group.
(-) Not available

Table 3.11.6.6 Southern horse mackerel (Divisions VIIIc and IXa)

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 1-11
1985	1,655.00	117.12	43.53	0.199
1986	2,691.22	170.28	71.49	0.318
1987	1,422.76	191.07	54.65	0.217
1988	1,096.91	194.88	56.39	0.271
1989	1,055.33	192.53	56.40	0.303
1990	832.36	205.21	49.21	0.235
1991	1,880.73	213.46	45.51	0.204
1992	1,990.77	210.23	50.96	0.241
1993	804.96	202.06	57.43	0.252
1994	853.07	168.87	52.59	0.197
1995	164.50	200.19	52.68	0.206
Average	1,313.42	187.81	53.71	0.240
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.11.7.1 Annual landings (t) of SARDINE in Divisions VIIIc and IXa by country.

Country	1976	1977	1978	1979	1980	1981	1982
Portugal	79,649	79,819	83,553	91,294	106,302	113,253	100,859
Spain	62,041	45,931	56,437	62,147	85,380	100,880	103,645
Total	141,690	125,750	139,990	153,441	191,682	214,133	204,504

Country	1983	1984	1985	1986	1987	1988	1989
Portugal	85,922	95,110	111,709	103,451	90,214	93,591	91,091
Spain	95,217	107,576	92,398	77,155	78,611	64,949	46,035
Total	181,139	202,686	204,107	180,606	168,825	158,540	137,126

Country	1990	1991	1992	1993	1994	1995
Portugal	92,404	92,638[1]	83,315	90,404	94,468	87,818
Spain	46,753	35,118	42,739	48,391	38,332	33,566
Total	139,157	127,756	126,054	138,795	132,800	121,384

[1]Discards included.

Table 3.11.7.2 Sardine in the Divisions VIIIc and IXa

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-5
1976	11.67	515.60	141.69	0.188
1977	11.62	528.73	125.75	0.102
1978	12.83	537.87	139.99	0.169
1979	14.35	536.37	153.44	0.239
1980	15.81	558.02	191.68	0.245
1981	11.16	577.98	214.13	0.338
1982	8.12	558.25	204.50	0.411
1983	22.54	503.64	181.14	0.370
1984	8.64	546.43	202.69	0.291
1985	6.28	591.52	204.11	0.330
1986	5.19	507.17	180.61	0.380
1987	10.52	409.01	168.83	0.403
1988	5.40	349.75	158.54	0.476
1989	5.19	280.64	137.13	0.482
1990	4.94	241.96	139.16	0.619
1991	12.97	232.69	127.76	0.477
1992	7.51	329.55	126.05	0.397
1993	1.28	345.17	138.80	0.547
1994	1.58	261.15	132.80	0.536
1995	0.44	200.17	121.38	0.662
Average	8.90	430.58	159.51	0.383
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.11.8.a.1 Annual catches (in tonnes) of Bay of Biscay anchovy (Subarea VIII) As estimated by the Working Group members.

COUNTRY	FRANCE	SPAIN	INTERNATIONAL
YEAR	VIIIab	VIIIbc	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	9863	14924
1988	6743	8266	15009
1989	2200	8174	10374
1990	10598	23258	33856
1991	9708	9573	19281
1992	15207	22468	37675
1993	20914	19173	40087
1994	16993	17554	34547
1995	10848	18950	29798
1996	2630	16128	18758 (*)
AVERAGE (1960-95)	4491	29870	34361

(*) Preliminary data for the first half of the year

Table 3.11.8.a.2 Anchovy in the Bay of Biscay (Fishing Area VIII).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 1-3
1987	8,174.57	29.03	14.92	0.537
1988	3,386.04	28.83	15.01	0.762
1989	21,180.30	16.39	10.37	0.741
1990	7,238.46	60.30	33.86	0.733
1991	27,798.70	29.58	19.28	1.441
1992	27,825.30	70.99	37.68	0.967
1993	15,667.40	94.96	40.09	0.654
1994	14,356.40	69.93	34.55	0.645
1995	15,164.00	56.63	29.80	0.596
Average	15,643.46	50.74	26.17	0.786
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.11.8.b.1 Portuguese and Spanish annual landings of ANCHOVY in Division IXa (tonnes). (From Pestana, 1989 and 1996 and Working Group members).

	Portugal				Spain			
Year	**IXa C-N**	**IXa C-S**	**IXa South**	**Total**	**IXa North**	**IXa South**	**Total**	**TOTAL**
1943	7121	355	2499	9975	-	-	-	-
1944	1220	55	5376	6651	-	-	-	-
1945	781	15	7983	8779	-	-	-	-
1946	0	335	5515	5850	-	-	-	-
1947	0	79	3313	3392	-	-	-	-
1948	0	75	4863	4938	-	-	-	-
1949	0	34	2684	2718	-	-	-	-
1950	31	30	3316	3377	-	-	-	-
1951	21	6	3567	3594	-	-	-	-
1952	1537	1	2877	4415	-	-	-	-
1953	1627	15	2710	4352	-	-	-	-
1954	328	18	3573	3919	-	-	-	-
1955	83	53	4387	4523	-	-	-	-
1956	12	164	7722	7898	-	-	-	-
1957	96	13	12501	12610	-	-	-	-
1958	1858	63	1109	3030	-	-	-	-
1959	12	1	3775	3788	-	-	-	-
1960	990	129	8384	9503	-	-	-	-
1961	1351	81	1060	2492	-	-	-	-
1962	542	137	3767	4446	-	-	-	-
1963	140	9	5565	5714	-	-	-	-
1964	0	0	4118	4118	-	-	-	-
1965	7	0	4452	4460	-	-	-	-
1966	23	35	4402	4460	-	-	-	-
1967	153	34	3631	3818	-	-	-	-
1968	518	5	447	970	-	-	-	-
1969	782	10	582	1375	-	-	-	-
1970	323	0	839	1162	-	-	-	-
1971	257	2	67	326	-	-	-	-
1972	-	-	-	-	-	-	-	-
1973	6	0	120	126	-	-	-	-
1974	113	1	124	238	-	-	-	-
1975	8	24	340	372	-	-	-	-
1976	32	38	18	88	-	-	-	-
1977	3027	1	233	3261	-	-	-	-
1978	640	17	354	1011	-	-	-	-
1979	194	8	453	655	-	-	-	-
1980	21	24	935	980	-	-	-	-
1981	426	117	435	978	-	-	-	-
1982	48	96	512	656	-	-	-	-
1983	283	58	332	673	-	-	-	-
1984	214	94	84	392	-	-	-	-
1985	1893	146	83	2122	-	-	-	-
1986	1892	194	95	2181	-	-	-	-
1987	84	17	11	112	-	-	-	-
1988	338	77	43	458	-	4263	4263	4721
1989	389	85	22	496	118	5336	5454	5950
1990	424	93	24	541	220	5911	6131	6672
1991	187	3	20	210	15	5696	5711	5921
1992	92	46	0	138	33	2995	3028	3166
1993	20	3	0	23	1	1960	1961	1984
1994	231	5	0	236	117	3036	3153	3389
1995	6724	332	0	7056	5329	571	5900	12956
1996*	-	-	-	-	116	547	663	-

(-) Not available
(0) Less than 1 tonne
* Preliminary data for the first half of the year   E:\crr\acfm96\tables\T-3118B1.XLS

Table 3.12.2.1 Nominal landings of HAKE as reported to ICES (tonnes).

HAKE IIIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	5	3	13	15	15	5	4	2
Denmark	576	952	1,584	1,623	1,546	1,188	780	536
Germany, Fed. Rep.	-	-	-	-	-	1	+	-
Netherlands	1	-	-	-	-	-	-	-
Norway	60	56	113	115	154	121*	58*	30
Sweden	38	50	98	103	141	162	121	32
Total	680	1,061	1,808	1,856	1,856	1,477	963	600

*Preliminary.

HAKE IVa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	+	+	+	+	1	1	1	2
Denmark	232	245	336	343	322	478	237	96
Faroe Islands	-	-	-	-	-	6	4*	11
France	380	585[1]*	748[1]*	134[1]*	109*	151[1]*	77[1]*	81[1]
Germany, Fed. Rep.	30	29	9	19	28	70	51	66
Netherlands	+	8	1	4	18	4	+	+
Norway	202	269	420	505	442	459*	241*	178
Sweden[a)]	33	24	41	138	60	38	30	15
UK (England & Wales)[2]	67	2	7	8	16	5	3	5
UK (N. Ireland)[2]	3							
UK (Scotland)[2]	353	191	237	365	417	460	316	288
Total	1,300							

*Preliminary. [a)]Includes IVb 1988-1993. [1]Includes IIa(EC) and IVb,c. [2]1989-1994 Revised. N. Ireland included with England and Wales.

Table 3.12.2.1 Continued

HAKE IVb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	32	25	78	115	116	69	55	32
Denmark	790[1]	860[2]	934[3]	1,374[4]	1,500	1,512	1,111[5]	854
France	1	...[a)*]	...[a)*]	...[a)*]	12*	...[a)*]	...[a)*]	...[a)]
Germany, Fed. Rep.	8	5	13	11	22	48	28	35
Netherlands	149	117	89	81	162	135	74	75
Norway	2	2	2	8	2	+*	4*	4
Sweden[a)]	...	...	...	...	...	...	19	8
UK (England & Wales)[6]	18	16	17	27	49	30	33	16
UK (N. Ireland)[6]	-							
UK (Scotland)[6]	34	31	29	53	37	21	27	12
Total	1,034							

*Preliminary. [a)]Included in IVa 1988-1993. [1]Includes 12 t reported as Sub-area IV. [2]Includes 4 t reported as Sub-area IV. [3]Includes 11 t reported as Sub-area IV. [4]Includes 7 t reported as Sub-area IV. [5]Includes 3 t reported as Sub-area IV.
[6]1989-1994 Revised. N. Ireland included with England and Wales.

HAKE IVc

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	6	5	1	2	1	2	1	1
Denmark	+	+	1	1	+	+	+*	+
France	-	...[1*]	...[1*]	...[1*]	1*	...[1*]	...[1*]	...[1]
Germany, Fed. Rep.	-	-	-	-	-	+	+	-
Netherlands	4	-	1	1	2	1	1	2
UK (England & Wales)	2	1	+[2]	1	4	+	1	1
UK (Scotland)	-	-	-[2]	+	+	+	-	-
Total	12							

*Preliminary. [1]Included in IVa. [2]Revised

Table 3.12.2.1 Continued

HAKE VIa

Country	1988	1989	1990	1991	1992	1993	1994	1995[*]
Belgium	2	2	-	+	-	1	+	+
Denmark	+	+	+	+	+	1	+	1
France	1,909	9,417[1*]	6,539[1*]	3,162[1*]	1,197[*]	3,261[1*]	2,500[1*]	2,431[1]
Germany, Fed. Rep.	2	2	+	+	+	1	+	-
Ireland	265	730	207	151	241	251	244	350
Netherlands	-	-	14	3	-	-	-	-
Norway	5	1	+	+	+	+[*]	1[*]	+
Spain	1,340	840	647	1,217				
UK (England & Wales)[2]	1,169	492	257	659	627	642	508	419
UK (N. Ireland)[2]	83							
UK (Scotland)[2]	1,329	1,493	1,559	1,841	1,454	1,393	1,079	1,167
Total	6,104							

[*]Preliminary. [1]Includes Vb(EC), VIb and VII. [2]1989-1994 Revised. N. Ireland included with England and Wales.

HAKE VIb

Country	1988	1989	1990	1991	1992	1993	1994	1995[*]
France	-	...[1*]	...[1*]	...[1*]	-[*]	...[1*]	...[1*]	...[1]
Ireland	-	-	115	76	102	1	+	-
Norway	-	-	+	1	-	+[*]	+[*]	-
Spain	1,336	930	1,029	749				
UK (England & Wales)[2]	75	8	15	3	7	38	22	40
UK (N. Ireland)[2]	-							
UK (Scotland)[2]	5	6	13	16	8	19	25	18
Total	1,416							

[*]Preliminary. [1]Included in VIa. [2]1989-1994 Revised. N. Ireland included with England and Wales.

HAKE VIIa

Country	1988	1989	1990	1991	1992	1993	1994	1995[*]
Belgium	17	19	16	6	10	7	5	3
France	187	...[1*]	...[1*]	...[1*]	61[*]	...[1*]	...[1*]	...[1]
Ireland	237	321	106	85	122	242	225	116
UK (England & Wales)[2]	186	1,244	1,466	1,121	816	768	542	482
UK (Isle of Man)	2	6[3]	7[3]	11[3]	6[3]	7	25	
UK (N. Ireland)[2]	523							
UK (Scotland)[2]	202	183	107	67	54	54	52	19
Total	1,354							

[*]Preliminary. [1]Included in VIa. [2]1989-1994 revised. N. Ireland included with England and Wales. [3]Revised.

Table 3.12.2.1 Continued

HAKE VIIb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	478	...1*	...1*	...1*	69*	...1*	...1*	...1
Germany, Fed. Rep.	-	-	-	-	-	-	5	-
Ireland	128	89	219	133	196	424	250	215
Netherlands	-	-	-	7	-	4	-	-
Norway	-	-	+	+	1	-*	-*	+
Spain	4,033	901	450	843				
UK (England & Wales)[2]	859	189	145	221	589	486	373	304
UK (N. Ireland)[2]	2							
UK (Scotland)[2]	8	21	34	51	125	172	142	96
Total	5,508							

*Preliminary. [1]Included in VIa. [2]1989-1994 revised. N. Ireland included with England and Wales.

HAKE VIId

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	26	1	1	2	3	1	2	1
Denmark	-	-	-	-	+	-	+*	-
France	4	...1*	...1*	...1*	4*	...1*	...1*	...1
UK (England & Wales)	2	3	3	3	1	1	5	3
UK (Scotland)	-	-	-	-	+	+	+	-
Total	32							

*Preliminary. [1]Included in VIa.

HAKE VIIe

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	3	3	1	+	+	1	+	+
Denmark	-	-	-	-	-	-	+*	-
France	1,185	...1*	...1*	...1*	503*	...1*	...1*	...1
Ireland	-	-	-	11	11	-	-	+
Spain	-	-	-	47				
UK (England & Wales)	329	353	449[2]	506	293	266	253	134
UK (Scotland)	-	1	-[2]	-	+	1	-	-
Total	1,517							

*Preliminary. [1]Included in VIa. [2]Revised.

Table 3.12.2.1 Continued

HAKE VIIf

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	30	35	28	10	12	10	11	9
France	551	...[1*]	...[1*]	...[1*]	296*	...[1*]	...[1*]	...[1]
Ireland	-	-	26	16	30	-	-	-
Spain	-	-	-	2				
UK (England & Wales)	505	519[2]	305[2]	275[2]	174	295	235	157
UK (Scotland)	-	-[2]	-[2]	+[2]	-	+	-	-
Total	1,086							

*Preliminary. [1]Included in VIa. [2]Revised.

HAKE VIIg-k

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	16	29	19	8	11	13	9	10
Denmark	+	-	+	+	-	-	-	-
France	3,332	...[1*]	...[1*]	...[1*]	1,579*	...[1*]	...[1*]	...[1]
Ireland	1,331	965	1,593	1,301	1,812	1,621	1,456	1,505
Netherlands	-	4	-	15	-	-	-	-
Norway	-	-	+	-	-	-*	-*	-
Spain	5,229	6,672	5,073	6,502				
UK (England & Wales)[2]	2,539	1,198	1,493	2,364	2,736	2,331	2,233	2,176
UK (N. Ireland)[2]	+							
UK (Scotland)[2]	1	3	38	180	169	302	267	199
Total	12,448							

*Preliminary. [1]Included in VIa. [2]1989-1994 revised. N. Ireland included with England and Wales.

Table 3.12.2.1 Continued

HAKE VIII

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	2	15	8	12	13	7	18	17
Denmark	-	-	-	-	+	-	-*	-
France	13,853	13,678[1*]	12,979[2*]	15,607[3*]	11,426[4*]	8,972[5*]	11,854[6*]	11,630[7]
Ireland	-	2	-	-	-	-	-	
Netherlands	-	-	28	-	-	-	-	
Portugal	23	21	20	23	37	16	45	70
Spain	13,630	10,359	10,405	12,084				
UK (England & Wales)	2	-	+[8]	1[8]	+	-	-	-
Total	27,510							

*Preliminary. [1]VIIIa,b,d,e 13,663 t; VIIIc, IX, X, COPACE(EC) 15 t. [2]VIIIa,b,d,e 12,977 t; VIIIc, IX, X COPACE (EC) 2 t. [3]VIIIa,b,d,e 15,591 t; VIIIc, IX, X, COPACE(EC) 16 t. [4]VIIIa,b 11,284 t, VIIIc 19 t, VIIId 119 t and VIIIe 4 t. [5]VIIIa,b,d,e 8,957 t; VIIIc, IX, X, COPACE(EC) 15 t. [6]VIIIa,b,d,e 11,688 t; VIIIc, IX, X, COPACE(EC) 166 t. [7]VIIIa,b,d,e 11,553 t VIIIc, IX, X, COPACE(EC) 77 t. [8]Revised.

HAKE IX

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Portugal	5,469	3,111	3,074	3,564	4,582	3,257[1]	2,640[1]	3,039
Spain	6,060	651	608	578				
Total	11,529	3,762	3,682	4,142				

*Preliminary. [1]Revised.

Table 3.12.2.2 Hake in the Northern Area (IIIa, IVa, VIa, VII, VIIIa,b).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings and discards	Fishing Mortality Age 1-9
1978	319.48	179.84	52.91	0.256
1979	333.35	175.16	53.80	0.272
1980	450.51	183.92	60.46	0.285
1981	333.78	195.27	56.26	0.277
1982	314.41	202.48	58.06	0.269
1983	302.87	213.95	60.13	0.272
1984	291.34	214.95	65.15	0.269
1985	518.79	219.85	63.64	0.248
1986	259.32	233.35	60.05	0.235
1987	266.13	234.99	65.32	0.251
1988	337.74	197.60	66.82	0.301
1989	234.86	192.22	68.78	0.315
1990	355.86	179.70	61.41	0.308
1991	314.75	168.46	59.29	0.321
1992	425.16	140.95	58.29	0.361
1993	392.85	129.40	53.64	0.361
1994	269.36	121.77	52.64	0.373
1995	482.75	146.75	57.87	0.308
Average	344.63	185.03	59.70	0.293
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.12.3.a.1 Catches (t) of MACKEREL in the Norwegian Sea (Division IIa) and off the Faroes (Division Vb), 1983-1995. (Data submitted by Working Group members.)

Country	1983	1984	1985	1986	1987[1]	1988[1]
Denmark	10,427	11,787	7,610	1,653	3,133	4,265
Faroe Islands	-	137	-	-	-	22
France	-	-	16	-	-	-
Germany, Fed. Rep.	5	-	-	99	-	380
German Dem. Rep.	-	-	-	16	292	-
Norway	38,453	82,005	61,065	85,400	25,000	86,400
Poland	-	-	-	-	-	-
United Kingdom	-	-	-	2,131	157	1,413
USSR	65	4,292	9,405	11,813	18,604	27,924
Discards	-	-	-	-	-	-
Total	48,950	98,222	78,096	101,112	47,186	120,404

Country	1989	1990	1991	1992	1993[2]	1994[2]	1995
Denmark	6,433	6,800	1,098	251	-	-	4,746
Estonia				216	-	3,302	1,925
Faroe Islands	1,247	3,100	5,793	3,347	1,167	6,258	9,032
France	11	-	23	6	6	5	5
Germany, Fed. Rep.	-	-	-	-	-	-	-
German Dem. Rep.	2,409	-	-	-	-	-	-
Latvia				100	4,700	1,508	389
Norway	68,300	77,200	76,760	91,900	110,500	140,708	93,315
Poland	-	-	-	-	-	-	-
Russia				42,440	49,600	28,041	44,537
United Kingdom	-	400	514	802	-	1,706	194
USSR	12,088	30,000	13,631[3]	-	-	-	-
Misreported[1]						-109,625	-18,647
Discards	-	2,300	-	-	-	-	
Total	90,488	118,700	97,819	139,062	165,973	71,903	135,493

[1]Includes catches probably taken in the northern part of Division IVa.
[2]Preliminary.
[3]Russia.

Table 3.12.3.a.2 Catch (t) of MACKEREL in the North Sea, Skagerrak, and Kattegat (Sub-area IV and Division IIIa), 1983–1995. (Data submitted by Working Group members).

Country	1983	1984	1985	1986	1987[1]	1988
Belgium	93	68	-	49	14	20
Denmark	11,285	10,088	12,424	23,368	28,217	32,588
Faroe Islands	-	-	1,356	-	-	-
France	2,248	-	322	1,200	2,146	1,806
Germany	10	112	217	1,853	474	177
Ireland	-	-	-	-	-	-
Netherlands	866	340	726	1,949	2,761	2,564
Norway	24,464	27,311	30,835	50,600	108,250	59,750
Sweden	1,903	1,440	760	1,300	3,162	1,003
United Kingdom	16	2	143	18	94	876
USSR	-	-	-	-	-	-
Unallocated, discards and misreported	96	202	3,656	162,822	136,737	233,532
Total	40,985	39,576	50,466	243,700	301,618	338,316
Misreported[3]				148,000	117,000	180,000

Country	1989	1990	1991	1992	1993[2]	1994[2]	1995
Belgium	37	-	125	102	191	351	106
Denmark	26,831	29,000	38,834	41,719	42,502	47,852	30,891
Estonia				400	-	-	-
Faroe Islands	2,685	5,900	5,338	-	11,408	11,027	17,883
France	2,200	1,600	2,362	956	1,480	1,570	1,599
Germany	6,312	3,500	4,173	4,610	4,940	1,479	712
Ireland	8,880	12,800	13,000	13,136	13,206	9,032	5,607
Latvia				211	-	-	-
Netherlands	7,343	13,700	4,591	6,547	7,770	3,637	1,275
Norway	81,400	74,500	102,350	115,700	112,700	115,741	108,785
Sweden	6,601	6,400	4,227	5,100	5,934	7,099	6,285
United Kingdom	38,660	30,800	36,917	35,137	41,010	27,479	21,609
Russia	-	-	-	-	-	-	-
Romania	-	-	-	-	-	2,903	-
Unallocated, discards, and misreported	100,651	126,900	153,958	143,546	149,417	245,807	127,338
Total	281,600	305,100	365,875	367,164	390,558	473,977	322,099
Misreported[3]	92,000	126,000	130,000	127,000	146,697	245,157	106,987

[1] May includes catches taken in Division IIa.
[2] Preliminary.
[3] Catches reported as taken in Division VIa.

Table 3.12.3.a.3 Catch (t) of MACKEREL in the Western area (Sub-areas VI and VII and Divisions VIIIa,b,d,e). (Data submitted by Working Group members).

Country	1983	1984	1985	1986	1987	1988
Belgium	+	+	-	+	-	-
Denmark	15,000	200	400	300	100	-
Faroe Islands	14,900	9,200	9,000	1,400	7,100	2,600
France	11,000	12,500	7,400	11,200	11,100	8,900
Germany	23,000	11,200	11,800	7,700	13,300	15,900
Ireland	110,000	84,100	91,400	74,500	89,500	85,800
Netherlands	73,600	99,000	37,000	58,900	31,700	26,100
Norway	19,900	34,700	24,300	21,000	21,600	17,300
Poland	-	-	-	-	-	-
Spain	-	100	+	-	-	1,500
United Kingdom	182,900	198,300	205,900	156,300	200,700	208,400
USSR	+	200	+	-	-	+
Unallocated + misreported[1]	105,500	18,000	75,100	-98,701	-91,000	-175,300
Discard	11,300	12,100	4,500	-	-	5,800
Grand Total	567,100	479,600	467,700	232,599	284,000	377,000
Misreported[3]				-148,000	-117,000	-180,000

Country	1989[2]	1990	1991	1992	1993[2]	1994[2]	1995
Belgium	-	-	-	-	-	-	-
Denmark	1,000?	-	1,573	194	-	2,239	1,443
Estonia							361
Faroe Islands	1,100	1,000	4,095	-	2,350	4,283	4,248
France	12,700	17,400	10,364	9,109	8,296	9,998	10,178
Germany	16,200	18,100	17,138	21,952	23,776	25,011	23,703
Ireland	61,100	61,500	64,827	76,313	81,773	79,996	72,927
Netherlands	24,000	24,500	29,156	32,365	44,600	40,698	34,514
Norway	700	-	-	-	600	2,552	-
Poland	-	-	-	-	-	-	-
Spain	1,400	400	4,020	2,764	3,162	4,126	4,509
United Kingdom	149,100	162,700	162,588	196,890	215,265	208,656	190,344
USSR	-	-	-	-	-	-	-
Unallocated + misreported[1]	-73,100	-114,500	-133,802	-125,528[1]	-146,697[1]	-130,133	-78,742
Discard	4,900	11,300	23,550	22,020	15,660	4,220	6,991
Grand Total	288,900	302,900	183,509	236,079	248,785	251,646	270,476
Misreported[3]	-92,000	-126,000	-130,000	-127,000	-146,697	-134,765	-106,987

[1]Includes catches taken in Division IVa, but misreported to Division VIa.
[2]Preliminary.
[3]Catches taken in Division IVa but reported for Division VIa.

Table 3.12.3.a.4 Landings (tonnes) of Mackerel in Divisions VIIIc and IXa, 1977-1995. (Data submitted by Working Group members).

	Division VIIIc	Division IXa					
Years	**Spain**	**Portugal**	**Spain**	**Poland**	**USSR**	**Total**	**TOTAL**
1977	19,852	1,743	2,935	8	2,879	7,565	27,417
1978	18,543	1,555	6,221	-	189	7,965	26,508
1979	15,013	1,071	6,280	-	111	7,462	22,475
1980	11,316	1,929	2,719	-	-	4,648	15,964
1981	12,834	3,108	2,111	-	-	5,219	18,053
1982	15,621	3,018	2,437	-	-	5,455	21,076
1983	10,390	2,239	2,224	-	-	4,463	14,853
1984	13,852	2,250	4,206	-	-	6,456	20,308
1985	11,810	4,178	2,123	-	-	6,301	18,111
1986	16,533	6,419	1,837	-	-	8,256	24,789
1987	15,982	5,714	491	-	-	6,205	22,187
1988	16,844	4,388	3,540	-	-	7,928	24,772
1989	13,446	3,112	1,763	-	-	4,875	18,321
1990	16,086	3,819	1,406	-	-	5,225	21,311
1991	16,940	2,789	1,051	-	-	3,840	20,780
1992	12,043	3,576	2,427	-	-	6,003	18,046
1993	16,675	2,015	1,027	-	-	3,042	19,719
1994	21,146	2,158	1,741	-	-	3,899	25,045
1995	23,631	2,893	1,025	-	-	3,918	27,549

Table 3.12.3.a.5 Catches 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[1]	Divs. VIIIc, IXa	Total		
	Landings	Discards[2]	Catch	Landings	Discards[2]	Catch	Landings	Discards[2]	Catch	Landings	Landings	Landings	[2]	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	Not	356,487	-	356,487
1973	52,200	-	52,200	167,300	-	167,300	326,519	-	326,519	21,600	available	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	27,417	620,848	-	620,848
1978	151,700	15,100	166,900	355,500	35,500	391,000	148,817	-	148,817	4,200	26,508	686,725	50,700	737,425
1979	203,300	20,300	223,600	398,000	39,800	437,800	152,323	500	152,823	7,000	22,475	783,098	60,600	843,698
1980	218,700	6,000	224,700	386,100	15,600	401,700	87,391	-	87,391	8,300	15,964	716,455	21,600	738,055
1981	335,100	2,500	337,600	274,300	39,800	314,100	64,172	3,216	67,388	18,700	18,053	710,325	45,516	755,841
1982	340,400	4,100	344,500	257,800	20,800	278,600	35,033	450	35,483	37,600	21,076	691,009	25,350	716,359
1983	315,100	22,300	337,400	245,400	9,000	254,400	40,889	96	40,985	49,000	14,853	665,242	31,396	696,638
1984	306,100	1,600	307,700	176,100	10,500	186,600	39,374	202	39,576	93,900	20,308	635,782	12,302	648,084
1985	308,140	2,735	390,875	75,043	1,800	76,843	46,790	3,656	50,446	78,000	18,111	606,084	8,191	614,275
1986	104,100	+	104,100	128,499	+	128,499	236,309	7,431	243,740	101,000	24,789	594,697	7,431	602,128
1987	183,700	+	183,700	100,300	+	100,300	290,829	10,789	301,618	47,000	22,187	644,016	10,789	654,805
1988	115,600	3,100	118,700	75,600	2,700	78,300	308,550	29,766	338,316	116,200	24,772	640,772	35,566	676,288
1989	121,300	2,600	123,900	72,900	2,300	75,200	279,410	2,190	281,600	86,900	18,321	578,831	7,090	585,921
1990	114,800	5,800	120,600	56,300	5,500	61,800	300,800	4,300	305,100	116,800	21,311	610,011	15,600	625,611
1991	109,500	10,700	120,200	50,500	12,800	63,300	358,700	7,200	365,900	97,800	20,683	637,183	30,700	667,883
1992	141,906	9,620	151,526	72,153	12,400	84,553	364,184	2,980	367,164	139,062	18,046	735,351	25,000	760,351
1993	133,497	2,670	136,167	99,828	12,790	112,618	387,838	2,720	390,558	165,973	19,720	806,856	18,180	825,036
1994	134,338	1,390	135,728	113,088	2,830	115,918	474,830	1,150	475,980	69,900	25,043	817,198	5,370	822,568
1995	145,626	74	145,700	117,883	6,917	124,800	322,000	730	323,400	135,500	27,600	747,879	7,721	755,600

[1]For 1976-1985 only Division IIa.
[2]Discards estimated only for one fleet in recent years.

NB: Landings from 1969–1978 were taken from the 1978 Working Group report (Tables 2.1, 2.2 and 2.5).

Table 3.12.3.a.6 Catches of mackerel by Division and Sub-area in 1995. (Data submitted by Working Group members.)

Division/ Sub-area	Quarter				Total
	1	2	3	4	
IIa + Vb	200	2,000	133,300	+	135,500
IVa	103,900	200	60,100	147,800	312,000
IVb		+	1,100	400	1,500
IVc	100	300	1,000	1,500	2,900
IIIa	+	300	500	4,800	5,600
VI	117,200	9,500	2,600	16,400	145,700
VII	51,100	30,000	3,300	34,200	118,600
VIIIa,b,d,e	1,600	3,900	400	300	6,200
Sub-total	274,100	46,200	202,300	205,400	728,000
VIIIc	6,300	16,000	900	500	23,700
IXa	800	1,000	1,400	700	3,900
Grand total	281,200	63,200	204,600	206,600	755,600

Catches rounded to nearest 100.
Catches less than 50 t = +.

Table 3.12.3.a.7 Mackerel in the North East Atlantic.

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-8
1984	7,259.00	2,856.14	648.08	0.192
1985	3,454.00	2,821.71	614.28	0.191
1986	3,442.00	2,817.67	602.13	0.172
1987	5,892.00	2,779.07	654.81	0.200
1988	3,910.00	2,868.86	676.29	0.217
1989	5,127.00	2,905.73	585.92	0.168
1990	3,000.00	2,800.99	625.61	0.172
1991	3,278.00	3,194.54	667.88	0.185
1992	3,764.00	3,205.90	760.35	0.218
1993	4,626.00	2,879.11	825.04	0.278
1994	2,589.00	2,548.94	827.71	0.276
1995	1,592.00	2,538.10	756.19	0.270
Average	3,994.42	2,851.40	687.02	0.212
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.12.3.a.8 Mackerel (Western Component).

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-8
1972	2,126.01	3,905.97	170.78	0.012
1973	4,616.17	3,974.87	219.45	0.027
1974	3,549.96	3,951.71	298.05	0.059
1975	4,793.35	3,683.97	491.38	0.150
1976	5,190.00	2,795.97	507.18	0.231
1977	1,010.00	2,789.91	325.97	0.113
1978	3,379.00	2,985.14	503.91	0.154
1979	5,549.00	2,653.94	605.74	0.216
1980	5,532.00	2,273.75	604.76	0.241
1981	7,192.00	2,389.93	661.76	0.193
1982	1,892.00	2,270.15	623.82	0.194
1983	1,389.00	2,489.30	614.29	0.190
1984	6,649.00	2,458.29	550.93	0.182
1985	3,102.00	2,451.65	561.29	0.189
1986	3,258.00	2,189.54	537.62	0.166
1987	5,667.00	2,481.49	615.38	0.205
1988	3,328.00	2,613.57	628.00	0.220
1989	4,662.00	2,629.13	567.40	0.170
1990	2,708.00	2,484.83	605.94	0.176
1991	3,036.00	2,856.37	646.17	0.194
1992	3,183.00	2,851.84	742.31	0.230
1993	4,598.00	2,510.20	805.04	0.308
1994	1,878.00	2,149.73	797.69	0.301
1995	1,994.00	2,126.44	728.64	0.307
Average	3,761.73	2,748.65	558.90	0.185
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.12.3.a.9 Mackerel - North Sea component (Weight in '000 t).

Year	Spawning Stock Biomass	Landings
1965	2850[1]	208
1966	2700[1]	530[2]
1967	1900[1]	930[2]
1968	1500[1]	822[2]
1969	1113[3]	739[2]
1970	550[3]	323[2]
1971	580[3]	243[2]
1972	1249[3]	125[4]
1973	1097[3]	226[4]
1974	1036[3]	190[4]
1975	826[4]	138[4]
1976	700[4]	165[4]
1977	583[4]	188[4]
1978	436[4]	103[4]
1979	336[4]	66[4]
1980	258[4]	61[4]
1981	189[4]	60[4]
1982	162[4]	40[4]
1983	168[4]	43[4]
1984	133[5]	67[4]
1985		35[4]
1986	45[5]	25[4]
1987		3[4]
1988	37[5]	6
1989		7
1990	78[5]	10
1991		-[6]
1992		-[6]
1993		-[6]
1994		-[6]
1995		-[6]
Average	805	206

[1]Hamre, J. 1980 Rapp.P.-v. Reun.Cons.Int.Explor.Mer. 177:212–242
[2]Report of the Mackerel Working Group 1975. ICES CM 1975/H:3
[3]Report of the Mackerel Working Group 1981. ICES CM 1981/H:7
[4]Report of the Mackerel Working Group 1989. ICES CM 1989/H:7
[5]Estimations based on Mackerel Egg Surveys
[6]Assumed by the Working Group to be 10,000 t as in 1990

Table 3.12.4.1 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	43,405	37,703	34,177	38,686	46,302
IX	20,237	31,159	24,540	29,763	29,231	24,023
Total	144,353	193,607	222,340	269,745	358,533	439,901

Sub-area	1991	1992	1993	1994	1995[1]
II + Vb	4,487	13,457	3,168	759	13,133
IV + IIIa	77,994	113,141	140,383	112,580	98,745
VI	34,455	40,921	53,822	69,616	83,595
VII	201,326	188,135	221,120	200,256	330,705
VIII	49,426	54,186	53,753	35,500	28,709
IX	21,778	26,713	31,944	28,442	25,147
Total	389,466	436,553	504,190	447,153	580,034

[1]Preliminary.

Table 3.12.4.2 Landings (t) of HORSE MACKEREL in Sub-area II. (Data as submitted by Working Group members.)

Country	1980	1981	1982	1983	1984	1985	1986	1987
Denmark	-	-	-	-	-	-	-	39
Faroe Islands	-	-	-	-	-	-	-	-
France	-	-	-	-	1	1	-[2]	-[2]
Germany	-	+	-	-	-	-	-	-
Norway	-	-	-	412	22	78	214	3,272
Russia	-	-	-	-	-	-	-	-
UK (England & Wales)	-	-	-	-	-	-	-	-
Total	-	+	-	412	23	79	214	3,311

Country	1988	1989	1990	1991	1992	1993	1994	1995[1]
Denmark	-	-	-	-	-	-	-	200
Faroe Islands	-	-	964[3]	1,115[3]	9,157[3]	1,068	-	-
France	-[2]	-	-	-	-	-	55	-
Germany	64	12	+	-	-	-	-	-
Norway	6,285	4,770	9,135	3,200	4,300	2,100	4	11,300
Russia	469	27	1,298	172	-	-	700	1,633
UK (England & Wales)	-	-	17	-	-	-	-	-
Total	6,818	4,809	11,414	4,487	13,457	3,168	759	13,133

[1]Preliminary.
[2]Included in Sub-area IV.
[3]Includes catches in Division Vb.

Table 3.12.4.3 Landings (t) of HORSE MACKEREL in Sub-area VI by country. (Data submitted by Working Group members).

Country	1980	1981	1982	1983	1984	1985	1986	1987
Denmark	734	341	2,785	7	-	-	-	769
Faroe Islands	-	-	1,248	-	-	4,014	1,992	4,450[3]
France	45	454	4	10	14	13	12	20
Germany	5,550	10,212	2,113	4,146	130	191	354	174
Ireland	-	-	-	15,086	13,858	27,102	28,125	29,743
Netherlands	2,385	100	50	94	17,500	18,450	3,450	5,750
Norway	-	5	-	-	-		83	75
Spain	-	-	-	-	-		-[2]	-[2]
UK (Engl. + Wales)	9	5	+	38	+	996	198	404
UK (N. Ireland)						-	-	-
UK (Scotland)	1	17	83	-	214	1,427	138	1,027
USSR	-	-	-		-	-	-	-
Unallocated + discards						-19,168	-13,897	-7,255
Total	8,724	11,134	6,283	24,881	31,716	33,025	20,455	35,157

Country	1988	1989	1990	1991	1992	1993	1994	1995[1]
Denmark	1,655	973	615	-	42	-	294	106
Faroe Islands	4,000[3]	3,059	628	255	-	820	80	-
France	10	2	17	4	3	+	-	-
Germany	615	1,162	2,474	2,500	6,281	10,023	1,430	1,368
Ireland	27,872	19,493	15,911	24,766	32,994	44,802	65,564	120,124
Netherlands	3,340	1,907	660	3,369	2,150	590	341	2,326
Norway	41	-	-	-	-	-	-	-
Spain	-[2]	-[2]	-[2]	1	3	-	-	-
UK (Engl. + Wales)	475	44	145	1,229	577	144	109	208
UK (N.Ireland	-	-	-	1,970	723	-	-	-
UK (Scotland)	7,834	1,737	267	1,640	86	4,523	1,760	789
USSR	-	-	44	-	-	-	-	-
Unallocated + discards	-	6,493	143	-1,278	-1,940	-6,960[4]	-51	-41,326
Total	45,842	34,870	20,904	34,456	40,469	53,942	69,527	83,595

[1]Preliminary.
[2]Included in Sub-area VII.
[3]Includes Divisions IIIa, IVa,b and VIb.
[4]Includes a negative unallocated catch of -7,000 t.

Table 3.12.4.4 Landings (t) of HORSE MACKEREL in Sub-area VII by country. Data submitted by the Working Group members).

Country	1980	1981	1982	1983	1984	1985	1986	1987
Belgium	-	1	1	-	-	-	+	-
Denmark	5,045	3,099	877	993	732	1,477 [2]	30,408 [2]	27,368
Faroe Islands	-	-	-	-	-	-	-	-
France	1,983	2,800	2,314	1,834	2,387	1,881	3,801	2,197
Germany	2,289	1,079	12	1,977	228	-	5	374
Ireland	-	16		-	65	100	703	15
Netherlands	23,002	25,000	27,500 [2]	34,350	38,700	33,550	40,750	69,400
Norway	394	-	-	-	-	-	-	-
Spain	50	234	104	142	560	275	137	148
UK (England & Wales)	12,933	2,520	2,670	1,230	279	1,630	1,824	1,228
UK (N. Ireland)	-	-	-	-	-	-	-	-
UK (Scotland)	1	-	-	-	1	1	+	2
USSR	-	-	-	-	-	120	-	-
Unallocated + discards	-	-	-	-	-	-	-	-
Total	45,697	34,749	33,478	40,526	42,952	39,034	77,628	100,734

Country	1988	1989	1990	1991	1992	1993	1994	1995 [1]
Belgium	-	-	+	-	-	-	1	-
Denmark	33,202	34,474	30,594	28,888	18,984	16,978	41,605	28,300
Faroe Islands	-	-	28	-	-	-	-	-
France	1,523	4,576	2,538	1,230	1,198	1,001	-	-
Germany	4,705	7,743	8,109	12,919	12,951	15,684	14,828	17,436
Ireland	481	12,645	17,887	19,074	15,568	16,363	15,281	58,011
Netherlands	43,560	43,582	111,900	104,107	109,197	157,110	92,903	116,126
Norway	-	-	-	-	-	-	-	-
Spain	150	14	16	113	106	54	29	25
UK (England & Wales)	3,759	4,488	13,371	6,436	7,870	6,090	12,418	31,641
UK (N. Ireland)	-	-	-	2,026	1,690	587	119	-
UK (Scotland)	2,873	+	139	1,992	5,008	3,123	9,015	10,522
USSR	-	-	-	-	-	-	-	-
Unallocated + discards	-	28,368	7,614	24,541	15,563	4,010 [3]	14,057	68,644
Total	90,253	135,890	192,196	201,326	188,135	221,000	200,256	330,705

Provisional.
Includes Sub-area VI.
Includes a negative unallocated catch of -4,000 t.

Table 3.12.4.5 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			Total
	IIIa	IVb,c	Discards	VIId	Total	IIa	IVa	VIa	VIIa-c,e-k	VIIIa,b,d,e	Discards	Total	VIIIc	IXa	Total	All stocks
1982	- 2,788[3]	-		1,247	4,035	-	-	6,283	32,231	3,073	-	41,587	19,610	39,726	59,336	104,958
1983	- 4,420[3]	-		3,600	8,020	412	-	24,881	36,926	2,643	-	64,862	25,580	48,733	74,313	147,195
1984	- 25,893[3]	-		3,585	29,478	23	94	31,716	38,782	2,510	500	73,625	23,119	23,178	46,297	149,400
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	150,830
1986	396	19,496		4,756	24,648	214	776	20,343	72,761	3,071	8,500	105,665	40,334	31,159	71,493	201,806
1987	436	9,477		1,721	11,634	3,311	11,185	35,197	99,942	7,605	-	157,240	30,098	24,540	54,638	223,512
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	29,763	56,392	268,163
1989	913	25,830		6,522	33,265	4,809	85,304[2]	34,870	131,218	11,516	1,150	268,867	27,170	29,231	56,401	358,533
1990	14,872[1]	17,437		1,325	18,762	11,414	112,753[2]	20,794	182,580	21,120	9,930	373,463	25,182	24,023	49,205	441,430
1991	2,725[1]	11,400		600	12,000	4,487	63,869[2]	34,415	196,926	25,693	5,440	333,555	23,733	21,778	45,511	391,066
1992	2,374[1]	13,955	400	688	15,043	13,457	101,752	40,881	180,937	29,329	1,820	370,550	24,243	26,713	50,955	436,548
1993	850[1]	3,895	930	8,792	13,617	3,168	134,908	53,782	204,318	27,519	8,600	433,145	25,483	31,945	57,428	504,190
1994	2,492[1]	2,496	630	2,503	5,689	759	106,911	69,546	194,188	11,044	3,935	388,875	24,147	28,442	52,589	447,153
1995	240	7,948	30	8,666	16,756	13,133	90,527	83,486	320,102	1,175	2,046	510,597	27,534	25,147	52,681	580,034

[1]Norwegian and Danish catches are included in the Western horse mackerel.
[2]Norwegian catches in Division IVb included in the Western horse mackerel.
[3]Divisions IIIa and IVb,c combined.

Table 3.12.4.6 Western Horse mackerel (IIa, IVa, VIa, VIIa-c, e-k, VIIIa-b,d-e).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 5-14
1982	1,560.00	1,506.00	42.00	0.041
1983	57,039.00	1,690.00	65.00	0.131
1984	1,687.00	1,839.00	74.00	0.035
1985	1,443.00	2,690.00	81.00	0.064
1986	2,188.00	3,627.00	106.00	0.034
1987	2,674.00	4,267.00	157.00	0.030
1988	4,906.00	4,802.00	188.00	0.037
1989	645.00	4,227.00	269.00	0.055
1990	1,076.00	3,740.00	374.00	0.089
1991	442.00	3,606.00	334.00	0.066
1992	1,463.00	2,841.00	371.00	0.085
1993	4,397.00	2,545.00	433.00	0.141
1994	2,147.00	1,944.00	389.00	0.136
1995	519.00	1,472.00	511.00	0.320
Average	5,870.43	2,914.00	242.43	0.090
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.12.5.1 Landings (tonnes) of BLUE WHITING from the main fisheries, 1986-1995, as estimated by the Working Group.

Area	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Norwegian Sea fishery ('Subareas I+II and Divisions Va,XIVa-b)	160 061	123 042	55 829	42 615[3)]	2 106	78 703	62 312	43 240	22674	23 733[3)]
Fishery in the spawning area (Divisions Vb, VIa, VIb and VIIb-c)	534 263[1)]	445 881[1)]	421 636	473 165	463 495	218 946	317 237	347 101	378 704	423 282
Industrial mixed fishery (Divisions IVa-c, Vb and IIIa)	99 580	62 689	45 143	75 958	63 192	39 872	65 974	58 082	28 563	104 004
Subtotal northern fishery	793 904[2)]	631 612[2)]	522 608	591 738	528 793	337 521	445 523	448 423	429 941	551 019
Southern fishery (Subareas VII+IX, Divisions VIId,e,g-k)	33 082	32 819	30 838	33 695	32 817	32 003	28 722	32 256	29 473	27 664
Total	826 986	664 431	553 446	625 433	561 610	369 524	474 245	480 679	459 414	578 683

[1)] Including directed fishery also in Divisions VIIg-k, IVa and Sub-area XII.
[2)] Excluding directed fishery also in Division VIIg-k.
[3)] Including Icelandic industrial fishery in Division Va.

able 3.12.5.2 Landings (tonnes) of BLUE WHITING from the directed fisheries in the Norwegian Sea (Sub-areas I and II, Divisions Va, XIVa and XIVb) 1986-1995, as estimated by the Working Group.

ountry	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
aroes	-	9 290	-	1 047	-	-	-	-	-	-
erman Dem. Rep.	3 541	1 010	3	1 341	-	-	-	-	-	-
ermany Fed. Rep.	106	-	-	-	-	-	-	-	2[4]	3[4]
reenland	10	-	-	-	-	-	-	-	-	-
eland	-	-	-	4 977[3]	-	-	-	-	-	369[3]
etherlands	-	-	-	-	-	-	-	-	-	72
orway	-	-	-	-	566	100	912	240	-	-
oland	-	56	10	-	-	-	-	-	-	-
SSR/Russia[1]	156 404	112 686	55 816	35 250	1 540	78 603	61 400	43 000	22 250[2]	23 289
atvia	-	-	-	-	-	-	-	-	422	-
otal	160 061	123 042	55 829	42 615	2 106	78 703	62 312	43 240	22 674	23 733

From 1992
Includes Vb
Icelandic mixed fishery in Va
Germany

Table 3.12.5.3 Landings (tonnes) of BLUE WHITING from directed fisheries in the spawning area (Division Vb, VIa, b, VIIb, c, VIIg-k and Sub-area XII), as estimated by the Working Group.

Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Denmark	11 364	2 655	797	25	-	-	3 167	-	770	-
Faroes	80 564	70 625	79 339	70 711	43 405	10 208[1]	12 731	14 984	22 548	26 009
France	-	-	-	2 190	-	-	-	1 195	-	720
German Dem. Rep.	2 750	3 584	4 663	3 225	230	-	-	-	-	-
Germany Fed, Rep.	-	266	600	848	1 469	349[3]	1 307[3]	91[3]	-	6 310[3]
Ireland	16 440	3 300	245	-	-	-	-	-	3	-
Netherland	8 888	5 627	800	2 078	7 280	17 359	11 034	18 436	21 076	26 703
Norway	283 162	191 012	208 416	258 386	281 036[1]	114 866[1]	148 733[1]	198 916	226 235	261 272
UK (Eng.& Wales)	10	5	3	1 557	13	-	356	2	1 418	4 622[4]
UK (Scotland)	3 472	3 310	5 068	6 463	5 993	3 541	6 493	2 030	3 047	
USSR/Russia 2)	127 613	165 497	121 705	127 682	124 069	72 623	115 600	96 000	94 531	83 931
Japan	-	-	-	-	-	-	918	1 742	2 574	-
Estonia	-	-	-	-	-	-	6 156	1 033	4 342	13 715
Latvia	-	-	-	-	-	-	10 742	10 626	2 160	-
Lithauen	-	-	-	-	-	-	-	2 046	-	-
Total	534 263	445 881	421 636	473 165	463 495	218 946	317 237	347 101	378 704	423 282

[1] Including directed fishery also in Division IVa
[2] From 1992
[3] Germany
[4] UK

Table 3.12.5.4 Landings (tonnes) of BLUE WHITING from the mixed industrial fisheries and caught as by-catch in ordinary fisheries in Divisions IIIa, IVa.

Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	19
Denmark	57 315	28 541	18 144	26 605	27 052	15 538	31 189	41 053	19 686	12 4
Faroes	5 678	7 051	492	3 325	5 281	355	705	1 522	1 794	
German Dem. Rep.[1]	-	53	-	-	-	-	-	-	-	
Germany Fed, Rep.[1]	-	62	280	3	-	-	25[3]	9[3]	-	
Netherland	1 114	-	-	-	20	-	2	46	-	
Norway	26 941	24 969	24 898	42 956	29 336[2]	22 644	31 977	12 333	3 408	78 5
Sweden	8 532	2 013	1 229	3 062	1 503	1 000	2 058	2 867[4]	3 675	13 0
UK (Eng.& Wales) [1]	-	-	-	7	-	-	17	-	-	
UK (Scotland)	-	-	100	-	-	335	1	252	-	
Total	99 580	62 689	45 143	75 958	63 192	39 872	65 974	58 082	28 563	104 0

[1] Including directed fishery also in Division IVa
[2] Including mixed industrial fishery in the Norwegian Sea
[3] Germany
[4] Unprecise estimates reported catch of 34 265 t in 1993; the mean of 1992 and 1994, i.e. 2 867 t, is used in the VPA-RUN

Table 3.12.5.5 Landings (tonnes) of BLUE WHITING from the Southern areas (Sub-areas VIII and IX and Divisions VIIg-k and VIId, e) 1985-1994 as estimated by the Working Group.

Country	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Netherlands	-	-	-	-	450	10	-	-	-	-
Norway	-	4	-	-	-	-	-	-	-	-
Portugal	8 116	9 148	5 979	3 557	2 864	2 813	4 928	1 236	1 350	2 285
Spain	24 965	23 644	24 847	30 108	29 490	29 180	23 794	31 020	28 118	25 379
UK (Eng.& Wales)	1	23	12	29	13	-	-	-	5	-
France	-	-	-	1	-	-	-	-	-	-
Total	33 082	32 819	30 838	33 695	32 817	32 003	28 722	32 256	29 473	27 664

Table 3.12.5.6 Blue whiting, combined stock.

Year	Recruitment Age 0	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1981	5,535.67	4,468.09	909.56	0.215
1982	24,389.10	3,226.14	576.42	0.177
1983	24,223.40	2,218.05	570.07	0.213
1984	13,403.10	1,823.21	641.78	0.276
1985	10,961.80	2,070.98	695.60	0.333
1986	10,551.50	2,373.17	826.99	0.478
1987	8,250.15	1,990.34	664.43	0.390
1988	9,598.10	1,677.83	553.41	0.491
1989	23,113.90	1,578.46	625.43	0.527
1990	9,660.47	1,426.72	561.61	0.506
1991	7,106.66	1,654.98	369.52	0.296
1992	5,217.35	2,100.05	474.25	0.229
1993	9,240.40	1,955.18	480.67	0.258
1994	10,212.70	1,834.34	459.41	0.282
1995	23,980.00	1,685.12	578.69	0.402
Average	13,029.62	2,138.84	599.19	0.338
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.12.6.1 Estimated landings (tonnes) of deep-water species by ICES Sub-areas and Divisions, 1988-1993.

I+II	Species	1988	1989	1990	1991	1992	1993	1994	1995
	ALFONSINOS (Beryx spp.)								
	ARGENTINES (Argentina silus)	11351	8390	9123	7668	8234	5716		
	BLACK SCABBARDFISH (Aphanopus carbo)								
	GREATER FORKBEARD (Phycis blennoides)	0	0	23	39	33	1		
	MORIDAE								
	ORANGE ROUGHY (Hoplostethus atlanticus)								
	ROUGHHEAD GRENADIER (Macrourus berglax)	0	0	589	829	424	136		
	ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	0	24	43	70	41	35	15	
	RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)								
	SHARKS, VARIOUS	37	15	0	0	0	0		
	SILVER SCABBARDFISH (Lepidopus caudatus)								
	WRECKFISH (Polyprion americanus)								

III+IV	Species	1988	1989	1990	1991	1992	1993	1994	1995
	ALFONSINOS (Beryx spp.)								
	ARGENTINES (Argentina silus)	2718	3786	2322	2554	4434	567		
	BLACK SCABBARDFISH (Aphanopus carbo)	0	0	57	0	0	0	16	
	GREATER FORKBEARD (Phycis blennoides)	15	12	115	181	145	28		
	MORIDAE								
	ORANGE ROUGHY (Hoplostethus atlanticus)	0	0	0	10	33	0		
	ROUGHHEAD GRENADIER (Macrourus berglax)	0	0	0	0	7	0		
	ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	618	1052	1531	2070	4247	1868	1968	
	RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)								
	SHARKS, VARIOUS	5	16	11	17	2	2	5	3
	SILVER SCABBARDFISH (Lepidopus caudatus)	0	0	0	0	27	0		
	WRECKFISH (Polyprion americanus)								

Va	Species	1988	1989	1990	1991	1992	1993	1994	1995
	ALFONSINOS (Beryx spp.)								
	ARGENTINES (Argentina silus)	206	8	112	247	657	1255		
	BLACK SCABBARDFISH (Aphanopus carbo)								
	GREATER FORKBEARD (Phycis blennoides)								
	MORIDAE								
	ORANGE ROUGHY (Hoplostethus atlanticus)	0	0	0	65	382	717	158	42*
	ROUGHHEAD GRENADIER (Macrourus berglax)								
	ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	2	4	7	48	210	276	210	221*
	RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)								
	SHARKS, VARIOUS	0	0	0	0	2	52	34	97*
	SILVER SCABBARDFISH (Lepidopus caudatus)								
	WRECKFISH (Polyprion americanus)								

Vb	Species	1988	1989	1990	1991	1992	1993	1994	1995
	ALFONSINOS (Beryx spp.)	0	0	4	0	4	0		
	ARGENTINES (Argentina silus)	278	227	92	60	1443	1062		
	BLACK SCABBARDFISH (Aphanopus carbo)	0	0	419	152	64	287	160	249*
	GREATER FORKBEARD (Phycis blennoides)	2	1	38	52	49	22		
	MORIDAE	0	0	0	5	0	0		
	ORANGE ROUGHY (Hoplostethus atlanticus)	0	0	5	48	13	37	170	
	ROUGHHEAD GRENADIER (Macrourus berglax)								
	ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	1	193	1208	1424	2038	688	499	
	RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)								
	SHARKS, VARIOUS	0	0	0	3	41	387	43	
	SILVER SCABBARDFISH (Lepidopus caudatus)								
	WRECKFISH (Polyprion americanus)								

VI+VII	Species	1988	1989	1990	1991	1992	1993	1994	1995
	ALFONSINOS (Beryx spp.)	0	12	8	0	3	0		
	ARGENTINES (Argentina silus)	10438	25523	7294	5197	5906	0		
	BLACK SCABBARDFISH (Aphanopus carbo)	0	41	1060	59	2488	3481	3904	3
	GREATER FORKBEARD (Phycis blennoides)	799	369	549	621	903	53		
	MORIDAE	0	0	0	1	25	0		
	ORANGE ROUGHY (Hoplostethus atlanticus)	0	0	3	3781	4462	2146	1925	
	ROUGHHEAD GRENADIER (Macrourus berglax)								
	ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	32	2440	5975	8166	8379	8433	8564	
	RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)	252	189	134	123	40	15	9.3	
	SHARKS, VARIOUS	106	125	426	1421	3233	945	1137	1317
	SILVER SCABBARDFISH (Lepidopus caudatus)	0	0	0	0	703	2		
	WRECKFISH (Polyprion americanus)	7	0	2	10	15	0		

Table 3.12.6.1 Continued

VIII+IX Species	1988	1989	1990	1991	1992	1993	1994	1995
ALFONSINOS (Beryx spp.)	0	0	1	0	1	0		
ARGENTINES (Argentina silus)								
BLACK SCABBARDFISH (Aphanopus carbo)	2602	3473	3274	3979	4399	4513	3428	4025
GREATER FORKBEARD (Phycis blennoides)	57	7	16	22	17	8		
MORIDAE								
ORANGE ROUGHY (Hoplostethus atlanticus)					34	32	31	
ROUGHHEAD GRENADIER (Macrourus berglax)								
ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	0	0	5	1	12	14	5	
RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)	507	532	478	243	140	175	277	
SHARKS, VARIOUS	3545	0	1318	1433	1556	1517		
SILVER SCABBARDFISH (Lepidopus caudatus)	2666	1385	584	808	2211	2397	1054	5949*
WRECKFISH (Polyprion americanus)	198	284	163	194	269	338	406	

X Species	1988	1989	1990	1991	1992	1993	1994	1995
ALFONSINOS (Beryx spp.)	225	260	338	371	450	533	728	100
ARGENTINES (Argentina silus)								
BLACK SCABBARDFISH (Aphanopus carbo)	0	0	0	166	370	2		
GREATER FORKBEARD (Phycis blennoides)	423	476	530	487	442	327		
MORIDAE	0	0	50	0	0			
ORANGE ROUGHY (Hoplostethus atlanticus)	0	0	0	0	1	0		
ROUGHHEAD GRENADIER (Macrourus berglax)								
ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	0	0	44	0	0	0	0	0
RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)	637	924	889	874	1110	829	938	
SHARKS, VARIOUS	549	560	602	896	761	592		
SILVER SCABBARDFISH (Lepidopus caudatus)	70	91	120	166	2160	264	373	
WRECKFISH (Polyprion americanus)	191	235	224	170	237	311	428	

XII Species	1988	1989	1990	1991	1992	1993	1994	1995
ALFONSINOS (Beryx spp.)								
ARGENTINES (Argentina silus)								
BLACK SCABBARDFISH (Aphanopus carbo)	0	0	0	0	512	1051	824	75*
GREATER FORKBEARD (Phycis blennoides)								
MORIDAE								
ORANGE ROUGHY (Hoplostethus atlanticus)						24	89	580
ROUGHHEAD GRENADIER (Macrourus berglax)								
ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	1060	9495	2838	7206	2051	2215	684	
RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)								
SHARKS, VARIOUS								
SILVER SCABBARDFISH (Lepidopus caudatus)	0	102	20	0	0	0		
WRECKFISH (Polyprion americanus)								

XIV Species	1988	1989	1990	1991	1992	1993	1994	1995
ALFONSINOS (Beryx spp.)								
ARGENTINES (Argentina silus)	0	0	6	0	0	0		
BLACK SCABBARDFISH (Aphanopus carbo)								
GREATER FORKBEARD (Phycis blennoides)								
MORIDAE								
ORANGE ROUGHY (Hoplostethus atlanticus)								
ROUGHHEAD GRENADIER (Macrourus berglax)	0	0	0	0	0	34		
ROUNDNOSE GRENADIER (Coryphaenoides rupestris)	52	45	47	29	31	4	15	
RED (=BLACKSPOT) SEABREAM (Pagellus bogaraveo)								
SHARKS, VARIOUS								
SILVER SCABBARDFISH (Lepidopus caudatus)								
WRECKFISH (Polyprion americanus)								

Table 3.12.6.2 Availability of new biological information on deep-water species

	Geog Dist	Depth Dist	Abund-ance	Length Freq	Length/ weight	Age Growth	Feeding	Repro-duction	Biomass	Catch-ability	Stock ID
New information											
Deania calcea/profundorum	+	+	+	+							
Centrophorus granulosus/squamosus	+		+								
Galeus melastomus	+			+							
Chimaera monstrosa	+	+		+	+						
Alepocephalus bairdii					+						
Epigonus telescopus		+	+	+			+	+			
Helicolenus dactylopterus	+	+		+		+					
Hoplostethus mediterraneus	+	+		+							
Macrourus berglax					+			+			
Phycis blennoides	+	+	+	+							
Polyprion americanus		+						+			
Trachyrhynchus trachyrhyncus		+	+								
Malacocephalus laevis		+									
Nezumia sclerorhynchus		+		+							
Aristeus antennatus			+	+		+		+			
Aristeomorpha foliacea		+	+			+					
Pleosinika martia		+	+								
No new information											
Centroscymnus crepidater											
Centroscymnus coelolepis											
Centroscyllium fabricii											
Etmopterus spinax											
Etmopterus princeps											
Scymnodon ringens											
Chaecon (Geryon) affinis											

Table 3.12.6.3 Black Scabbardfish. Study Group estimates of landings (tonnes).

BLACK SCABBARDFISH (*Aphanopus carbo*) III and IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
France		0	57	0	0	0	13	
Germany							3	
TOTAL		0	57	0	0	0	16	

BLACK SCABBARDFISH (*Aphanopus carbo*) Va

Country	1988	1989	1990	1991	1992	1993	1994	1995
Iceland						0	1	+
TOTAL	0	0	0	0	0	0	1	+

BLACK SCABBARDFISH (*Aphanopus carbo*) Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes			12	1	35	202	114	249
France			407	151	29	76	45	
Germany, F.R.						9	1	
TOTAL	0	0	419	152	64	287	160	249

BLACK SCABBARDFISH (*Aphanopus carbo*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes		46			3	62		
France			1060	2759	2495	3411	3856	
Germany, F.R.							46	3
Ireland						8	3	
UK (Scotland)							2	
TOTAL		46	1060	2759	2498	3481	3907	3

BLACK SCABBARDFISH (*Aphanopus carbo*) VIII and IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
France			0	1	0	0	0	
Portugal	2602	3473	3274	3978	4399	4513	3428	4025
TOTAL	2602	3473	3274	3979	4399	4513	3428	4025

BLACK SCABBARDFISH (*Aphanopus carbo*) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes					370			
Portugal				166		2		
TOTAL	0	0	0	166	370	2		

continued

Table 3.12.6.3 (continued)

BLACK SCABBARDFISH (*Aphanopus carbo*) XII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes						1051	779	75#
France					512			
Germany							45	
TOTAL	0	0	0	0	512	1051	824	
ALL AREAS	2602	3519	4810	7056	7779	9334	8336	4352*

includes VIb Hatton Bank
* preliminary

Table 3.12.6.4 Argentines. Study Group estimates of landings (tonnes).

ARGENTINES (*Argentina silus*) I and II

Country	1988	1989	1990	1991	1992	1993	1994	1995
Germany, F.R.								357
Netherlands			5					
Norway	11332	8367	9118	7741	8234	7913	6217	6319
Poland	5							
Portugal								
Russia/USSR	14	23						
UK (Scotland)							590	
TOTAL	11351	8390	9123	7741	8234	7913	6807	6676

ARGENTINES (*Argentina silus*) III and IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
Denmark		1322	737	1421	3565	2353	1118	2149
Faroes	1062							
France				1				
Germany, F.R.	1		13	0	1			
Netherlands		335		3	70	298		
Norway	1655	2128	1572	1123	698	800	300	100
UK (Scotland		1		6	101	56	24	
TOTAL	2718	3786	2322	2554	4434	3507	1442	2249

ARGENTINES (*Argentina silus*) Va

Country	1988	1989	1990	1991	1992	1993	1994	1995
Iceland	206	9	113	247	657	1255	756	589
TOTAL	206	9	113	247	657	1255	756	589

ARGENTINES (*Argentina silus*) Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes	278	111	2885	59	1439	1063	960	6752
Russia/USSR		116	3		4			6752
UK (Scotland)				1				
TOTAL	278	227	2888	60	1443	1063	960	6752

continued

Table 3.12.6.4 (continued)

ARGENTINES (*Argentina silus*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes		188	689					
France				7	1			
Germany, F.R.			37				43	365
Ireland	5454	6103	585	453	320		150	
Latvia								
Netherlands		3715	5871	4723	5118	1168	6256	5440
Norway	4984	12184						
UK (England)		198						
UK (Scotland)		3171	112	10	467	409	1377	
UK (NI)				4				
TOTAL	10438	25559	7294	5197	5906	1577	7826	5440

ARGENTINES (*Argentina silus*) XIV

Country	1988	1989	1990	1991	1992	1993	1994	1995
Norway			6					
TOTAL			6					
ALL AREAS	24991	37971	21746	15799	20674	15315	17791	21706

Table 3.12.6.5 Alfonsinos. Study Group estimates of landings (tonnes).

ALFONSINOS (*Beryx* spp.) IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	0	0	1	0	2	0	0	
TOTAL	0	0	1	0	2	0	0	

ALFONSINOS (*Beryx* spp.) Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
France			5	0	4	0		
TOTAL	0	0	5	0	4	0		

ALFONSINOS (*Beryx* spp.) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France		12	8		3			
TOTAL	0	12	8	0	3	0		

ALFONSINOS (*Beryx* spp.) VIII and IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
France			1		1			
TOTAL	0	0	1	0	1	0		

ALFONSINOS (*Beryx* spp.) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Norway						195	0	0
Portugal	225	260	338	371	450	533	635	
Russia							864	100
TOTAL	225	260	338	371	450	728	1499	100
ALL AREAS	225	272	353	371	460	728	1499	100

Table 3.12.6.6 Roundnose Grenadier. Study Group estimates of landings (tonnes).

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) I and II

Country	1988	1989	1990	1991	1992	1993	1994	1995
Denmark					1			
France		3	26	39	11	33	3	
Germany, F.R.		2	2	3	0	0	12	
Norway				28	29	2		
Russia/USSR		16	12					
GDR		3	3					
TOTAL	0	24	43	70	41	35	15	

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) III and IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
Denmark	612	884	785	1214	2856	1591	1910	2149
France		164	462	538	421	218	14	
Germany, F.R.	1	1	2	4		4	2	1
Norway			280	304	211	55		
Sweden	5	1	2	10	755		42	
UK (Scotland		2			4			
TOTAL	618	1052	1531	2070	4247	1868	1968	2150

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) Va

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes		2						
Iceland*	2	2	7	48	210	276	210	221*
TOTAL	2	4	7	48	210	276	210	221*

* includes other grenadiers

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes		20	75	22	551	339	286	405*
France		166	1129	1394	1480	335	209	
Norway				7	1			
Germany, F.R.	1	5	4	1	6	14	1	
Russia/USSR		52						
TOTAL	1	243	1208	1424	2038	688	499	405

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes	27	2	29		99	263		
France		2433	5944	8159	8019	8169	8525	
Germany, F.R.	4	3	2	7	142	1	15*	2
Ireland							14	
Norway					5			
UK (England)	1				113			
UK (Scotland)		2			1			
TOTAL	32	2490	5975	8166	8379	8433	8554	2

*provisional

continued

Table 3.12.6.6 (continued)

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) VIII and IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
France			5	1	12	14	5	
TOTAL	0	0	5	1	12	14	5	

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
France		0	0	44	0	0	0	0
TOTAL		0	0	44	0	0	0	0

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) XII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes							457	182*
France				10	72	0	0	
Germany, F.R.						39	9	
Latvia				4296	1684	2176	675	
Russia/USSR	1060	9495	2838	2900	295			
TOTAL	1060	9495	2838	7206	2051	2215	684	182*

*provisional (includes some from VIb)

ROUNDNOSE GRENADIER (*Coryphaenoides rupestris*) XIV

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes		3						
Germany, F.R.	45	42	45	23	19	4	10	13
Greenland	7		1	4	1			
Iceland*					4			
Norway					6			
UK (England)			1	2				
UK (Scotland)					1			
TOTAL	52	45	47	29	31	4	10	13

ALL AREAS	1765	13253	11654	19058	17009	13533	11945	2973*

* includes other grenadiers

Table 3.12.6.7 Orange Roughy. Study Group estimates of landings (tonnes).

ORANGE ROUGHY (*Hoplostethus atlanticus*) II

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	0	0	0	0	6	1		
TOTAL	0	0	0	0	6	1		

ORANGE ROUGHY (*Hoplostethus atlanticus*) III and IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
France				10	33			
TOTAL	0	0	0	10	33	0		

ORANGE ROUGHY (*Hoplostethus atlanticus*) Va

Country	1988	1989	1990	1991	1992	1993	1994	1995
Iceland				65	382	717	158	42*
TOTAL	0	0	0	65	382	717	158	42*

ORANGE ROUGHY (*Hoplostethus atlanticus*) Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes					1	36	170	419*
France			5	48	12	1	0	
TOTAL	0	0	5	48	13	37	170	419*

*preliminary

ORANGE ROUGHY (*Hoplostethus atlanticus*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	0	0	3	3781	4462	2146	1925	
TOTAL	0	0	3	3781	4462	2146	1925	

ORANGE ROUGHY (*Hoplostethus atlanticus*) VIII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	0	0	0	0	34	32	31	
TOTAL	0	0	0	0	34	32	31	

ORANGE ROUGHY (*Hoplostethus atlanticus*) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Norway						1		
TOTAL	0	0	0	0	0	1	0	0

continued

Table 3.12.6.7 (continued)

ORANGE ROUGHY (*Hoplostethus atlanticus*) XII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes						24	89	580
TOTAL	0	0	0	0	0	24	89	580
ALL AREAS	0	0	8	3904	4930	2958	2373	1041

Table 3.12.6.8 Silver Scabbardfish. Study Group estimates of landings (tonnes).

SILVER SCABBARDFISH (*Lepidopus caudatus*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France								
Germany, F.R.						2		
TOTAL	0	0	0	0		2		

SILVER SCABBARDFISH (*Lepidopus caudatus*) VIII and IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
France								
Portugal	2666	1385	547	808	1264	2397	1054	5492*
Russia/USSR			37		110			
TOTAL	2666	1385	584	808	1374	2397	1054	5492*

*excl. December

SILVER SCABBARDFISH (*Lepidopus caudatus*) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Latvia					1905			
Portugal	70	91	120	166	255	264	373	
TOTAL	70	91	120	166	2160	264	373	

SILVER SCABBARDFISH (*Lepidopus caudatus*) XII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Russia/USSR		102	20					
TOTAL	0	102	20	0	0	0		

ALL AREAS	2736	1578	724	974	3534	2663	1427	5492*

*excl. December

Table 3.12.6.9 Roughhead grenadier. Study Group estimates of landings (tonnes).

ROUGHHEAD GRENADIER (*Macrourus berglax*) I and II

Country	1988	1989	1990	1991	1992	1993	1994	1995
Germany, F.R			9					
Norway			580	829	424	136		
TOTAL	0	0	589	829	424	136		

ROUGHHEAD GRENADIER (*Macrourus berglax*) II and IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
Norway	0	0	0	0	7	0		
TOTAL	0	0	0	0	7	0		

ROUGHHEAD GRENADIER (*Macrourus berglax*) XIV

Country	1988	1989	1990	1991	1992	1993	1994	1995
Greenland						18	5	2
Norway	0	0	0	0	0	34		
TOTAL	0	0	0	0	0	52	5	2
TOTAL ALL AREAS	0	0	589	829	431	188	5	2

Table 3.12.6.10 Moridae. Study Group estimates of landings (tonnes).

MORIDAE Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
Norway	0	0	0	5	0	0		
TOTAL	0	0	0	5	0	0		

MORIDAE VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Norway	0	0	0	1	25	0		
TOTAL	0	0	0	1	25	0		

MORIDAE X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Portugal	18	17	23	36	31	33	42	
TOTAL	18	17	23	36	31	33	42	
ALL AREAS	18	17	23	42	56	33	42	

Table 3.12.6.11 Red (=blackspot) seabream. Study Group estimates of landings (tonnes).

RED (=BLACKSPOT) SEABREAM (*Pagellus bogaraveo*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	52	44	22	13	6	5		
Ireland	0	0	3	10	16	0		
Spain	47	69	73	30	18	10*	9*	
UK (England)	153	76	36	56	0	0		
UK (Chan. Isles)	0	0	0	14	0	0		
TOTAL	252	189	134	123	40	15	9	

RED (=BLACKSPOT) SEABREAM (*Pagellus bogaraveo*) VIII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	37	31	15	10	5	3		
Spain	91	234	280	124	119	172	131	
UK (England)	9	7	17	0	0	0		
TOTAL	137	272	312	134	124	175	131	

RED (=BLACKSPOT) SEABREAM (*Pagellus bogaraveo*) IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
Portugal	370	260	166	109	166		146	
TOTAL	370	260	166	109	166		146	

RED (=BLACKSPOT) SEABREAM (*Pagellus bogaraveo*) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Portugal	637	924	889	874	1110	829	983	
TOTAL	637	924	889	874	1110	829	983	
ALL AREAS	1396	1645	1501	1240	1440	1019	1269	

Table 3.12.6.12 Greater forkbeard. Study Group estimates of landings (tonnes)

GREATER FORKBEARD (*Phycis blennoides*) I and II

Country	1988	1989	1990	1991	1992	1993	1994	1995
Norway	0	0	23	39	33	1		
TOTAL	0	0	23	39	33	1		

GREATER FORKBEARD (*Phycis blennoides*) III and IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	12	12	18	20	13	0		
Norway	0	0	92	161	130	28		
UK (England)	3	0	5	0	0	0		
UK (Scotland)	0	0	0	0	2	0		
TOTAL	15	12	115	181	145	28		

GREATER FORKBEARD (*Phycis blennoides*) Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	2	1	10	8	16	0		
Norway	0	0	28	44	33	22		
TOTAL	2	1	38	52	49	22		

GREATER FORKBEARD (*Phycis blennoides*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	252	342	454	476	646	0		
Ireland	0	14	0	1	4	0	111	
Norway	0	0	88	126	244	53		
Spain	485	0	0	0	0	0		
UK (England)	62	13	6	13	0	0		
UK (Scotland)	0	0	1	5	9	0		
TOTAL	799	369	549	621	903	53	111	

GREATER FORKBEARD (*Phycis blennoides*) VIII and IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	7	7	16	18	9	0		
Portugal	0	0	0	4	8	8		
Spain	50	0	0	0	0	0		
TOTAL	57	7	16	22	17	8		

GREATER FORKBEARD (*Phycis blennoides*) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Portugal	29	42	50	68	81	115	135	
TOTAL	29	42	50	68	81	115	135	

ALL AREAS	902	431	791	983	1228	227	246	

Table 3.12.6.13 Wreckfish. Study Group estimates of landings (tonnes).

WRECKFISH (*Polyprion americanus*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	7	0	2	10	15	0		
TOTAL	7	0	2	10	15	0		

WRECKFISH (*Polyprion americanus*) VIII and IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	1	1	2	3	1	0		
Portugal	188	283	161	191	268	338	406	
Spain	9	0	0	0	0	0		
TOTAL	198	284	163	194	269	338	406	

WRECKFISH (*Polyprion americanus*) X

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	0	0	0	0	3	0		
Portugal	191	235	224	170	234	308	428	
Norway	0	0	0	0	0	3		
TOTAL	191	235	224	170	237	311	428	
ALL AREAS	396	519	389	374	521	649	834	

Table 3.12.6.14 Various sharks. Study Group estimates of landings (tonnes).

SHARKS VARIOUS I and II

Country	1988	1989	1990	1991	1992	1993	1994	1995
Russia/USSR	37	15	0	0	0	0		
TOTAL	37	15	0	0	0	0		

SHARKS VARIOUS III and IV

Country	1988	1989	1990	1991	1992	1993	1994	1995
France	1	0	0	0	0	0		
Germany, F.R.	0	0	0	5	0	4	2	1
UK (England)	4	2	1	4	2	2	3	2
UK (Scotland)	0	14	10	8	0	0		
TOTAL	5	16	11	17	2	2	5	3

SHARKS VARIOUS Va

Country	1988	1989	1990	1991	1992	1993	1994	1995
Iceland	0	0	0	0	2	52	34	97*
TOTAL	0	0	0	0	2	52	34	97*

*preliminary

SHARKS VARIOUS Vb

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes	0	0	0	3	36	376		
Germany, F.R.	0	0	0	0	0	2	43	
UK (England)	0	0	0	0	5	9		
TOTAL	0	0	0	3	41	387	43	

SHARKS VARIOUS VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Faroes	0	0	0	0	3	0		
France	21	21	383	1167	2727	0		
Germany, F.R.	0	0	0	0	0	124	395	2
Spain	66	0	0	0	0	0		
UK (England)	19	32	38	201	503	821	742	1315
UK (Scotland)	0	8	5	53	0	0		
TOTAL	106	125	426	1421	3233	945	1137	1317

SHARKS VARIOUS VIII and IX

Country	1988	1989	1990	1991	1992	1993	1994	1995
Portugal	0	0	1318	1433	1556	1517		
Spain	3545	0	0	0	0	0		
TOTAL	3545	0	1318	1433	1556	1517		

continued

Table 3.12.6.14 (continued)

SHARKS VARIOUS X

Country	1988	1989	1990	1991	1992	1993	1994	1995
Portugal	549	560	602	896	761	592		
TOTAL	549	560	602	896	761	592		
ALL AREAS	4242	716	2357	3770	5595	3495	1219	1417

Table 3.12.6.15 Rabbitfish. Study Group estimates of landings (tonnes).

RABBITFISH (*Chimaera monstrosa*) Va

Country	1988	1989	1990	1991	1992	1993	1994	1995
Iceland				499	106	7	76	118*
TOTAL	0	0	0	499	106	7	76	118*
*preliminary								

RABBITFISH (*Chimaera monstrosa*) VI and VII

Country	1988	1989	1990	1991	1992	1993	1994	1995
Ireland							2	
TOTAL	0	0	0	0	0	0	2	0
ALL AREAS	0	0	0	499	106	7	78	118*

Table 3.12.6.16 Smoothhead. Study Group estimates of landings (tonnes).

SMOOTHHEAD (*Alepocephalus* spp.)

Country	1988	1989	1990	1991	1992	1993	1994	1995
Iceland					10	3	0.4	0.4*
TOTAL	0	0	0	0	10	3	0.4	0.4*

*preliminary

Table 3.12.7.a1 Blue ling. Study Group estimates of landings (tonnes).

BLUE LING IIa+b

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	77	126	228	47	28	-	-	
France	37	43	49	24	19	12*	n/a	n/a
Germany, Fed. Rep.	5	5	4	1	+	2	2	1
Greenland	-	-	-	-	3[1]	3[1]	-	n/a
Norway	3,416	1,883	1,128	1,408	987	1,003*	399*	342
UK (England & Wales)	2	2	4	-	2	+	9	...
UK (Scotland)	-	-	-	-	-	+	-	...
United Kingdom								1
Total	3,537	2,059	1,413	1,480	1,039	1,020	410	344

*Preliminary. [1]Includes IIb.

BLUE LING III

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Denmark	10	7	8	9	29	16	14	16
Norway	11	15	12	9	8	6	4	4
Sweden	1	1*	1	3	1	1	-	n/a
Total	22	23	21	21	38	23	18	20

*Preliminary

BLUE LING IVa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Denmark	1	1	+	1	1	2	+	-
Faroe Islands	13	-	-	31	-	101	-*	105
France IV	223	245	319	370	237	74*	-	-
Germany, Fed. Rep.	6	4	8	7	9	2	3	+
Norway	116	196	162	178	263	186*	241*	201
UK (England & Wales)	2	12	4	2	8	1	15	(8)[1]
UK (Scotland)	2	+	+	32	36	44	19	...
United Kingdom								200
Total	363	458	493	621	554	410	278	506

Preliminary.[1]Included in UK total.

BLUE LING IVb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
U K (England & Wales)	-	-	-	-	-	3	-	-
Total	-	-	-	-		3	-	-

*Preliminary

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.a1 (Continued)

BLUE LING IVc

Country	1988	1989	1990	1991	1992	1993	1994	1995*
U K (England & Wales)	-	-	-	-	-	-	3	-
Total	-	-	-	-		-	3	-

*Preliminary

BLUE LING Va

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	271	403	1,029	241	321	40	89	104
Germany, Fed. Rep.	-	-	-	-	-	-	1	2
Iceland	1,893	2,125	1,992	1,582	2,558	2,193	1,542	1,490
Norway	7	5	-	1	1	-*	-*	-
Total	2,171	2,533	3,021	1,824	2,880	2,233	1,632	1,596

*Preliminary.

BLUE LING Vb_1

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	3,487	2,468	946	1,573	1,918	2,088	1,065*	1,764[2]
France V	3,038	1,802	1,707	562	315	151	n/a	n/a
Germany, Fed. Rep.	49	51	71	36	21	24	3[2]	2
Norway	94	228	450	196	390	218*	173*	38
UK (England & Wales)	-	-	-	1	4	19	-	(4)[4]
UK (Scotland)	-	-	-	...[1]	...[1]	...[1]	...[1]	...
United Kingdom								8[3]
Total	6,668	4,549	3,174	2,368	2,648	2,500	1,241	1,812

*Preliminary. [1]Included in Vb_2. [2]Includes Vb_2. [3]Reported as Vb. [4]Included in UK total.

BLUE LING Vb_2

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	2,788	622	68	71	1,705	182	239*	...[2]
Norway	72	95	191	51	256	22*	16*	36
UK (Scotland)	-	-	-	2[1]	+[1]	9[1]	1[1]	...[2]
Total	2,860	717	259	124	1,961	213	256	36

*Preliminary. [1]Includes Vb_1. [2]See Vb_1.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.a1 (Continued)

BLUE LING VIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	14	6	-	8	4	-	-	-
France	6,616	7,383	4,487	3,226	3,330	3,116	n/a	n/a
Germany, Fed. Rep.	2	2	44	18	4	48	24	+
Ireland	-	-	-	-	-	3	73	n/a
Norway	29	143	54	63	129	27*	90*	96
UK (England & Wales)	2	-	-	1	-	13	1	(34)[1]
UK (Scotland)	1	+	1	35	24	42	91	...
United Kingdom								744
Total	6,664	7,534	4,586	3,351	3,491	3,249	279	840

*Preliminary. [1]Included in UK total.

BLUE LING VIb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	2,000	1,292	360	111	231	51	5*	373[1]
France	499	60*	1,125	3,531	1,272	840	n/a	n/a
Germany, Fed. Rep.	37	22	-	6	2	109	104	160
Norway	42	217	127	102	50	50	33*	12
UK (England & Wales)	9	-	-	5	2	66	3	(11)[2]
UK (Scotland)	14	16	2	15	14	57	25	...
United Kingdom								49
Total	2,601	1,607	1,614	3,775	1,571	1,173	170	594

*Preliminary. [1]Includes XII.[2]Included in UK total.

BLUE LING VIIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France[1]	-	-	-*	-*	-	-*	n/a	n/a
UK (Scotland)	-	-	-	1	-	-	-	-
Total	-	-	-	1	-	-	-	-

*Preliminary. [1]See VIIb,c.

BLUE LING VIIb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France VII	22	279	159	152	116	102	n/a	n/a
Germany, Fed. Rep.	1	-	-	-	-	-	-	-
Ireland	-	-	-	-	-	-	1	n/a
Norway	-	2	-	-	3	2	1	-
UK (England & Wales)	-	-	-	-	-	11	6	(3)[1]
UK (Scotland)	-	-	-	-	6	28	22	...
United Kingdom								12
Total	23	281	159	152	125	143	30	12

*Preliminary. [1] Included in UK total.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.a1 (Continued)

BLUE LING VIId,e								
Country	1988	1989	1990	1991	1992	1993	1994	1995*
France[1]								
Total	-	-	-	-	-	-		

*Preliminary.[1] See VIIb,c.

BLUE LING VIIg-k								
Country	1988	1989	1990	1991	1992	1993	1994	1995*
France [1]								
UK (England & Wales)	-	-	-	-	-	5	3	...
UK (Scotland)	-	-	-	-	-	2	4	...
United Kingdom								44
Total						7	7	44

*Preliminary.[1] See VIIb,c.

BLUE LING X								
Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	-	-	-*	33	-	-	n/a	n/a
Total	-	-	-	33	-	-		

BLUE LING XII								
Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	263	70	5	1,147	971	2,591	n/a	n/a
Total	263	70	5	1,147	971	2,591		

BLUE LING XIV								
Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	21	13	-	-	-	-	1	-
France	-	-	-	-	-	390	n/a	n/a
Germany, Fed. Rep.	218	58	64	105	27	16	15	4
Greenland	3	-	5	5	2	-	-	
Iceland	-	-	-	-	-	3,124	289	60
Norway	-	-	-	+	50	173*	11*	-
UK (England & Wales)	-	-	10	45	27	21	57	...
UK (Scotland)	-	-	-	-	4	1	-	...
United Kingdom								19
Total	242	71	79	155	110	3,725	373	83

*Preliminary.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.a2 Blue ling in ICES fishing areas.

Year	Landings
1980	37
1981	29
1982	22
1983	21
1984	22
1985	25
1986	27
1987	24
1988	24
1989	20
1990	15
1991	15
1992	15
1993	17
1994	5
1995	6
Average	20
Unit	1000 tonnes

Table 3.12.7.b1 Ling. Study Group estimates of landings (tonnes).

LING IIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	3	2	14	17	3	-	101	16
France	29	19	20	12	9	9	n/a	n/a
Germany, Fed. Rep.	10	11	17	5	6	13	9	8
Norway	6,070	7,326	7,549	7,755	6,495	7,032*	6,169*	5,921
UK (England & Wales)	4	10	25	4	8	39	30	(3)[1]
UK (Scotland)	3	-	3	+	+	-	-	...
United Kingdom								6
Total	6,119	7,368	7,628	7,793	6,521	7,093	6,309	5,951

*Preliminary [1]Included in UK total

LING IIb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
U K (England & Wales)	7	-	-	-	-	-	13	-
Total	7	-	-	-		-	13	-

*Preliminary

LING III

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	2	1	4	1	4	3	2	4
Denmark	165	246	375	278	323	343	244	222
Germany, Fed. Rep.	-	-	3	-	-	-	+	-
Norway	135	140	131	161	120	150	116	113
Sweden	29	35	30	44	100	131	112	n/a
UK (England & Wales)	-	-	-	-	-	15	-	-
Total	331	422	543	484	547	642	474	339

*Preliminary

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.b1 (Continued)

LING IVa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	3	1	1	4	9	9	20	2
Denmark	408	578	610	609	613	629	528	406
Faroe Islands	13	3	9	6	2	14	25*	50
France IV	1,143	751	655	847	414	395	n/a	n/a
Germany, Fed. Rep.	262	217	241	223	200	726	770	425
Netherlands	4	16	-	-	-	-	-	-
Norway	6,473	7,239	6,290	5,799	5,945	6,522*	5,355*	6,148
Sweden[1]	5	29	13	24	28	13	3	n/a
UK (England & Wales)	55	136	213	197	330	363	148	(179)[2]
UK (N. Ireland)	1	14	-	+	4	-	+	...
UK (Scotland)	2,856	2,693	1,995	2,260	3,208	4,138	4,645	...
United Kingdom								5,712
Total	11,223	11,677	10,027	9,969	10,753	12,809	11,494	12,743

*Preliminary. [1] Includes IVb 1988-1993. [2]Included in UK total.

LING IVb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Germany, Fed.Rep	-	-	-	-	-	-	-	23
U K (England & Wales)	172	234	255	284	385	412	433	300
Total	172	234	255	284	385	412	433	323

*Preliminary

LING Va

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	134	95	42	69	34	20	3	-
Faroe Islands	619	614	399	530	526	501	548*	430
Germany, Fed. Rep.	-	-	-	-	-	-	+	+
Iceland	5,098	4,898	5,157	5,206	4,556	4,333	4,053	3,530
Norway	10	5	-	-	-	-*	-*	-
Total	5,861	5,612	5,598	5,805	5,116	4,854	4,604	3,960

*Preliminary.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.b1 (Continued)

LING Vb_1

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Denmark	4[2]	-	-	-	-	-	-	
Faroe Islands	1,383	1,498	1,575	1,828	1,218	1,242	1,541*	2,985[3]
France V	53	44	36	37	3	5*	n/a	n/a
Germany, Fed. Rep.	4	2	1	2	+	1	1[3]	1[3]
Norway	884	1,415	1,441	1,594	1,153	921	1,017*	446
UK (England & Wales)	1	-	+	-	15	62	20	(2)[5]
UK (Scotland)[1]	...	...	...	...	...	...	...	...
United Kingdom								34[4]
Total	2,329	2,959	3,053	3,461	2,389	2,231	2,579	3,466

*Preliminary. [1]Included in Vb_2. [2]Includes 1 t reported as Division Vb. [3]Includes Vb_2. [4]Reported as Vb. [5]Included in UK total.

LING Vb_2

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	832	362	162	492	577	282	479*	...[3]
Norway	1,284	1,328	633	555	637	332	486	503
UK (England & Wales)	-	-	-	-	-		10	...[2]
UK (Scotland)[1]	5	3	9	4	11	11	20	...[2]
Total	2,121	1,693	804	1,051	1,225	625	995	503

*Preliminary. [1]Includes Vb_1. [2]See Vb_1. [3]Included in Vb_1

LING VIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	4	6	-	3	-	+	1	-
Denmark	+	1	+	+	1	+	1	2
Faroe Islands	-	6	8	3	-	-	-*	-
France[1]	5,381	3,417	2,568	1,777	1,297	1,492	n/a	n/a
Germany, Fed. Rep.	6	11	1	2	2	92	134	130
Ireland	196	138	41	57	38	171	133	n/a
Norway	3,392	3,858	3,263	2,029	2,305	1,937*	2,034*	3,156
Spain	580							
UK (England & Wales)	1,075	307	111	260	259	442	551	(547)[2]
UK (Isle of Man)	-	+	-	-	+	-	-	n/a
UK (N. Ireland)	53	6	2	10	6	13	10	...
UK (Scotland)	874	881	736	654	680	1,133	1,126	...
United Kingdom								2,552
Total	11,561	8,631	6,730	4,795	4,588	5,280	3,990	5,840

*Preliminary. [1]Reported for Sub-area, not divisions. [2]Included in UK total.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.b1 (Continued)

LING VIb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	196	17	3	-	35	4	104	71[1]
France[2]		*						
Germany, Fed. Rep.	-	-	-	-	+	+	-	+
Ireland	-	-	26	31	23	60	44	n/a
Norway	1,253	3,616	1,315	2,489	1,713	1,179*	2,116*	1,308
Spain	2,995							
UK (England & Wales)	93	26	10	29	28	43	52	(81)[3]
UK (N. Ireland)	-	-	+	2	2	4	4	...
UK (Scotland)	223	84	151	111	90	232	220	...
United Kingdom								206
Total	4,760	3,743	1,505	2,662	1,891	1,522	2,540	1,585

*Preliminary. [1]Includes XII. [2]See Ling VIa. [3]Included in UK total.

LING VII

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	5,057	5,261	4,575	3,977	2,552	2,123	n/a	n/a
Total	5,057	5,261	4,575	3,977	2,552	2,123		

*Preliminary

LING VIIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	14	10	11	4	4	10	8	12
France[1]								
Ireland	100	138	8	10	7	51	136	n/a
UK (England & Wales)	49	112	63	31	43	81	46	(46)[2]
UK (Isle of Man)	-	1	1	2	1	2	2	n/a
UK (N. Ireland)	38	43	59	60	40	60	76	...
UK (Scotland)	10	7	27	18	10	15	16	...
United Kingdom								139
Total	211	311	169	125	105	219	284	151

*Preliminary. [1]French catches in VII not split into divisions, see Ling VII. [2]Included in UK total.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.b1 (Continued)

LING VIIb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France[1]								
Germany, Fed. Rep.	-	+	-	-	-	97	98	161
Ireland	50	43	51	62	44	224	225	n/a
Norway	57	368	463	326	610	145*	306*	295
Spain	1,231							
UK (England & Wales)	750	161	133	294	485	550	530	(606)[2]
UK (N. Ireland)	-	-	-	8	4	9	2	...
UK (Scotland)	8	5	31	59	143	409	434	...
United Kingdom								905
Total	2,096	577	678	749	1,286	1,434	1,595	1,361

*Preliminary. [1]See Ling VII. [2]Included in UK total.

LING VIId,e

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	36	52	31	7	10	15	14	10
Denmark	+	-	-	-	+	-	+	-
France[1]								
Ireland	-	-	22	25	16	-	-	
UK (England & Wales)	743	644	743	647	493	421	437	(497)[2]
UK (Scotland)	-	4	3	1	+	+		...
United Kingdom								488
Total	779	700	799	680	519	436	451	498

*Preliminary. [1]See Ling VII. [2]See UK total.

LING VIIf

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	77	42	23	34	9	8	21	35
France[1]								
Ireland	-	-	3	5	1	-	-	n/a
UK (England & Wales)	367	265	207	259	127	215	379	(454)[2]
UK (Scotland)	-	3	-	4	-	+	-	...
United Kingdom								455
Total	444	310	233	302	137	223	400	490

*Preliminary. [1]See Ling VII. [2]Included in UK total.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.b1 (Continued)

LING VIIg-k

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Belgium	35	23	20	10	10	9	19	34
Denmark	1	-	+	+	-	+	-	-
France[1]								
Germany, Fed. Rep.	-	-	-	-	-	35	10	40
Ireland	286	301	356	454	323	374	620	
Norway	-	163	260	-	-	-*	-*	-
Spain	1,421							
UK (England & Wales)	1,439	518	434	830	1,130	1,551	2,143	(3,228)[2]
UK (Isle of Man)	-	-	+	-	-	-	-	
UK (N. Ireland)	-	+	-	-	+	1	1	...
UK (Scotland)	2	7	7	100	130	364	277	...
United Kingdom								3,663
Total	3,184	1,012	1,077	1,394	1,593	2,334	3,070	3,737

*Preliminary. [1]See Ling VII. [2]Included in UK total.

LING VIII

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	1,018	1,214	1,371	1,127	801	508	n/a	n/a
U K (England & Wales)	10	7	1	12	1	2	8	46
Total	1,028	1,221	1,372	1,139	802	510	8	46

*Preliminary

LING XII

Country	1988	1989	1990	1991	1992	1993	1994	1995*
U K (England & Wales)	-	-	3	10	-	-	5	3
Total	-	-	3	10	-	-	5	3

*Preliminary

LING XIV

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Germany, Fed. Rep.	3	1	1	+	9	-	+	-
Iceland	-	-	-	-	-	+	-	
Norway	-	-	2	+	7	1*	4*	14
UK (England & Wales)	-	-	6	1	1	8	1	(3)[1]
UK (Scotland)	-	-	-	-	-	-	1	...
United Kingdom								3
Total	3	1	9	1	17	9	6	17

*Preliminary. [1]Included in UK total.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.b2 Ling in ICES fishing areas.

Year	Landings
1980	56,490
1981	51,380
1982	58,932
1983	62,150
1984	62,227
1985	61,508
1986	57,676
1987	63,078
1988	57,000
1989	52,000
1990	45,000
1991	45,000
1992	40,000
1993	43,000
1994	39,000
1995	41,000
Average	52,215
Unit	tonnes

Table 3.12.7.c1 Tusk. Study Group estimates of landings (tonnes).

TUSK IIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	115	75	153	38	33	-	281*	88
France	32	55	63	32	21	23	n/a	n/a
Germany, Fed. Rep.	13	10	13	6	2	2	2	2
Greenland	-	-	-	-	-	1[1]	-	n/a
Norway	14,241	19,206	18,387	18,227	15,908	17,545	12,266	11,229
UK (England & Wales)	2	4	12	3	10	3	3	...
UK (Scotland)	-	-	+	+	-	+	-	...
United Kingdom								1
Total	14,403	19,350	18,628	18,306	15,974	17,574	12,552	11,320

*Preliminary. [1]Includes IIb.

TUSK IIb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
U K (England & Wales)	-	-	-	-	-	1	-	-
Total	-	-	-	-	-	1	-	-

*Preliminary

TUSK III

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Denmark	8	18	9	14	22	19	6	4
Norway	51	71	45	43	46	48	33	33
Sweden	2	4	6	27	15	12	12	n/a
Total	61	93	60	84	83	79	51	37

*Preliminary

TUSK IVa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Denmark	83	86	136	142	167	102	82	6
Faroe Islands	1	1	1	12	-	4	4*	-
France	201	148	144	212	119	82	n/a	n/a
Germany, Fed. Rep.	62	53	48	47	42	29	27	20
Norway	3,998	6,050	3,838	4,008	4,435	4,768	3,001	2,988
Sweden[1]	-	+	1	1	2	+	+	
UK (England & Wales)	12	18	29	26	34	9	24	(10)[2]
UK (N. Ireland)	-	+	-	-	-	-	-	...
UK (Scotland)	72	62	57	89	131	147	151	...
United Kingdom								180
Total	4,429	6,418	4,254	4,537	4,930	5,141	3,289	3,194

*Preliminary. [1]Includes IVb 1988-1993. [2]Included in UK total.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.c1 (Continued)

TUSK IVb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Germany, Fed.Rep.	-	-	-	-	-	-	-	1
U K (England & Wales)	-	1	-	-	1	-	2	3
Total	-	1	-	-	1	-	2	4

*Preliminary

TUSK Va

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	3,757	3,908	2,475	2,286	1,567	1,329	1,212*	897
Germany, Fed Rep.	-	-	-	-	-	-	-	1
Iceland	3,078	3,143	4,816	6,446	6,442	4,746	4,612	5,446
Norway	20	10	-	-	-	-	-	-
Total	6,855	7,061	7,291	8,732	8,009	6,075	5,824	6,344

*Preliminary.

TUSK Vb$_1$

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Denmark	+	-	-	-	-	-	-	-
Faroe Islands	2,827	1,828	3,065	3,829	2,796	1,647	2,649*	3,280[2]
France	81	64	66	19	11	9	n/a	n/a
Germany, Fed. Rep.	8	2	26	1	2	2	1[2]	1[2]
Norway	1,143	1,828	2,045	1,321	1,590	1,202*	747*	270
UK (England & Wales)	-	-	-	-	-	2	2	(1)[4]
UK (Scotland)[1]	...	...	...	...	...	...	...	...
United Kingdom								3[3]
Total	4,059	3,722	5,202	5,170	4,399	2,862	3,399	3,554

*Preliminary. [1]Included in Vb$_2$. [2]Includes Vb$_2$. [3]Reported as Vb.[4]Included in UK total.

TUSK Vb$_2$

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	545	163	128	375	541	292	445	...[3]
Norway	1,061	1,237	851	721	450	285	462	404
UK (England & Wales)	-	-	-	-	-	-	+	...[2]
UK (Scotland)[1]	+	+	+	+	1	+	2	...[2]
Total	1,606	1,400	979	1,096	992	577	909	404

*Preliminary. [1]Includes Vb$_1$. [2]See Vb$_1$. [3]Included in Vb$_1$.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.c1 (Continued)

TUSK VIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Denmark	-	+	-	-	-	-	+	-
Faroe Islands	-	6	9	5	-	-	-*	-
France[1]	766	694	723	514	532	386	n/a	n/a
Germany, Fed. Rep.	1	3	+	+	+	4	6	+
Ireland	-	2	-	-	-	3	1	n/a
Norway	1,310	1,583	1,506	998	1,124	783	865	990
UK (England & Wales)	30	3	7	9	5	2	5	(1)[2]
UK (N. Ireland)	-	-	+	+	-	+	-	...
UK (Scotland)	13	6	11	17	21	31	40	...
United Kingdom								81
Total	2,120	2,297	2,256	1,543	1,682	1,209	917	1,071

*Preliminary. [1]Reported for Sub-area VI. Not allocated by divisions. [2]Included in UK total.

TUSK VIb

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	217	41	6	-	63	12	70*	86[2]
France[1]								
Germany, Fed. Rep.	-	-	-	+	+	+	+	+
Ireland	-	-	-	5	5	32	30	
Norway	601	1,537	738	1,068	763	899	1,673*	1,415
UK (England & Wales)	8	2	2	3	3	3	6	(1)[3]
UK (N. Ireland)	-	-	+	-	1	+	-	...
UK (Scotland)	34	12	19	25	30	54	66	...
United Kingdom								36
Total	860	1,592	765	1,101	865	1,000	1,845	1,537

*Preliminary. [1]See VIa. [2]Includes XII. [3]Included in UK total.

TUSK VII

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	15	22	20	15	16	9	n/a	n/a
Total	15	22	20	15	16	9		

*Preliminary

TUSK VIIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France[1]								
UK (England & Wales)	-	-	+	-	+	+	-	...
UK (Scotland)	+	+	+	1	2	+	+	...
United Kingdom								1
Total	+	+	+	1	2	+	+	1

*Preliminary. [1]French catches not split into divisions, see Tusk VII.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.c1 (Continued)

TUSK VIIb,c

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France[1]								
Ireland	-	-	3	7	8	15	9	
Norway	12	91	138	30	167	70	63	18
UK (England & Wales)	5	-	1	2	33	17	9	(7)[2]
UK (N. Ireland)	-	-	-	1	1	+	-	...
UK (Scotland)	+	-	2	1	3	12	8	...
United Kingdom								7
Total	17	91	144	41	212	114	89	25

*Preliminary. [1]French catches not split into divisions, see Tusk VII. [2]Included in UK total.

TUSK VIIg-k

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France[1]								
Ireland	-	-	-	-	-	17	12	n/a
Norway	-	82	27	-	-	-	-	-
UK (England & Wales)	5	1	0	8	38	7	12	(16)[2]
UK (Scotland)	-	-	+	2	-	3	3	...
United Kingdom								26
Total	5	83	27	10	38	27	27	26

*Preliminary. [1]French catches not split into divisions, see Tusk VII. [2]Included in UK total.

TUSK VIIIa

Country	1988	1989	1990	1991	1992	1993	1994	1995*
U K (England & Wales)	1	-	-	-	-	-	-	-
Total	1	-	-	-	-	-	-	-

*Preliminary.

TUSK XII

Country	1988	1989	1990	1991	1992	1993	1994	1995*
France	1	1	0	1	1	12	n/a	n/a
Total	1	1	0	1	1	12		

*Preliminary.

TUSK XIV

Country	1988	1989	1990	1991	1992	1993	1994	1995*
Faroe Islands	19	13	-	-	-	-	-*	-
Germany, Fed. Rep.	2	1	2	2	+	+	-	-
Iceland	-	-	-	-	4	1	+	-
Norway	-	-	7	68	120	53	16	30
UK (England & Wales)	-	-	-	1	+	+	+	+
Total	21	14	9	71	124	54	16	30

*Preliminary.

N.B. United Kingdom does not include Isle of Man

Table 3.12.7.c2 Tusk in ICES fishing areas.

Year	Landings
1980	49
1981	39
1982	41
1983	42
1984	41
1985	44
1986	44
1987	41
1988	34
1989	42
1990	40
1991	41
1992	37
1993	34
1994	29
1995	28
Average	39
Unit	1000 tonnes

Table 3.13.2.1 Nominal fish catches in the Baltic from 1973–1995 (in '000 t). Anadromous species, except salmon, not included. (Data as officially reported to ICES.)

Year	Species							Total
	Cod	Herring	Sprat	Flatfish	Salmon	Freshwater species	Others	
1973	189	404	213	18	2.7	23	55	905
1974	189	407	242	21	2.9	21	54	937
1975	234	415	201	24	2.9	20	60	957
1976	255	393	195	19	3.1	21	46	932
1977	213	413	211	22	2.4	22	42	925
1978	196	420	132	23	2.0	22	44	839
1979	273	459	78	24	2.3	20	47	903
1980	388	453	57	18	2.4	14	29	961
1981	380	419	47	16	2.4	13	31	908
1982	361	442	45	17	2.2	13	30	910
1983	376	459	31	16	2.4	13	20	917
1984	442	426	52	15	3.7	13	17	969
1985	344	431	69	17	4.0	11	16	892
1986	271	401	75	18	3.5	12	19	800
1987	238	373	91	16	3.8	13	24	759
1988	225	407	86	14	3.2	13	31	779
1989	192	414	89	14	4.2	14	18	745
1990	167	360	92	12	5.6	11	18	666
1991[1]	139	295	111	14	4.6	17	19	600
1992[1]	72	339	146	12	4.7	8	13	595
1993[1]	41	352	194	12	3.4	10	7	619
1994[1]	75	353	301	18	2.9	9	8	767
1995[1]	117	343	326	22	2.7	9	17	837

[1]Preliminary.

Table 3.13.2.2 Nominal catch (tonnes) of HERRING in Divisions IIIb,c,d, 1963-1995. (Data as officially reported to ICES.)

Year	Denmark	Finland	German Dem.Rep.	Germany, Fed.Rep.	Poland	Sweden	USSR	Total
1963	14,991	48,632	10,900	16,588	28,370	27,691	78,580[1]	225,752
1964	29,329	34,904	7,600	16,355	19,160	31,297	84,956	223,601
1965	20,058	44,916	11,300	14,971	20,724	31,082[2]	83,265	226,216
1966	22,950	41,141	18,600	18,252	27,743	30,511	92,112	251,309
1967	23,550	42,931	42,900	23,546	32,143	36,900	108,154	310,124
1968	21,516	58,700	39,300	16,367	41,186	53,256	124,627	354,952
1969	18,508	56,252	19,100	15,116	37,085	30,167	118,974	295,202
1970	16,682	51,205	38,000	18,392	46,018	31,757	110,040	312,094
1971	23,087	57,188	41,800	16,509	43,022	32,351	120,728	334,685
1972	16,081	53,758	58,100	10,793	45,343	41,721	118,860	344,656
1973	24,834	67,071	65,605	8,779	51,213	59,546	127,124	404,172
1974	19,509	73,066	70,855	9,446	55,957	60,352	117,896	407,081
1975	18,295	69,581	71,726	10,147	68,533	62,791	113,684	414,757
1976	23,087	75,581	58,077	6,573	63,850	41,841	124,479	393,488
1977	25,467	78,051	62,450	7,660	60,212	52,871	126,000	412,711
1978	26,620	89,792	46,261	7,808	63,850	54,629	130,642	419,602
1979	33,761	83,130	50,241	7,786	79,168	86,078	118,655	458,819
1980	29,350	74,852	59,187	9,873	68,614	92,923	118,074	452,873
1981	28,424	65,389	56,643	9,124	64,005	84,500	110,782	418,867
1982	40,289	73,501	50,868	8,928	76,329	92,675	99,175	441,765
1983	32,657	83,679	51,991	9,273	82,329	86,561	112,370	458,860
1984	32,272	86,545	50,073	8,166	78,326	65,519	105,577	426,478
1985	27,847	88,702	51,607	9,079	85,865	57,554	110,783	431,437
1986	21,598	83,800	53,061	9,382	77,109	39,909	115,665	400,524
1987	23,283	82,522[3]	50,037	6,199	60,616	36,446	113,844	372,947
1988	29,950	92,824[3]	53,539	5,699	60,624	41,828	122,849	407,313
1989	26,654	81,122[3]	54,828	5,777	58,328	65,032	121,784	413,525
1990	16,237	66,078[3]	40,187	5,152	60,919	55,174	116,478	360,225

Year	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Sweden	Russia	Total
1991	23,995	27,034[4]	51,546[3]	16,022	33,270	6,468[5]	45,991	59,176	31,755	295,257[6]
1992	33,855	29,556	72,171[3]	17,746	25,965	3,237[6]	52,864	75,907	27,979	339,280[6]
1993	34,945	32,982	77,353[3]	20,143	21,949	3,912[6]	50,833	86,497	23,545	352,159[6]
1994	45,190	34,493	97,674[3]	12,367	22,676	4,988[6]	49,111	70,886	15,904	353,411[6,7]
1995	37,762	43,482	94,613[3]	7,898	24,972	3,706[6]	45,676	68,019	16,970	343,099[6]

[1]Including Division IIIa.
[2]Large quantity of herring used for industrial purposes is included with "Unsorted and Unidentified Fish".
[3]Includes some by-catch of sprat.
[4]As reported by Estonian authorities; 32,683 t reported by Russian authorities.
[5]As reported by Lithuanian authorities; 6,456 t reported by Russian authorities.
[6]Preliminary.
[7]Includes catches from the Faroe Islands of 122 t.

Table 3.13.2.3 Nominal catch (tonnes) of SPRAT in Divisions IIIb,c,d, 1963–1995. (Data as officially reported to ICES.)

Year	Denmark	Finland	German Dem.Rep.	Germany, Fed.Rep.	Poland	Sweden	USSR	Total
1963	2,525	1,399	8,000	507	10,693	101	45,820[1]	69,045
1964	3,890	2,111	14,700	1,575	17,431	58	55,753	95,518
1965	1,805	1,637	11,200	518	16,863	46	52,829	84,898
1966	1,816	2,048	21,200	66	13,579	38	52,407	91,454
1967	3,614	1,896	11,100	2,930	12,410	55	40,582	72,587
1968	3,108	1,291	10,200	1,054	14,741	112	55,050	85,556
1969	1,917	1,118	7,500	377	17,308	134	90,525	118,879
1970	2,948	1,265	8,000	161	20,171	31	120,478	153,054
1971	1,833	994	16,100	113	31,855	69	133,850	184,814
1972	1,602	972	14,000	297	38,861	102	151,460	207,294
1973	4,128	1,854	13,001	1,150	49,835	6,310	136,510	212,788
1974	10,246	1,035	12,506	864	61,969	5,497	149,535	241,652
1975	9,076	2,854	11,840	580	62,445	31	114,608	201,434
1976	13,046	3,778	7,493	449	56,079	713	113,217	194,775
1977	16,933	3,213	17,241	713	50,502	433	121,700	210,735
1978	10,797	2,373	13,710	570	28,574	807	75,529	132,360
1979	8,897	3,125	4,019	489	13,868	2,240	45,727	78,365
1980	4,714	2,137	151	706	16,033	2,388	31,359	57,488
1981	8,415	1,895	78	505	11,205	1,510	23,881	47,489
1982	6,663	1,468	1,086	581	14,188	1,890	18,866	44,742
1983	2,861	828	2,693	550	8,492	1,747	13,725	30,896
1984	3,450	374	2,762	642	10,954	7,807	25,891	51,880
1985	2,417	364	1,950	638	22,156	7,111	34,003	68,639
1986	5,693	705	2,514	392	26,967	2,573	36,484	75,328
1987	8,617	287[2]	1,308	392	34,887	870	44,888	91,249
1988	6,869	495[2]	1,234	254	25,359	7,307	44,181	85,699
1989	9,235	222[2]	1,166	576	20,597	3,453	53,995	89,244
1990	8,858	162[2]	518	905	14,299	7,485	59,737	91,964

Year	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Sweden	Russia	Total
1991	21,781	14,124[3]	99[2]	736	17,996[4]	3,569	23,200	8,328	20,736	110,569[5]
1992	28,210	4,140	893[2]	608	17,388	1,697[5]	30,126	53,558	9,851	146,471[5]
1993	27,435	5,763	206[2]	8,267	12,553	2,798[5]	33,701	92,416	10,745	193,884[5]
1994	69,644	9,079	497[2]	374	20,132	2,789[5]	44,556	135,779	16,719	300,535[5,6]
1995	76,420	13,052	4,103[2]	230	24,383	4,799[5]	37,280	150,435	14,934	325,636[5]

[1]Including Division IIIa.
[2]Some by-catch of sprat included in herring.
[3]As reported by Estonian authorities; 17,893 t reported by Russian authorities.
[4]As reported by Latvian authorities; 17,672 t reported by Russian authorities.
[5]Preliminary.
[6]Includes catches from the Faroe Islands of 966 t.

Table 3.13.2.4 Nominal catch (tonnes) of COD in Divisions IIIb,c,d, 1963–1995. (Data as officially reported to ICES.)

Year	Denmark	Faroe Islands	Finland	German Dem.Rep.	Germany Fed.Rep.	Poland	Sweden	USSR	Total
1963	35,851		12	7,800	10,077	47,514	22,827	30,550[1]	154,631
1964	34,539		16	5,100	13,105	39,735	16,222	24,494	133,211
1965	35,990		23	5,300	12,682	41,498	15,736	22,420	133,649
1966	37,693		26	6,000	10,534	56,007	16,182	38,269	164,711
1967	39,844		27	12,800	11,173	56,003	17,784	42,975	180,606
1968	45,024		70	18,700	13,573	63,245	18,508	43,611	202,731
1969	45,164		58	21,500	14,849	60,749	16,656	41,582	200,558
1970	43,443		70	17,000	17,621	68,440	13,664	32,248	192,486
1971	47,563		3	9,800	14,333	54,151	12,945	20,906	159,701
1972	60,331		8	11,500	13,814	56,746	13,762	30,140	186,301
1973	66,846		95	11,268	25,081	49,790	16,134	20,083	189,297
1974	58,659		160	9,013	20,101	48,650	14,184	38,131	188,898
1975	63,860		298	14,740	21,483	69,318	15,168	49,289	234,156
1976	77,570		278	8,548	24,096	70,466	22,802	51,516	255,276
1977	74,495		310	10,967	31,560	47,703	18,327	29,680	213,042
1978	50,907		1,446	9,345	16,918	64,113	15,996	37,200	195,925
1979	60,071		2,938	8,997	18,083	79,697	24,003	78,730	272,519
1980	76,015	1,250	2,317	7,406	16,363	123,486	34,089	124,359	388,186[2]
1981	93,155	2,765	3,249	12,938	15,082	120,942	44,300	87,746	380,177
1982	98,230	4,300	3,904	11,368	19,247	92,541	44,807	86,906	361,303
1983	108,862	6,065	4,677	10,521	22,051	76,474	54,876	92,248	375,774
1984	121,297	6,354	5,257	9,886	39,632	93,429	65,788	100,761	442,404
1985	107,614	5,890	3,793	6,593	24,199	63,260	54,723	78,127	344,199
1986	98,081	4,596	2,917	3,179	18,243	43,237	48,804	52,148	271,205
1987	85,544	5,567	2,309	5,114	17,127	32,667	50,186	39,203	237,717
1988	75,019	6,915	2,903	4,634	16,388	33,351	58,027	28,137	225,374
1989	66,235	4,499	1,913	2,147	14,637	31,855	55,919	14,722	191,927
1990	56,702	3,558	1,667	1,630	7,225	28,730	54,473	13,461	167,446

Year	Denmark	Estonia	Faroe Islands	Finland	Germany	Latvia	Lithuania	Poland	Sweden	Russia	Total
1991	50,640	1,805[3]	2,992	1,662	8,637	2,627	1,849	25,748	39,552	3,196	138,708[4]
1992	30,418	1,369	593	460	6,668	1,250	874[4]	13,314	16,244	404	71,594[4]
1993	10,919	70	558	203	5,127	1,333	904[4]	8,909	12,201	483	40,707[4]
1994	19,822	905	779	520	7,088	2,379	1,886[4]	14,426	25,685	1,114	74,604[4]
1995	34,612	1,049	777	1,851	14,681	6,471	3,629[4]	25,001	27,289	1,612	117,265[4,5]

[1]Including Division IIIa.
[2]Includes catches from United Kingdom (England & Wales) of 2,901 t.
[3]As reported by Estonian authorities; 1,812 t reported by Russian authorities.
[4]Preliminary.
[5]Includes preliminary catches from Norway of 293 t.

Table 3.13.2.5 Nominal catch (tonnes) of FLATFISH in Divisions IIIb,c,d, 1963-1995. (Data as officially reported to ICES.)

Year	Denmark	Finland	German Dem.Rep.	Germany, Fed.Rep.	Poland	Sweden	USSR	Total
1963	9,888	-	3,390	794	2,794	1,026	1,460[1]	19,862
1964	9,592	-	4,600	905	1,582	1,147	4,420	22,246
1965	8,877	-	2,300	899	2,418	1,140	5,471	21,105
1966	7,590	-	2,900	647	3,817	1,113	5,328	21,395
1967	8,773	-	3,400	786	2,675	1,077	4,259	20,970
1968	9,047	-	3,600	769	4,048	1,047	4,653	23,164
1969	8,693	-	2,800	681	3,545	953	4,167	20,839
1970	7,937	-	2,200	606	3,962	464	3,731	18,900
1971	7,212	-	2,500	553	4,093	415	4,088	18,861
1972	6,817	-	3,200	542	4,940	412	3,950	19,861
1973	6,181	-	3,419	655	4,278	724	2,550	17,807
1974	9,686	55[2]	2,390	628	4,668	653	2,515	20,595
1975	8,257	100	2,172	937	5,139	658	6,455	23,718
1976	7,572	194	2,801	836	4,394	582	3,018	19,397
1977	7,239	203	3,378	960	4,879	484	4,754	21,897
1978	9,184	390	4,034	1,106	5,418	396	2,500	23,028
1979	10,376	399	4,396	665	5,137	450	2,670	24,093
1980	8,276	52	3,286	460	3,429	427	2,305	18,235
1981	6,674	78	3,031	704	2,958	434	2,323	16,202
1982	5,818	50	3,608	543	4,214	250	2,596	17,079
1983	6,000	39	3,957	751	2,809	217	2,371	16,144
1984	5,165	43	3,173	662	3,865	176	1,859	14,943
1985	6,506	37	4,290	542	3,533	170	1,528	16,606
1986	6,808	52	3,480	494	5,044	250	1,438	17,566
1987	5,734	58	2,457	757	4,468	273	2,194	15,941
1988	5,092	69	3,227	759	3,030	281	1,605	14,063
1989	4,597	70	3,822	644	2,946	245	1,723	14,047
1990	5,682	59	1,722	820	2,253	257	1,427	12,220

Year	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Sweden	Russia	Total
1991	5,583	248[3]	76	3,055	445[4]	n/a	4,009	224	317[5]	13,957[6]
1992	4,579	164	64	2,287	624	399[6]	3,906	337	75	12,435[6]
1993	3,275	165	85	2,156	475	155[6]	5,101	271	159	11,842[6]
1994	5,094	162	79	6,634	337	270[6]	4,900	314	173	17,963[6]
1995	6,556	102	89	5,146	411	209[6]	8,964	661	268	22,406[6]

[1]Including Division IIIa.
[2]Excluding subsistence fisheries.
[3]As reported by Estonian authorities; 236 t reported by Russian authorities.
[4]As reported by Latvian authorities; 466 t reported by Russian authorities.
[5]Includes 141 t reported by Russian authorities for Lithuania.
[6]Preliminary.

Table 3.13.3.1 Catches of herring ('000 t) in the Baltic by country and sub-division 1994 and 1995

Year and country	Total catch	Sub-division 22	23	24	25	26	27	28	29	30	31	32
1994												
Denmark	52.3	*1*	1.5	39.5	11.3							
Estonia	33.7							9.9	6.8			17.0
Finland	92.3				0.0		0.2	1.9	27.6	49.1	4.1	9.5
Germany	15.1	*2*		11.4	3.7							
Latvia	26.2					0.8		25.3				
Lithuania	4.9					4.9						
Poland	52.4			6.3	28.4	17.7						
Russia	16.7					8.0	1.5					7.2
Sweden	72.5		0.3	7.7	24.7	4.4	20.5	9.8	2.2	2.5	0.4	
Total	366.0	0.0	1.8	64.9	68.0	35.8	22.1	46.9	36.5	51.6	4.5	33.8

1 :Included in value for Sd 24

Year and country	Total catch	Sub-division 22	23	24	25	26	27	28	29	30	31	32
1995 *1*												
Denmark	49.1	*2*	0.9	36.8	11.4							
Estonia	42.9							16.4	5.1			21.4
Finland	83.4				0.0			0.5	20.3	51.5	3.8	7.3
Germany	13.4	*2*		13.4								
Latvia	28.4					0.1		28.2				
Lithuania	3.6					3.6						
Poland	45.7			7.3	24.7	13.6						
Russia	17.0					8.8						8.2
Sweden	66.1		0.2	15.8	15.5	1.8	17.7	9.3	2.9	2.3	0.5	
Total	349.6	0.0	1.1	73.3	51.7	28.0	17.7	54.5	28.2	53.9	4.3	36.9

1 :Preliminary
2 :Included in value for Sd 24

Table 3.13.3. a1 HERRING in Division IIIa and Sub. Division 22-24. 1986 - 1995. Landings in thousands of tonnes. (Data provided by Working Group members 1996).

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995 [1]
Skagerrak											
Denmark	88.2	94.0	105.0	144.4	47.4	62.3	58.7	64.7	87.8	44.9	43.7
Faroe Islands	0.5	0.5									
Norway	4.5	1.6	1.2	5.7	1.6	5.6	8.1	13.9	24.2	17.7	16.7
Sweden	40.3	43.0	51.2	57.2	47.9	56.5	54.7	88.0	56.4	66.4	48.5
Total	133.5	139.1	157.4	207.3	96.9	124.4	121.5	166.6	168.4	129.0	108.9
Kattegat											
Denmark	69.2	37.4	46.6	76.2	57.1	32.2	29.7	33.5	28.7	23.6	16.9
Sweden	39.8	35.9	29.8	49.7	37.9	45.2	36.7	26.4	16.7	15.4	30.8
Total	109.0	73.3	76.4	125.9	95.0	77.4	66.4	59.9	45.4	39.0	47.7
Sub. Div. 22+24											
Denmark	15.9	14.0	32.5	33.1	21.7	13.6	25.2	26.9	38.0	39.5	36.8
Germany	54.6	60.0	53.1	54.7	56.4	45.5	15.8	15.6	11.1	11.4	13.4
Poland	16.7	12.3	8.0	6.6	8.5	9.7	5.6	15.5	11.8	6.3	7.3
Sweden	11.4	5.9	7.8	4.6	6.3	8.1	19.3	22.3	16.2	7.4	15.8
Total	98.6	92.2	101.4	99.0	92.9	76.9	65.9	80.3	77.1	64.6	73.3
Sub. Div. 23											
Denmark	6.8	1.5	0.8	0.1	1.5	1.1	1.7	2.9	3.3	1.5	0.9
Sweden	1.1	1.4	0.2	0.1	0.1	0.1	2.3	1.7	0.7	0.3	0.2
Total	7.9	2.9	1.0	0.2	1.6	1.2	4.0	4.6	4.0	1.8	1.1
Grand Total	349.0	307.5	336.2	432.4	286.4	279.9	257.8	311.4	294.9	234.4	231.0

[1] Preliminary data.

Table 3.13.3. a2 Herring in Division IIIa and Sub-divisions 22-24 (spring spawners).

Year	Landings
1975	106
1976	86
1977	89
1978	124
1979	124
1980	143
1981	158
1982	151
1983	224
1984	261
1985	247
1986	186
1987	175
1988	251
1989	186
1990	204
1991	192
1992	168
1993	171
1994	164
1995	173
Average	171
Unit	1000 tonnes

Table 3.13.3 b1 Catches of HERRING, Sub-divisions 25–29 (including Gulf of Riga) and 32. Catches as reported to the Working Group ('000 t).

Country	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995[1]
Denmark	11.9	13.9	19.4	10.6	14.1	15.3	10.5	6.5	7.6	3.9	4.2	10.8	7.3	4.6	6.8	8.1	8.9	11.3	11.4
Estonia															32.7	29.7	32.7	33.7	42.9
Finland	33.7	38.3	40.4	44.0	42.5	47.5	59.1	54.1	54.2	49.4	50.4	58.1	50.0	26.9	18.1	30.0	32.3	39.2	28.1
Germany	0.0	0.1	0.0	0.0	1.0	1.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0
Latvia															33.3	25.8	25.4	26.1	28.3
Lithuania															6.5	4.6	3.0	4.9	3.6
Poland	57.2	61.3	70.4	58.3	51.2	63.0	67.1	65.8	72.8	67.8	55.5	57.2	51.8	52.3	47.1	39.2	41.1	46.1	38.3
Russia	137.0	130.6	118.1	118.0	110.2	99.2	84.6	105.6	110.8	115.7	113.8	122.8	121.8	116.2	31.9	29.5	21.6	16.7	17.0
Sweden	48.7	55.4	71.3	72.5	72.9	83.8	78.6	56.9	42.5	29.7	25.4	33.4	55.4	44.2	36.5	43.0	66.4	61.6	47.2
Total	313.7	305.2	323.1	304.4	294.0	311.1	302.0	289.9	289.5	268.3	251.9	286.3	289.9	244.2	212.8	209.9	231.4	243.3	216.8

[1]Preliminary.

Table 3.13.3 b2 Herring in Baltic Fishing Areas 25–29 and 32 plus Gulf of Riga.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1974	29,349.60	2,227.20	310.00	0.148
1975	24,401.90	2,180.45	313.00	0.145
1976	48,445.60	1,959.50	318.00	0.152
1977	31,264.90	2,081.68	314.00	0.142
1978	34,568.00	2,039.62	305.00	0.132
1979	29,428.10	1,907.66	323.00	0.163
1980	38,783.60	1,645.20	304.00	0.162
1981	47,038.30	1,445.20	294.00	0.197
1982	48,011.30	1,472.47	311.00	0.168
1983	41,735.80	1,424.77	302.00	0.239
1984	47,922.40	1,367.20	290.00	0.261
1985	35,134.40	1,268.97	289.00	0.269
1986	16,491.20	1,186.81	268.00	0.316
1987	30,136.90	1,093.48	252.00	0.258
1988	12,039.50	1,167.95	286.00	0.237
1989	19,249.70	1,027.36	290.00	0.293
1990	24,411.50	989.97	244.00	0.257
1991	23,093.00	964.57	213.00	0.250
1992	27,781.00	1,062.05	210.00	0.223
1993	20,949.10	1,112.47	231.00	0.221
1994	17,680.40	1,094.82	243.00	0.219
1995	21,315.00	1,039.32	217.00	0.225
Average	30,419.60	1,443.58	278.50	0.213
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.13.3 b3 Herring catches in the Gulf of Riga (as reported to the Working Group).

Category	Catch in '000 t						
	1976	1977	1978	1979	1980	1981	1982
Total catch	**31.9**	**26.6**	**23**	**21.8**	**20.7**	**22.7**	**17.5**
Gulf of Riga herring	*27.4*	*24.2*	*16.7*	*17.1*	*15*	*16.8*	*12.8*
Open sea herring	4.5	2.4	6.3	4.7	5.7	5.9	4.7

Category	Catch in '000 t						
	1983	1984	1985	1986	1987	1988	1989
Total catch	**20.3**	**19.6**	**20.2**	**18.2**	**17.7**	**19.8**	**22.7**
Gulf of Riga herring	*15.5*	*15.8*	*15.6*	*16.9*	*12.9*	*16.8*	*16.8*
Open sea herring	4.8	3.8	4.6	1.3	4.8	3	5.9

Category	Catch in '000 t					
	1990	1991	1992	1993	1994	1995
Total catch	**20.8**	**20.8**	**23.9**	**26.5**	**29.3**	**38.8**
Gulf of Riga herring	*14.8*	*14.7*	*21.8*	*22.2*	*24.3*	*32.7*
Open sea herring	6	6.1	2.1	4.3	5	6.1

Table 3.13.3 b4 Herring in the Gulf of Riga.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-7
1970	1,820.98	37.13	33.20	1.104
1971	3,803.22	34.39	32.18	0.803
1972	1,366.75	63.87	27.15	0.801
1973	1,287.01	64.11	27.90	0.540
1974	1,915.78	55.34	30.85	0.849
1975	808.93	50.62	28.52	0.808
1976	3,492.82	36.52	27.42	1.124
1977	846.22	50.28	24.19	0.742
1978	1,026.60	46.23	16.73	0.429
1979	968.63	44.67	17.14	0.565
1980	1,091.70	44.24	15.00	0.450
1981	931.96	45.71	16.77	0.540
1982	1,751.62	41.84	12.78	0.455
1983	1,297.94	51.44	15.54	0.484
1984	2,347.55	41.37	15.84	0.716
1985	1,187.57	57.25	15.58	0.556
1986	1,019.06	68.57	16.93	0.494
1987	3,700.31	53.48	12.88	0.342
1988	511.51	97.54	16.79	0.414
1989	1,264.86	63.60	16.78	0.320
1990	3,448.48	75.50	14.93	0.254
1991	4,154.50	78.22	14.79	0.336
1992	4,838.47	104.41	21.79	0.336
1993	3,670.57	125.24	22.20	0.266
1994	3,620.38	136.18	24.30	0.255
1995	4,598.00	135.28	32.66	0.324
Average	2,183.52	65.50	21.19	0.550
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.13.3 c1 Herring in Baltic Fishing Area 30.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1973	2,124.54	142.17	22.53	0.149
1974	2,567.97	148.93	20.29	0.130
1975	1,786.37	154.17	16.26	0.100
1976	3,749.07	153.26	22.01	0.136
1977	1,354.72	142.31	26.30	0.171
1978	906.95	143.56	25.11	0.154
1979	548.47	129.16	19.05	0.096
1980	1,458.28	118.95	20.15	0.151
1981	1,240.55	115.74	13.70	0.103
1982	1,984.97	98.10	17.85	0.179
1983	2,613.80	110.02	18.50	0.155
1984	4,238.07	121.23	25.63	0.194
1985	3,892.39	136.54	26.12	0.174
1986	1,561.50	156.94	26.49	0.171
1987	3,110.80	178.07	24.52	0.130
1988	1,600.62	172.53	27.65	0.122
1989	6,780.11	220.83	28.66	0.107
1990	7,646.68	292.87	31.28	0.078
1991	4,555.68	343.04	26.22	0.074
1992	6,189.07	361.05	39.31	0.098
1993	7,525.52	348.73	40.18	0.096
1994	3,772.86	442.31	56.38	0.123
1995	2,826.79	408.14	53.80	0.115
Average	3,218.95	201.68	27.30	0.131
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.13.3 d1 Herring in Baltic Fishing Area 31.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 2-6
1973	679.67	80.38	3.98	0.042
1974	679.44	86.62	6.48	0.071
1975	409.13	77.93	5.55	0.068
1976	1,245.75	76.28	8.51	0.107
1977	260.30	61.21	7.33	0.110
1978	161.88	73.78	9.77	0.120
1979	334.96	59.11	7.06	0.102
1980	1,262.08	46.29	9.66	0.160
1981	410.41	42.67	7.83	0.123
1982	365.21	51.74	8.65	0.137
1983	1,495.97	49.14	7.71	0.129
1984	1,028.78	53.16	8.92	0.106
1985	537.00	71.41	9.31	0.112
1986	500.61	77.25	9.09	0.093
1987	625.29	74.63	8.11	0.095
1988	281.66	83.99	8.77	0.104
1989	1,949.90	76.19	4.44	0.058
1990	1,073.53	72.98	7.82	0.073
1991	532.45	89.93	6.80	0.062
1992	893.84	77.80	6.54	0.064
1993	1,158.45	89.68	9.17	0.099
1994	751.86	83.59	5.83	0.058
1995	2,476.15	86.57	4.34	0.043
Average	831.06	71.40	7.46	0.093
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.13.4.1 Sprat catches in Sub-divisions 22–32 (thousand tonnes).

Year	Sub-divisions 22–32							Total
	Denmark	Finland	Germany Dem. Rep.	Germany Fed. Rep.	Poland	Sweden	USSR	
1977	7.2	6.7	17.2	0.8	38.8	0.4	109.7	180.8
1978	10.8	6.1	13.7	0.8	24.7	0.8	75.5	132.4
1979	5.5	7.1	4.0	0.7	12.4	2.2	45.1	77.1
1980	4.7	6.2	0.1	0.5	12.7	2.8	31.4	58.1
1981	8.4	6.0	0.1	0.6	8.9	1.6	23.9	49.3
1982	6.7	4.5	1.0	0.6	14.2	2.8	18.9	48.7
1983	6.2	3.4	2.7	0.6	7.1	3.6	13.7	37.3
1984	3.2	2.4	2.8	0.7	9.3	8.4	25.9	52.5
1985	4.1	3.0	2.0	0.9	18.5	7.1	34.0	69.5
1986	6.0	3.2	2.5	0.5	23.7	3.5	36.5	75.8
1987	2.6	2.8	1.3	1.1	32.0	3.5	44.9	88.2
1988	2.0	3.0	1.2	0.3	22.2	7.3	44.2	80.3
1989	5.2	2.8	1.2	0.6	18.6	3.5	54.0	85.8
1990	0.8	2.7	0.5	0.8	13.3	7.5	60.0	85.6
1991	10.0	1.6	-	0.7	22.5	8.7	59.7[1]	103.2

Year	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Russia	Sweden	Total
1992	24.3	4.1	1.8	0.6	17.4	3.3	28.3	8.1	54.2	142.2
1993	18.4	5.8	1.7	0.6	12.6	3.3	31.8	11.2	92.7	178.1
1994	60.6	9.6	1.9	0.3	20.1	2.3	41.2	17.6	135.2	288.7
1995	64.1	13.1	5.2	0.2	24.4	2.9	35.7	14.8	143.7	304.0

[1]Sum of catches by Estonia, Latvia, Lithuania and Russia.

Table 3.13.4.2 Sprat catches in the Baltic Sea by country and Sub-division ('000 t).

Year 1994

Country	Total catch	22	23	24	25	26	27	28	29	30	31	32
Denmark	**60.7**	8.0	-	3.4	49.3	-	-	-	-	-	-	-
Estonia	**9.6**	-	-	-	-	-	-	0.5	5.4	-	-	**3.6**
Finland	**1.9**	-	-	-	-	-	-	-	1.5	-	-	**0.5**
Germany	**0.3**	0.3	-	-	-	-	-	-	-	-	-	-
Latvia	**20.1**	-	-	-	-	3.1	-	17.1	-	-	-	-
Lithuania	**2.3**	-	-	-	-	2.3	-	-	-	-	-	-
Poland	**41.2**	-	-	-	5.4	35.8	-	-	-	-	-	-
Russia	**17.6**	-	-	-	-	17.6	-	-	-	-	-	-
Sweden	**135.2**	-	-	8.3	28.6	56.6	10.3	29.9	1.5	-	-	**0.0**
Total	**289.0**	**8.3**	-	**11.7**	**83.3**	**115.4**	**10.3**	**47.5**	**8.4**	-	-	**4.1**

Year 1995

Country	Total catch	22	23	24	25	26	27	28	29	30	31	32
Denmark	**64.1**	9.7	-	-	54.5	-	-	-	-	-	-	-
Estonia	**13.1**	-	-	-	-	-	-	0.6	5.2	-	-	7.3
Finland	**5.2**	-	-	-	-	-	-	-	3.6	0.8	-	0.9
Germany	**0.2**	0.2	-	-	-	-	-	-	-	-	-	-
Latvia	**24.4**	-	-	-	-	1.9	-	22.5	-	-	-	-
Lithuania	**2.9**	-	-	-	-	2.9	-	-	-	-	-	-
Poland	**35.7**	-	-	0.1	12.2	23.4	-	-	-	-	-	-
Russia	**14.8**	-	-	-	-	14.8	-	-	-	-	-	-
Sweden	**143.7**	-	-	8.5	39.9	30.0	30.3	33.5	1.3	-	-	-
Total	**304.0**	**9.9**	-	**8.7**	**106.6**	**73.0**	**30.3**	**56.6**	**10.1**	**0.8**	-	**8.2**

Table 3.13.4.3 Sprat in the Baltic Sea (Fishing Areas 22–32).

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-5
1974	52,178.70	859.96	241.70	0.338
1975	23,025.80	770.25	201.43	0.342
1976	226,619.00	550.32	194.78	0.317
1977	51,519.20	938.88	210.74	0.277
1978	17,503.10	800.94	132.36	0.268
1979	44,889.20	447.62	78.36	0.200
1980	22,912.80	243.10	57.66	0.243
1981	55,646.00	170.15	47.44	0.146
1982	35,465.70	191.63	49.14	0.266
1983	145,226.00	240.45	37.32	0.119
1984	70,973.30	469.32	52.56	0.178
1985	40,201.80	550.64	69.50	0.180
1986	15,759.20	499.23	75.48	0.214
1987	54,109.70	387.52	88.28	0.243
1988	9,726.57	406.31	80.06	0.221
1989	54,601.10	431.99	85.82	0.207
1990	62,433.60	594.69	85.58	0.116
1991	75,291.70	833.54	102.81	0.137
1992	94,386.10	1,171.79	142.20	0.203
1993	98,815.10	1,526.12	178.20	0.098
1994	33,131.00	1,526.21	290.80	0.184
1995	124,589.00	1,290.50	303.50	0.233
Average	64,045.62	677.33	127.53	0.215
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.13.5.1 Total landings of COD by countries in Sub-divisions 22–32.

Year	Denmark	Estonia	Finland	German Dem.Rep.	Germany, Fed.Rep.	Latvia	Lithuania	Poland	Russia	Sweden	USSR	Faroe Islands	Norway	Unallo-cated*	Total
1965	35,313	-	23	10,680	15,713	-	-	41,498	-	21,705	22,420	-		-	147,352
1966	37,070	-	26	10,589	12,831	-	-	56,007	-	22,525	38,270	-		-	177,318
1967	39,105	-	27	21,027	12,941	-	-	56,003	-	23,363	42,980	-		-	196,446
1968	44,109	-	70	24,478	16,833	-	-	63,245	-	24,008	43,610	-		-	216,353
1969	44,061	-	58	25,979	17,432	-	-	60,749	-	22,301	41,580	-		-	212,160
1970	42,392	-	70	18,099	19,444	-	-	68,440	-	17,756	32,250	-		-	198,451
1971	46,831	-	53	10,977	16,248	-	-	54,151	-	15,670	20,910	-		-	164,840
1972	59,717	-	76	13,720	15,516	-	-	57,093	-	16,471	30,140	-		-	192,733
1973	66,050	-	95	14,408	28,706	-	-	49,790	-	18,389	20,083	-		-	197,521
1974	57,810	-	160	10,970	22,224	-	-	48,650	-	16,435	38,131	-		-	194,386
1975	62,524	-	298	14,742	24,880	-	-	69,318	-	17,965	49,289	-		-	239,016
1976	77,570	-	287	8,552	26,626	-	-	70,466	-	20,188	49,047	-		-	252,736
1977	73,505	-	310	10,967	30,806	-	-	47,702	-	18,127	29,680	-		-	211,097
1978	50,611	-	1,437	9,345	15,122	-	-	64,113	-	16,793	37,200	-		-	194,621
1979	59,704	-	2,938	8,997	19,375	-	-	79,754	-	23,093	75,034	3,850		-	272,745
1980	75,529	-	5,962	7,406	18,407	-	-	123,486	-	33,201	124,350	1,250		-	389,591
1981	92,648	-	5,681	12,936	18,281	-	-	120,901	-	44,330	87,746	2,765		-	385,288
1982	91,927	-	8,126	11,368	21,860	-	-	92,541	-	46,548	86,906	4,300		80,948	444,524
1983	107,624	-	8,927	10,521	25,154	-	-	76,474	-	53,740	92,248	6,065		69,852	450,605
1984	113,701	-	9,358	9,886	42,031	-	-	93,429	-	65,927	100,761	6,354		-	441,447
1985	107,627	-	7,224	6,593	31,798	-	-	63,260	-	54,723	78,127	5,890		-	355,242
1986	98,464	-	5,633	3,179	22,422	-	-	43,236	-	49,572	52,148	4,596		-	279,250
1987	83,844	-	3,007	5,114	18,816	-	-	32,667	-	47,429	39,203	5,567		-	235,647
1988	74,742	-	2,904	4,634	18,295	-	-	33,351	-	54,968	28,137	6,915		-	223,946
1989	65,935	-	2,254	2,147	15,342	-	-	36,855	-	55,919	14,722	4,520		-	197,654
1990	56,700	-	1,731	1,629[2]	7,745	-	-	32,028	-	54,474	13,461	3,558		-	171,326
1991	50,606	1,810	1,712	-	9,443	2,627	1,865	25,748	3,299	39,491	-	2,611		-	139,212
1992	30,420	1,368	485	-	6,449	1,250	1,266	13,314	1,793	15,940	-	605		50,106	122,996
1993	11,707	70	225	-	5,126	1,333	605	8,909	892	12,048	-	-		61,533	115,350
1994	19,805	952	530	-	7,079	2,379	1,887	14,426	1,257	25,530	-	-		59,396	135,844
1995[1]	38,204	1,049	1,567	-	15,968	6,653	4,513	25,000	1,612	27,966	-	866	247	37,519	158,477

[1]Provisional data.

[2]Includes landings from October–December 1991 in former GDR.

*ACFM estimates.

Table 3.13.5.2 Total landings (t) of COD in Sub-divisions 22-32 by Sub-division and country (Norway and Faroe Islands excluded).

Year	Denmark				Faroe Islands	Finland				
	22	23	24	25-28	25-28	24	25-28	29	30[2]	31
1972	17,717	-	7,928	34,072	-		-	-	76	-
1973	21,400	-	9,195	35,455	-		-	-	95	-
1974	18,300	-	7,482	32,028	-		-	-	160	-
1975	15,981	-	7,500	39,043	-		-	270	8	-
1976	19,764	712	9,682	47,412	-		-	81	24	-
1977	17,726	1,166	10,213	44,400	-		-	85	26	-
1978	12,641	1,177	6,527	30,266	-		-	249	323	6
1979	16,093	2,029	7,232	34,350	3,850		-	707	518	16
1980	16,033	2,425	7,367	49,704	1,250		-	2,163	880	45
1981	15,502	1,473	7,152	68,521	2,765		-	3,036	684	11
1982	11,669	1,638	7,469	71,151	4,300		-	4,557	1,368	42
1983	14,100	1,257	7,861	84,406	6,065		-	5,322	2,013	36
1984	13,867	1,703	8,042	90,089	6,334		-	5,433	2,741	7
1985	15,563	1,076	7,461	83,527	5,890		-	4,646	1,706	7
1986	8,914	748	7,281	81,521	4,596		-	3,571	1,306	2
1987	7,990	1,503	5,470	68,881	5,567		-	1,389	1,143	2
1988	5,680	1,121	7,505	60,436	6,915		614	998	1,257	1
1989	3,422	636	4,637	57,240	4,520		392	603	1,097	1
1990	3,235	722	5,349	47,394	3,558		833	187	685	-
1991	5,536	1,431	3,847	39,792	2,611		1,061	228	404	-
1992	7,567	2,449	2,379	18,025	605		253	48	174	-
1993	4,901	1,001	3,765	2,040	-		61	11	142	2
1994	6,078	1,073	7,753	4,901	-		235	216	75	0
1995[1]	11,851	2,547	6,911	16,895	866	140	1406	2	17	0

Year	Federal Republic of Germany						German Democratic Republic					
	22	24	25	26	27	28	22	24	25	26	27	28
1972	10,531	1,782	3,193	10	-	-	4,560	5,105	1,950	2,072	-	33
1973	12,833	900	9,100	5,200	-	673	4,004	4,370	4,065	1,912	-	57
1974	9,998	395	5,242	5,769	-	820	3,028	5,431	1,469	996	-	52
1975	12,415	497	8,809	1,975	-	1,184	3,471	2,571	3,320	5,250	50	60
1976	12,312	581	7,526	4,490	-	1,717	1,292	3,290	800	3,150	10	10
1977	10,807	879	3,649	13,803	-	1,668	977	2,471	324	5,996	73	1,119
1978	9,972	880	2,178	1,793	-	299	1,619	5,466	414	1,714	1	131
1979	8,910	688	7,616	2,149	-	12	1,024	6,570	54	1,301	1	46
1980	5,968	689	10,985	673	-	92	880	4,700	5	1,818	-	3
1981	9,095	2,165	7,021	-	-	-	1,743	9,916	2	1,275	-	-
1982	7,394	666	13,069	662	-	69	1,908	8,707	-	728	-	25
1983	8,937	323	14,179	1,599	-	116	1,441	7,656	-	1,402	-	22
1984	11,340	208	21,948	7,926	-	609	1,851	6,242	-	1,793	-	-
1985	4,992	531	12,733	11,572	-	1,970	1,508	3,870	-	1,215	-	-
1986	2,236	666	10,545	8,399	-	576	825	2,173	1	180	-	-
1987	3,611	645	7,757	5,009	-	1,794	504	4,392	1	217	-	-
1988	3,670	547	11,321	2,577	-	180	330	4,302	1	1	-	-
1989	2,099	399	12,201	640	-	3	217	1,927	3	-	-	-
1990	1,997	1,057	3,232	1,427	-	32	129[5]	1,500[5]	+	-	-	-
1991	1,648	1,231	5,419	1,114	8	23	-	-	-	-	-	-
1992	2,320	1,336	2,187	586	-	20	-	-	-	-	-	-
1993	2,395	1,689	902	140	-	-	-	-	-	-	-	-
1994	2,151	1,872	2,858	134	-	64	-	-	-	-	-	-
1995	6,326[1]	4146[1]	4,960[1]	225[1]		311[1]	-	-	-	-	-	-

continue

Table 3.13.5.2 (continued)

Year	Poland 24	Poland 25[4]	Poland 26	Sweden 23	Sweden 24	Sweden 25	Sweden 26	Sweden 27[3]	Sweden 28	Sweden 29	Sweden 30	Sweden 31
1972		24,926	32,167	-	1,277	13,842	-	876	440	-	36	-
1973		29,010	20,780	-	1,655	15,224	-	971	485	-	54	-
1974		25,221	23,429	-	1,937	11,950	-	1,682	825	-	41	-
1975		35,373	33,945	-	1,932	12,511	-	2,052	1,367	103	-	-
1976		26,082	44,384	-	1,800	14,109	-	1,979	2,180	115	5	-
1977		18,172	29,530	550	1,516	11,775	-	2,584	1,560	120	22	-
1978		31,161	32,952	600	1,730	9,017	26	3,207	1,740	417	55	1
1979		40,146	39,608	700	1,800	13,628	50	3,458	2,665	641	145	6
1980		50,832	72,654	1,300	2,610	18,694	88	6,014	3,185	790	516	4
1981		50,698	70,203	900	5,700	24,600	260	7,200	4,450	712	500	8
1982		41,830	50,711	140	7,933	20,429	2,279	4,109	9,264	687	1,669	38
1983		35,153	41,321	120	6,910	27,630	1,810	6,490	9,200	1,260	320	-
1984		35,261	58,168	228	6,014	33,493	4,413	8,223	11,947	1,338	271	-
1985		19,332	43,928	263	4,895	22,737	8,170	7,068	9,523	1,115	929	23
1986		18,297	24,939	227	3,622	19,214	7,764	7,554	9,606	1,233	298	54
1987		12,254	20,413	137	4,314	15,173	7,833	5,708	7,507	903	5,817	37
1988		14,910	18,441	155	5,849	20,893	7,453	6,674	7,946	535	5,456	7
1989		20,819	16,036	192	4,987	28,068	6,742	7,703	6,829	440	927	31
1990		14,528	17,500	120	3,671	23,311	13,512	6,702	6,525	252	353	28
1991		9,853	15,895	232	2,768	18,413	7,034	5,096	5,548	180	207	12
1992		5,449	7,865	290	1,655	7,169	2,133	2,145	2,153	93	301	1
1993		5,039	3,870	274	1,675	5,872	2,161	940	972	40	114	-
1994	91	9,659	4,676	555	3,711	16,675	846	2,845	842	17	39	-
1995[1]	712	18,049	6,239	611	2,632	18,699	2,765	2,180	992	56	29	2

Year	Estonia 25	Estonia 26	Estonia 28	Estonia 29	Estonia 32	Latvia 24	Latvia 25	Latvia 26	Latvia 27	Latvia 28	Latvia 29	Lithuania 26	Lithuania 28	Russia 26	Russia 28	Russia 32
1991		1,537	273	-	-			1,190		1,432	-	1,854	11	3,034	264	1
1992		1,011	352	5	-			383		867	-	1,266	-	1,793	-	-
1993		61	8	-	1			761		572	-	605	-	892	-	-
1994	147	579	208	17	1	-	630	1,619	-	582	-	1,887		1,257	-	-
1995[1]	338	246	465	-	-	15	1,124	3,649	1	1,864		4,513		1,612		

Year	USSR 25	USSR 26	USSR 27	USSR 28	USSR 29	USSR 32	Unallocated	Total
1972	-	23,951	-	6,189	-	-	-	192,733
1973	-	8,768	1	11,250	50	14	-	197,521
1974	811	18,633	-	17,677	1,010	-	-	194,386
1975	946	17,884	3	28,677	1,735	44	-	239,016
1976	8,855	25,302	126	14,645	106	13	-	252,736
1977	390	17,880	4	11,304	91	11	-	211,097
1978	12	18,010	78	18,623	166	311	-	194,621
1979	13	30,776	-	39,875	1,575	2,795	-	272,745
1980	7	45,734	-	59,892	4,575	14,142	-	389,591
1981	2	44,254	-	32,195	3,733	7,562	-	385,288
1982	5	33,221	-	40,876	3,308	9,496	80,948	363,576
1983	-	33,600	-	39,464	6,095	13,089	69,852	380,753
1984	-	39,871	-	43,802	6,185	10,903	-	441,447
1985	-	32,096	-	27,137	8,822	10,072	-	355,242
1986	-	22,818	-	21,840	3,289	4,201	-	279,250
1987	-	22,652	-	11,457	1,654	3,440	-	235,647
1988	-	15,928	-	10,868	172	1,169	-	223,946
1989	-	8,440	-	6,058	121	103	-	197,694
1990	-	10,020	-	3,420	3	18	-	171,310
1991	-	-	-	-	-	-	-	139,212
1992	-	-	-	-	-	-	50,106	122,996
1993	-	-	-	-	-	-	61,533	115,350
1994							59,396	135,844
1995[1]							37,519	158,477

[1]Provisional.[2]Finland: 1972–1974, Sub-divisions combined. [3]Sweden: 1972–1974, Sub-divisions combined.

[4]Poland: some catches from Sub-division 24 included. [5]Includes landings from October-December 1990.

Table 3.13.5 a1 Total landings (t) of COD in Sub-divisions 22, 23 and 24.

Year	Denmark		German Dem. Rep.	Germany, Fed. Rep.	Poland	Finland	Sweden		Total				
	23	22 + 24	22 + 24	22 + 24	24	24	23	24	22	23	24	Unallocated	22 + 24
1965		19,457	9,705	13,350			-	2,182	27,867	-	7,007	-	44,874
1966		20,500	8,393	11,448			-	2,110	27,864	-	14,587	-	42,451
1967		19,181	10,007	12,884			-	1,996	28,875	-	15,193	-	44,068
1968		22,593	12,360	14,815			-	2,113	32,911	-	18,970	-	51,881
1969		20,602	7,519	12,717			-	1,413	29,082	-	13,169	-	42,251
1970		20,085	7,996	14,589			-	1,289	31,363	-	12,596	-	43,959
1971		23,715	8,007	13,482			-	1,419	32,119	-	14,504	-	46,623
1972		25,645	9,665	12,313			-	1,277	32,808	-	16,092	-	48,900
1973		30,595	8,374	13,733			-	1,655	38,237	-	16,120	-	54,357
1974		25,782	8,459	10,393			-	1,937	31,326	-	15,245	-	46,571
1975		23,481	6,042	12,912			-	1,932	31,867	-	12,500	-	44,367
1976	712	29,446	4,582	12,893			-	1,800	33,368	712	15,353	-	48,721
1977	1,166	27,939	3,448	11,686			550	1,516	29,510	1,716	15,079	-	44,589
1978	1,177	19,168	7,085	10,852			600	1,730	24,232	1,777	14,603	-	38,835
1979	2,029	23,325	7,594	9,598			700	1,800	26,027	2,729	16,290	-	42,317
1980	2,425	23,400	5,580	6,652			1,300	2,610	22,881	3,725	15,366	-	38,247
1981	1,473	22,654	11,659	11,260			900	5,700	26,340	2,373	24,933	-	51,273
1982	1,638	19,138	10,615	8,060			140	7,933	20,971	1,778	24,775	-	45,746
1983	1,257	21,961	9,097	9,260			120	6,910	24,478	1,377	22,750	-	47,228
1984	1,703	21,909	8,093	11,548			228	6,014	27,058	1,931	20,506	-	47,564
1985	1,076	23,024	5,378	5,523			263	4,895	22,063	1,339	16,757	-	38,820
1986	748	16,195	2,998	2,902			227	3,622	11,975	975	13,742	-	25,717
1987	1,503	13,460	4,896	4,256	-		137	4,314	12,105	1,640	14,281	-	26,926
1988	1,121	13,185	4,632	4,217	-		155	5,849	9,680	1,276	18,203	-	27,883
1989	636	8,059	2,145	2,498	-		192	4,987	5,738	828	11,637	-	17,689
1990	722	8,584	1,629[2]	3,054	-		120	3,671	5,361	842	11,577		16,938
1991	1,431	9,383	-	2,879	-		232	2,768	7,184	1,663	7,846	-	15,030
1992	2,449	9,946	-	3,656	-		290	1,655	9,887	2,739	5,370	-	15,257
1993	1,001	8,666	-	4,084	-		274	1,675	7,591	1,275	6,896	3,650	18,075
1994	1,073	13,831	-	4,023	91		555	3,711	8,229	1,628	13,427	6,000	27,216
1995[1]	2,547	18,762	-	10,472	712	140	611	2,632	18,177	3158	13,689	-	31,866

[1]Provisional data.
[2]Includes landings from October–December 1990 in the former GDR.
15 tons Latvian landings were transferred to Sub-divisions 25–32.

Table 3.13.5 a2 Cod in Baltic Fishing Areas 22 and 24.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 3-6
1970	139.06	37.28	43.96	0.927
1971	108.64	44.96	46.62	0.996
1972	147.67	46.55	48.90	1.295
1973	56.59	45.46	54.36	0.993
1974	142.75	49.17	46.57	1.331
1975	75.78	35.98	44.37	1.110
1976	66.53	47.63	48.72	1.442
1977	118.53	32.90	44.58	1.411
1978	84.43	27.89	38.84	1.004
1979	38.52	40.12	42.32	0.904
1980	102.23	45.94	37.92	0.937
1981	74.13	41.17	50.58	1.342
1982	78.21	39.12	45.69	0.845
1983	94.90	41.27	47.23	0.933
1984	30.51	38.39	47.56	0.812
1985	23.91	40.40	38.82	1.240
1986	67.72	24.11	25.22	1.742
1987	39.02	17.20	27.78	1.042
1988	11.99	24.16	27.88	0.991
1989	17.69	21.73	17.69	1.159
1990	14.99	13.57	16.94	1.340
1991	24.85	9.37	15.03	2.042
1992	52.79	7.02	15.26	1.375
1993	34.91	12.13	18.13	1.130
1994	58.17	22.78	27.00	0.516
1995	82.33	24.39	32.01	1.236
Average	68.73	31.95	36.54	1.157
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.13.5 b1 Total catch (t) of COD by countries in Sub-divisions 25–32.

Year	Denmark	Estonia	Finland	German Dem.Rep.	Germany, Fed.Rep.	Latvia	Lithuania	Poland	Russia	Sweden	USSR	Faroe Islands	Norway	Unallocated	Total
1965	15,856	-	23	975	2,183	-	-	41,498	-	19,523	22,420	-			102,478
1966	16,570	-	26	2,1969	1,383	-	-	56,007	-	20,415	38,270	-			134,867
1967	19,924	-	27	11,020	1,057	-	-	56,003	-	21,367	42,980	-			152,378
1968	21,516	-	70	12,118	2,018	-	-	63,245	-	21,895	43,610	-			164,472
1969	23,459	-	58	18,460	4,715	-	-	60,749	-	20,888	41,580	-			169,909
1970	22,307	-	70	10,103	4,855	-	-	68,440	-	16,467	32,250	-			154,492
1971	23,116	-	53	2,970	2,766	-	-	54,151	-	14,251	20,910	-			118,217
1972	34,072	-	76	4,055	3,204	-	-	57,093	-	15,194	30,140	-			143,833
1973	35,455	-	95	6,034	14,973	-	-	49,790	-	16,734	20,083	-			143,164
1974	32,028	-	160	2,517	11,831	-	-	48,650	-	14,498	38,131	-			147,815
1975	39,043	-	298	8,700	11,968	-	-	69,318	-	16,033	49,289	-			194,649
1976	47,412	-	287	3,970	13,733	-	-	70,466	-	18,388	49,047	-			203,303
1977	44,400	-	310	7,519	19,120	-	-	47,702	-	16,061	29,680	-			164,792
1978	30,266	-	1,437	2,260	4,270	-	-	64,113	-	14,463	37,200	-			154,009
1979	34,350	-	2,938	1,403	9,777	-	-	79,754	-	20,593	75,034	3,850			227,699
1980	49,704	-	5,962	1,826	11,750	-	-	123,486	-	29,291	124,350	1,250			347,619
1981	68,521	-	5,681	1,277	7,021	-	-	120,901	-	37,730	87,746	2,765			330,742
1982	71,151	-	8,126	753	13,800	-	-	92,541	-	38,475	86,906	4,300		80,948	397,000
1983	84,406	-	8,927	1,424	15,894	-	-	76,474	-	46,710	92,248	6,065		69,852	402,000
1984	90,089	-	9,358	1,793	29,577	-	-	93,429	-	59,685	100,761	6,354			391,046
1985	83,527	-	7,224	1,215	26,275	-	-	63,260	-	49,565	78,127	5,890			315,083
1986	81,521	-	5,633	181	19,520	-	-	43,236	-	45,723	52,148	4,596			252,558
1987	68,881	-	3,007	218	14,560	-	-	32,667	-	42,978	39,203	5,567			207,081
1988	60,436	-	2,904	2	14,078	-	-	33,351	-	48,964	28,137	6,915			194,477
1989	57,240	-	2,254	3	12,844	-	-	36,855	-	50,739	14,722	4,520			179,172
1990	47,394	-	1,731	+	4,691	-	-	32,028	-	50,683	13,461	3,558			152,870
1991	39,792	1,810	1,712	-	6,564	2,627	1,865	25,748	3,299	36,490	-	2,611			122,517
1992	18,025	1,368	485	-	2,793	1,250	1,266	13,314	1,793	13,995	-	605		50,106	105,000
1993	2,040	70	225	-	1,942	1,333	605	8,909	892	10,099	-	-		57,883	96,000
1994	4,901	952	292	-	3,056	5,660	1,887	14,335	1,257	21,264	-	-		53,396	107,000
1995[1]	16,895	1,049	1,427	-	5,496	6,653	4,513	25,000	1,612	24,723	-	866	247	37,519	126,000

[1]Provisional data.
[2]Includes landings from October-December 1991 in former GDR.

Table 3.13.5 b2 Cod in Baltic Fishing Areas 25–32.

Year	Recruitment Age 1	Spawning Stock Biomass	Landings	Fishing Mortality Age 4-7
1976	579.43	426.65	203.30	0.919
1977	993.62	404.45	164.69	0.830
1978	746.62	500.85	154.01	0.519
1979	567.58	756.50	227.70	0.471
1980	909.41	882.73	345.84	0.674
1981	850.44	880.42	325.62	0.681
1982	542.38	965.12	397.00	0.758
1983	342.53	866.84	402.00	0.767
1984	286.16	770.49	395.00	0.859
1985	302.57	624.98	316.00	0.730
1986	407.80	452.39	252.00	1.133
1987	255.95	376.26	217.00	0.948
1988	161.76	361.59	194.00	0.839
1989	182.14	294.38	179.00	1.088
1990	155.48	242.00	154.00	1.071
1991	232.30	198.06	122.00	0.953
1992	282.81	174.87	105.00	1.109
1993	228.44	191.02	96.00	0.599
1994	269.85	260.88	107.00	0.513
1995	220.93	309.29	126.00	0.623
Average	425.91	496.99	224.16	0.804
Unit	Millions	1000 tonnes	1000 tonnes	-

Table 3.13.6.1 Total catch (in tonnes) of FLOUNDER in the Baltic, by sub-divisions and country. (There are some gaps in the information. The "Total", therefore, is preliminary.)

Year	Denmark[1]			Finland			German Dem. Rep.			Germany, Fed. Rep.				Poland		Sweden[3]						
	22	23	24(25)	29	30	32	22	24	25(+26)	22	24(+25)	26	28	25(+24)	26	23	24	25	26	27	28	29
1973	1,983	-	386	-	-	-	181	1,624	1,516	349	4	-		1,580	2,070		-	502	-	-	-	-
1974	2,097	-	2,578	-	-	-	165	1,482	654	304	3	-		1,635	2,473		-	470	-	-	-	-
1975	1,992	-	1,678	113	22	47	163	1,469	406	469	1	-		1,871	2,585		-	400	-	-	-	-
1976	2,038	-	482	118	23	59	174	1,556	901	392	2	-		1,549	2,289		-	400	-	-	-	-
1977	1,974	-	389	115	32	56	555	2,708	1,096	393	4	-		2,071	2,089		-	416	-	-	-	-
1978	2,965	-	415	174	61	155	348	2,572	-	477	1	-		996	2,106		-	346	-	-	-	-
1979	2,451	-	405	192	54	153	189	2,509	-	259	3	-		1,230	1,860		-	315	-	-	-	-
1980	2,185	-	286	194	69	165	138	2,775	-	212	1	-		1,613	1,380		16	46	-	20	181	32
1981	1,964	-	548	227	56	135	271	2,595	-	351	1	-		1,151	1,541		21	30	-	21	194	34
1982	1,563	104	257	219	58	144	263	3,202	-	248	1	-		2,484	1,623		22	33	-	65	16	3
1983	1,714	115	450	181	67	120	280	3,572	-	418	1	-		1,828	905		72	108	-	212	52	9
1984	1,733	85	306	174	108	135	349	2,719	-	371	1	-		2,471	1,288		18	27	-	53	13	2
1985	1,561	130	649	157	97	137	236	3,253	-	199	4	-		2,063	1,302		16	24	-	47	12	2
1986	1,525	65	1,558	199	128	181	127	2,838	-	125	10	-		3,030	1,784		20	31	-	60	15	3
1987	1,208	122	1,007	159	106	143	71	2,096	-	114	11	-		2,530	1,745		17	26	-	51	13	2
1988	1,162	125	990	177	118	159	92	2,981	-	133	5	-		1,728	1,292		23	35	-	68	17	3
1989	1,321	83	1,062	175	122	163	126	3,616	-	122	2	-		1,896	1,089		22	34	-	66	16	3
1990	941	-	1,389	219	81	161	52	1,622	-	183	10	-		1,617	599		-	120	-	-	-	-
1991	925	-	1,497	236	81	167	-	-		246	1,814	-		2,008	1,905		24	31	-	88	20	-
1992	713	185	975	405	40	627	-	-		227	1,972	-		1,877	1,869		41	88	3	86	11	3
1993	649	194	635	438	57	683	-	-		235	1,230	-		3,276	1,229	26	27	63	1	83	10	-
1994	882	181	1,016	445	33	87	-	-	-	44	4,262	2	3	3,177	1,266	84	20	18	37	33	55	10
1995[5]	859	231	2,110	398	28	131	-	-	-	286	2,825	4	40	7,437	1,482	58	28	186	7	81	18	+

Continued

Table 3.13.6.1 Continued

Year	USSR				Estonia					Latvia			Lithuania		Russia		Total										
	26	28	29	32	25	26	28	29	32	24	26	28	25	26	26	28	22	23[4]	24	25	26	27	28	29	30	32	22-32
1973	-	2,610	-	-													2,513	-	2,014	3,598	2,070	-	2,610	-	-	-	12,805
1974	-	2,510	-	-													2,566	-	4,063	2,759	2,473	-	2,510	-	-	-	14,371
1975	-	6,455	-	-													2,624	-	3,148	2,677	2,585	-	6,455	113	22	-	17,624
1976	471	1,779	409	359													2,604	-	2,040	2,850	2,760	-	1,779	527	23	418	13,001
1977	210	1,081	321	414													2,922	-	3,101	3,583	2,299	-	1,081	436	32	470	13,924
1978	288	1,290	334	395													3,790	-	2,988	1,342	2,394	-	1,290	508	61	550	12,923
1979	158	1,170	330	1,012													2,899	-	2,917	1,545	2,018	-	1,170	522	54	1,165	12,290
1980	93	798	334	1,080													2,535	-	3,078	1,659	1,473	20	979	560	69	1,245	11,618
1981	58	742	445	1,078													2,586	-	3,165	1,181	1,599	21	936	706	56	1,213	11,463
1982	195	665	615	1,121													2,074	104	3,482	2,517	1,818	65	681	837	58	1,265	12,901
1983	209	551	497	1,114													2,412	115	4,095	1,936	1,114	212	603	687	67	1,234	12,475
1984	145	202	286	1,226													2,453	85	3,044	2,498	1,433	53	215	462	108	1,361	11,712
1985	268	189	265	806													1,996	130	3,922	2,087	1,570	47	201	424	97	943	11,417
1986	442	159	281	556													1,777	65	4,399	3,061	2,226	60	174	483	128	737	13,110
1987	1,315	203	279	397													1,393	122	3,131	2,556	3,060	57	216	440	106	540	11,615
1988	578	439	257	331													1,387	125	3,999	1,763	1,870	68	456	437	118	490	10,713
1989	783	512	214	214													1,569	83	4,702	1,930	1,872	66	528	392	122	377	11,641
1990	752	390	144	141													1,176	-	3,021	1,737	1,351	-	390	363	81	302	8,421
1991	-	-	-	-		49	1	135	51		123	323		125	216	10	1,171	-	3,335	2,039	2,418	88	354	371	81	172	10,029
1992	-	-	-	-		-	47	47	46		26	664		483	146	-	940	165	2,988	1,965	2,527	86	722	455	40	673	10,561
1993[5]	-	-	-	-		-	52	86	55		99	389		-[6]	225	-	884	220	1,892	3,339	1,562	83	430	524	57	738	9,742
1994	-	-	-	-		-	+	3	4		31	276		-[6]	167	-	926	265	5,298	3,195	1,503	33	334	458	33	87	12,132
1995	-	-	-	-	8	-	16	52	35	1	39	322	8	53	271	-	1,145	289	4,964	7,639	1,856	81	396	450	28	166	17,014

[1]For the years 1970-1981 catches in Sub-division 23 are included in Sub-division 22.
[2]Includes landings from October-December.
[3]For the years 1973-1979 and 1990 catches in Sub-divisions 24-29 are included in Sub-division 25.
[4]For the years 1973-1981 catches in Sub-division 23 are included in Sub-division 22.
[5]Provisional.
[6]No reported.

Table 3.13.7.1 Total catch (in tonnes) of PLAICE in the Baltic by Sub-division and country. (There are some gaps in the information. The "Total", therefore, is preliminary.)

Year	Denmark			German Dem. Rep.[1]		Federal Rep. of Germany				Poland		Sweden[2]						
	22	23	24 (+25)	22	24	22	24 (+25)	26	28	25(+24)	26	23	24	25	26	27	28	29
1970	3,757		494	-	-	202	16			-	-		149	-		-	-	-
1971	3,435		314	-	-	160	2			-	-		107	-		-	-	-
1972	2,726		290	-	-	154	2			-	-		78	-		-	-	-
1973	2,399		203	2	44	163	1			174	30		75	-		-	-	-
1974	3,440		126	36	10	166	2			114	86		60	-		-	-	-
1975	2,814		184	11	67	302	1			158	142		45	-		-	-	-
1976	3,328		178	11	82	302	3			164	76		44	-		-	-	-
1977	3,452		221	5	36	348	2			265	26		41	-		-	-	-
1978	3,848		681	33	1,198	346	3			633	290		32	-		-	-	-
1979	3,554		2,027	10	1,604	195	7			555	224		113	-		-	-	-
1980	2,216		1,652	5	303	84	5			383	53		113	-		-	-	-
1981	1,193		937	6	52	74	31			239	27		118	-		-	-	-
1982	716		393	6	25	39	6			43	64		40	6		7	1	-
1983	901		297	5	12	37	14			64	12		133	20		24	2	-
1984	803		166	7	2	23	8			106	-		23	3		4	1	-
1985	648		771	68	593	26	40			119	49		25	4		5	1	-
1986	570		1,019	34	372	25	7			171	59		48	7		9	1	-
1987	414		794	4	142	14	16			188	5		68	10		12	1	-
1988	234		323	3	16	7	1			9	1		49	7		9	1	-
1989	167		149	-	5	7	-			10	-		34	5		6	1	-
1990	236		100	0	1[3]	9	1			6	0		50	-		-	-	-
1991	328		112	-	-	15	9			2	1		5	2		2	-	-
1992	316		74	-	-	11	4			6	+		3	1		1	+	+
1993	171		66	-	-	16	6			4	+	2	4	+		-	-	-
1994	355		159	-	-	1	+			43	4	6	4	7		-	+	+
1995[4]	601	64	343	-	-	75	91	+	1	233	2	12	13	10	1	+	+	+

continued

Table 3.13.7.1 continued

Year	Total								
	22	23	24	25	26	27	28	29	22-28
1970	3,959	-	659	-	-	-	-	-	4,618
1971	3,595	-	423	-	-	-	-	-	4,018
1972	2,880	-	370	-	-	-	-	-	3,250
1973	2,564	-	323	174	-	-	-	-	3,091
1974	3,642	-	198	114	-	-	-	-	4,040
1975	3,127	-	297	158	-	-	-	-	3,724
1976	3,641	-	307	164	-	-	-	-	4,188
1977	3,805	-	300	265	-	-	-	-	4,396
1978	4,227	-	1,914	633	-	-	-	-	7,064
1979	3,759	-	3,751	555	-	-	-	-	8,289
1980	2,305	-	2,073	383	53	-	-	-	4,814
1981	1,273	-	1,138	239	27	-	-	-	2,677
1982	761	-	464	49	64	7	1	-	1,346
1983	943	-	456	84	12	24	2	-	1,521
1984	833	-	199	109	-	4	1	-	1,146
1985	742	-	1,429	119	49	5	1	-	2,345
1986	629	-	1,446	171	59	9	1	-	2,315
1987	432	-	1,020	198	5	12	1	-	1,668
1988	244	-	389	16	1	9	1	-	660
1989	174	-	188	15	-	6	1	-	384
1990	245	-	152	6	-	-	-	-	403
1991	343	-	126	4	1	2	-	-	476
1992	327	-	81	7	+	1	+	+	416
1993	187	2	76	4	+	-	-	-	269
1994	356	6	163	50	4	-	+	+	579
1995[4]	676	76	447	243	3	+	1	+	1,446

[1]Includes 1990 also landings from October-December.
[2]For the years 1970-1981 and 1990 catches in Sub-divisions 25-28 are included in Sub-division 24.
[3]Includes landings from Oct-Dec.
[4]Provisional.

Table 3.13.8.1 Total catch of DAB in the Baltic by sub-division and country (in tonnes). (There are some gaps in the information. The "Total", therefore, is preliminary).

Year	Denmark				German Dem. Rep.[1]		Fed.Rep. of Germany			Sweden[2]							Total								
	22	23	24(+25)	25–28	22	24	22	24	25	23	24	25	27	28	29	30	22	23	24	25	27	28	29	30	22-28
1970	845		20		11	-	74	-			+	-	-	-	-	-	930		20	-	-	-	-	-	950
1971	911		26		10	-	64	-			+	-	-	-	-	-	985		26	-	-	-	-	-	1,011
1972	1,110		30		9	-	63	-			23	-	-	-	-	-	1,182		53	-	-	-	-	-	1,235
1973	1,087		58		18	-	118	-			30	-	-	-	-	-	1,223		88	-	-	-	-	-	1,311
1974	1,178		51		18	-	118	-			34	-	-	-	-	-	1,314		85	-	-	-	-	-	1,399
1975	1,273		74		20	-	131	-			32	-	-	-	-	-	1,424		106	-	-	-	-	-	1,530
1976	1,238		60		17	-	114	-			27	-	-	-	-	-	1,369		87	-	-	-	-	-	1,456
1977	889		32		13	-	89	-			25	-	-	-	-	-	991		57	-	-	-	-	-	1,048
1978	928		51		19	14	128	4			-	-	-	-	-	-	1,075		69	-	-	-	-	-	1,144
1979	1,413		50		18	25	123	1			9	-	-	-	-	-	1,554		85	-	-	-	-	-	1,639
1980	1,593		21		15	25	101	+			3	-	-	-	-	-	1,709		49	-	-	-	-	-	1,758
1981	1,601		32		24	39	164	+			5	-	-	-	-	-	1,789		76	-	-	-	-	-	1,865
1982	1,863		50		46	38	182	4			6	5	8	6	-	1	2,001		98	5	8	6	-	1	2,209
1983	1,920		42		46	28	198	-			24	20	32	22	-	2	2,164		94	20	32	22	-	2	2,334
1984	1,796		65		30	47	175	2			4	3	5	4	-	1	2,001		118	3	5	4	-	1	2,132
1985	1,593		58		52	51	187	2			3	3	5	3	-	1	1,832		114	3	5	3	-	1	1,958
1986	1,655		85		36	35	185	1			1	1	1	1	-	-	1,876		122	1	1	1	-	-	2,001
1987	1,706		93		14	87	276	4			1	1	1	1	-	-	1,996		185	1	1	1	-	-	2,184
1988	1,846		75		22	91	281	1			1	1	1	1	-	-	2,149		168	1	1	1	-	-	2,320
1989	1,722		48		26	19	218	1			1	1	2	1	-	-	1,966		69	1	2	1	-	-	2,039
1990	1,743		146		14	11	252	1			8	-	-	-	-	-	2,009		166	-	-	-	-	-	2,175
1991	1,731		95		-	-	340	5			1	-	-	-	-	-	2,071		101	-	-	-	-	-	2,172
1992	1,406		81		-	-	409	6			+	1	1	+	4	-	1,406		87	1	1	+	1	+	1,496
1993	996		155		-	-	556	10		7	1	1	-	+	1	-	1,552	7	166	1	-	+	1	-	1,727
1994	1,621		163		-	-	1,190	80	45	5	1	1	-	+	+	-	2,811	5	245	1	-	+	+	-	3,062
1995[4]	1,510	47	127	10	-	-	1,185	49	3	5	1	5	-	1	+	-	2,695	52	177	18	-	1	+	-	2,943

[1]Includes 1990 also landings from Oct-Dec.
[2]For the years 1970-1981 and 1990 catches in Sub-divisions 25-30 are included in Sub-division 24.
[3]United Germany.
[4]Provisional.

Table 3.13.9.1 Total catch of TURBOT in the Baltic, by sub-divisions and country (in tonnes). (There are some gaps in the information. The "Total", therefore, is preliminary.)

Year	Denmark[1]			German Dem. Rep.[1]		Germany, Fed. Rep.						Poland		Sweden[2]						Latvia		Russia	Total							
	22	23	24 (+25)	22	24	22	24	25	26	27	28	25 (+24)	26	23	24	25	26	27	28 (+29)	26	28	26	22	23	24	25	26	27	28 (+29)	22–28
1965	-		-	3	39	-	-					-	-		-	-	-	-	-			-	-	-	-	-	-	-	-	42
1966	16		21	5	53	-	-					-	-		-	-	-	-	-			-	21	-	74	-	-	-	-	95
1967	14		20	7	10	-	-					-	-		-	-	-	-	-			-	21	-	30	-	-	-	-	51
1968	14		18	3	67	-	-					-	-		-	-	-	-	-			-	17	-	85	-	-	-	-	102
1969	13		13	4	57	-	-					-	-		-	-	-	-	-			-	17	-	70	-	-	-	-	87
1970	11		13	5	40	-	-					-	-		2	-	-	-	-			-	16	-	55	-	-	-	-	71
1971	11		26	4	86	-	-					-	-		2	-	-	-	-			-	15	-	114	-	-	-	-	129
1972	10		26	3	100	-	-					-	-		3	-	-	-	-			-	13	-	129	-	-	-	-	142
1973	11		30	3	33	-	-					58	13		5	-	-	-	-			-	14	-	68	58	13	-	-	153
1974	14		40	2	23	-	-					34	36		6	-	-	-	-			-	16	-	69	54	36	-	-	155
1975	27		48	3	38	15	-					23	6		7	-	-	-	-			-	45	-	93	23	6	-	-	167
1976	29		24	0	52	11	-					14	12		7	-	-	-	-			-	40	-	83	14	12	-	-	149
1977	32		37	0	55	9	-					12	55		8	-	-	-	-			-	41	-	100	12	55	-	-	208
1978	33		37	2	27	9	-					7	3		10	-	-	-	-			-	44	-	74	7	3	-	-	128
1979	23		38	3	39	6	-					29	34		12	-	-	-	-			-	32	-	89	29	34	-	-	184
1980	28		38	0	30	9	-					12	20		15	-	-	-	-			-	37	-	83	12	20	-	-	152
1981	28		62	1	46	8	-					10	19		7	-	-	-	-			-	37	-	115	10	19	-	-	181
1982	31		51	1	27	7	-					2	17		3	4	-	4	3			-	39	-	81	6	17	4	3	150
1983	33		40	3	9	8	-					5	4		31	41	-	35	24			-	44	-	80	46	4	35	24	233
1984	41		45	4	8	12	-					13	2		3	4	-	3	2			-	57	-	56	17	2	3	2	137
1985	56		34	5	22	15	-					67	15		4	5	-	4	3			-	76	-	60	72	15	4	3	230
1986	99		81	6	32	25	-					32	37		6	8	-	7	5			-	130	-	119	40	37	7	5	338
1987	134		93	4	34	30	-					155	21		8	11	-	9	6			-	168	-	135	166	21	9	6	505
1988	117		117	3	28	34	-					7	10		12	16	-	14	9			-	154	-	157	23	10	14	9	367
1989	135		109	7	22	20	-					-	11		11	15	-	13	9			-	161	-	142	15	11	13	9	351
1990	178		181	4	2	26	-					24	25		14	-	-	-	-			-	208	-	197	24	25	-	-	454
1991	228		137	-	-	44	39					73	20		2	12	-	16				-	272	-	178	85	36	16	9	596
1992	267		127	-	-	55	68					80	55		12	12	+	21	36			30	322	-	207	92	55	21	36	733
1993	159	29	152	-	-	74	56					520	72	2	4	14	+	13	38			34	233	31	212	535	105	13	38	1,167
1994	211	18	166	-	-	52	57	10				380	30	2	3	18	1	17	44			15	263	20	226	408	46	17	44	1,024
1995[3]	257	11	94	-	-	65	53	4	+	1	+	30	15	2	3	54	9	31	83	33	28	20	322	13	150	88	77	32	111	793

[1]Includes 1990 also landings from October-December.
[2]For the years 1970-1981 and 1990 catches in Sub-divisions 25-29 are included in Sub-division 24.
[3]Provisional.

Table 3.13.10.1 Total landings of BRILL (in tonnes). (There are some gaps in the information. The "Total", therefore, is preliminary).

Year	Sub-division 22		Sub-division 23		Total	Sub-divisions 24–28		Total	Subdivisions 22–28
	Denmark	Fed.Rep. of Germany	Denmark	Sweden		Denmark	Sweden		Total
1970	4	-			4	-	-	-	4
1971	3	-			3	-	-	-	3
1972	7	-			7	-	-	-	7
1973	11	-			11	2	-	2	13
1974	25	-			25	1	-	1	26
1975	38	1			39	1	+	1	40
1976	45	2			47	1	-	1	48
1977	60	5			65	2	-	2	67
1978	37	3			40	-	-	-	40
1979	30	0			30	-	-	-	30
1980	26	0			26	-	-	-	26
1981	22	1			23	-	-	-	23
1982	19	0			19	0	17	17	36
1983	13	0			13	0	42	42	55
1984	12	0			12	-	3	3	15
1985	16	0			16	0	1	1	17
1986	15	0			15	0	3	3	18
1987	12	0			12	0	3	3	15
1988	5	0			5	0	1	1	6
1989	9	0			9	0	1	1	10
1990	0	0			0	-	1	1	1
1991	15	0			0	-	-	-	15
1992	28	0			28	-	-	-	28
1993	29	-	5		34	1	+	1	35
1994	57	-	4		61	1	1	2	63
1995[1]	-[2]	-	-[2]	5		-[2]	8		

[1]Provisional.
[2]Not reported.

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Table 3.13.11.1 Annual nominal landings in tonnes of Baltic salmon by country and region in 1972-1995 (1995 provisional figure), S=sea, C=coast, R=river.

Year	Main Basin (Sub-divisions 24-29)										
	Denmark	Finland	Germany	Poland	Sweden		USSR		Total		
	S	S+C	S	S	S	R	S	C+R	S	C+R	GT
1972	1034	122	117	13	277	0	0	107	1563	107	1670
1973	1107	190	107	17	407	3	0	122	1828	125	1953
1974	1224	282	52	20	403	3	21	155	2002	158	2160
1975	1112	211	67	10	352	3	43	194	1795	197	1992
1976	1372	181	58	7	332	2	84	123	2034	125	2159
1977	951	134	77	6	317	3	68	96	1553	99	1652
1978	810	191	22	4	252	2	90	48	1369	50	1419
1979	854	199	31	4	264	1	167	29	1519	30	1549
1980	886	305	40	22	325	1	303	16	1881	17	1898

Year	Main Basin (Sub-divisions 24-29)																					
	Denmark	Faroe Islands	Estonia		Finland			Germany	Latvia		Lithuania	Poland		Russian Fed.	Sweden			Total			
	S	-	S	C	S	C	R	S	S	C	S	S	C	S	S	C	R	S	C	R	GT
1981	844	0	23	0	310	18	0	43	167	17	36	45	-	56	401	0	1	1925	35	1	1961
1982	604	0	45	0	184	16	0	20	143	31	30	38	-	57	376	0	1	1497	47	1	1545
1983	697	0	55	0	134	18	0	25	181	105	33	76	-	93	370	0	2	1664	123	2	1789
1984	1145	0	92	0	208	29	0	32	275	89	43	72	-	81	549	0	4	2497	118	4	2619
1985	1345	0	87	0	280	26	0	30	234	90	41	162	-	64	842	0	5	3085	116	5	3206
1986	848	0	52	0	306	38	0	41	279	130	57	137	-	46	764	0	4	2530	168	4	2702
1987	955	0	82	0	446	40	0	26	327	68	62	267	-	81	887	0	4	3133	108	4	3245
1988	778	0	60	0	305	30	0	41	250	96	48	93	-	74	710	0	6	2359	126	6	2491
1989	850	0	67	0	365	35	0	52	392	131	70	80	-	104	1053	0	4	3033	166	4	3203
1990	729	0	68	0	467	46	1	36	419	188	66	195	-	109	949	0	9	3038	234	10	3282
1991	625	0	64	0	478	35	1	28	361	120	62	77	-	86	641	0	14	2422	155	15	2592
1992	645	0	19	4	354	25	1	27	204	74	20	170	-	37	694	0	7	2170	103	8	2281
1993	575	16	23	4	425	76	1	31	204	52	15	191	-	49	754	7	5	2283	139	6	2428
1994	737	0	2	4	372	80	1	10	97	33	5	184	-	29	575	10	8	2011	127	9	2147
1995	556	0	4	3	551	88	1	19	100	39	2	121	12	21	465	12	7	1839	154	8	2001

Table 3.13.11.1 (Continued)

Year	Gulf of Bothnia (Sub-divisions 30-31)											Main Basin+Gulf of Bothnia (Sub-divs. 24-31) Total		
	Denmark	Finland			Sweden			Total						
	S	S	S+C	C	S	C	R	S	C	R	GT	S	C+R	GT
1972	11	0	143	0	9	126	65	163	126	65	354	1726	298	2024
1973	12	0	191	0	13	166	134	216	166	134	516	2044	425	2469
1974	0	0	310	0	15	180	155	325	180	155	660	2327	493	2820
1975	98	0	412	0	33	272	127	543	272	127	942	2338	596	2934
1976	38	271	0	155	22	229	80	331	384	80	795	2365	589	2954
1977	60	348	0	142	49	240	60	457	382	60	899	2010	541	2551
1978	0	127	0	145	18	212	40	145	357	40	542	1514	447	1961
1979	0	172	0	121	20	171	35	192	292	35	519	1711	357	2068
1980	0	162	0	148	23	172	35	185	320	35	540	2066	372	2438

Year	Gulf of Bothnia (Sub-divisions 30-31)										Main Basin + Gulf of Bothnia (Sub-divisions 24-31) Total			
	Finland			Sweden			Total							
	S	C	R	S	C	R	S	C	R	GT	S	C	R	GT
1981	125	157	6	26	242	35	151	399	41	591	2076	434	42	2552
1982	131	111	3	0	135	30	131	246	33	410	1628	293	34	1955
1983	176	118	4	0	140	32	176	258	36	470	1840	381	38	2259
1984	401	178	5	0	140	52	401	318	57	776	2898	436	61	3395
1985	247	151	4	0	114	38	247	265	42	554	3332	381	47	3760
1986	124	176	5	11	146	41	135	322	46	503	2665	490	50	3205
1987	66	173	6	8	106	35	74	279	41	394	3207	387	45	3639
1988	74	146	6	1	141	45	75	287	51	413	2434	413	57	2904
1989	225	207	6	10	281	63	235	488	69	792	3268	654	73	3995
1990	597	680	14	12	395	93	609	1075	107	1791	3647	1309	117	5073
1991	580	523	14	1	350	84	581	873	98	1552	3003	1028	113	4144
1992	487	746	14	7	386	87	494	1132	101	1727	2664	1235	109	4008
1993	279	426	16	10	267	83	289	693	99	1081	2572	832	105	3509
1994	238	269	14	0	179	70	238	448	84	770	2249	575	93	2917
1995	52	279	7	0	214	94	52	493	101	646	1891	647	109	2647

Table 3.13.11.1 (Continued)

Year	Gulf of Finland (Sub-division 32)					Baltic (Sub-divs. 24-32) Total		
	Finland			USSR				
	S	S+C	C	S	C+R	S	C+R	GT
1972	0	138	0	0	0	1864	298	2162
1973	0	135	0	0	0	2179	425	2604
1974	0	111	0	0	0	2438	493	2931
1975	0	74	0	0	0	2412	596	3008
1976	81	0	0	0	14	2446	603	3049
1977	75	0	0	0	13	2085	554	2639
1978	68	0	1	0	6	1582	454	2036
1979	63	0	3	0	4	1774	364	2138
1980	51	0	2	0	7	2117	381	2498

Year	Gulf of Finland (Sub-division 32)												Baltic (Sub-divs. 24-32) Total			
	Estonia			Finland			Russian Fed.		Total							
	S	C	R	S	C	R	S	R	S	C	R	GT	SEA	COAST	RIVER	GT
1981	0	2	0	46	1	0	5	0	51	3	0	54	2127	437	42	2606
1982	0	5	0	91	7	0	0	0	91	12	0	103	1719	305	34	2058
1983	0	3	0	163	32	0	0	0	163	35	0	198	2003	416	38	2457
1984	0	5	0	210	42	0	7	0	217	47	0	264	3115	483	61	3659
1985	0	4	0	219	34	2	20	0	239	38	2	279	3571	419	49	4039
1986	24	0	0	270	79	2	28	0	322	79	2	403	2987	569	52	3608
1987	10	0	0	257	61	2	23	0	290	61	2	353	3497	448	47	3992
1988	19	0	0	122	112	2	15	0	156	112	2	270	2590	525	59	3174
1989	36	0	0	181	145	2	37	0	254	145	2	401	3522	799	75	4396
1990	25	0	0	118	369	2	35	4	178	369	6	553	3825	1678	123	5626
1991	22	0	0	140	398	2	88	3	250	398	5	653	3253	1426	118	4797
1992	6	3	0	77	415	2	28	1	111	418	3	532	2775	1653	112	4540
1993	3	1	1	91	309	3	39	2	133	310	6	449	2705	1142	111	3958
1994	3	1	0	88	141	6	15	1	106	142	7	255	2355	717	100	3172
1995	1	1	0	25	186	6	24	2	50	187	8	245	1941	834	117	2892

Catches in Sub-division 24-32, since 1995 in Sub-divisions 23-32.
Danish, Finnish, German, Polish and Swedish catches are converted from gutted to ungutted weight by the factor 1.1.
Estonian, Latvian, Lithuanian and Russian catches are reported ungutted.
Sea trout are included in the sea catches in the order of 3 % for Denmark (before 1983), Estonia, Germany, Latvia, Lithuania,Russia, about 5% for Poland and 10% for Finland.
Non-professional catches are included in the Finnish landings based on inquiries in 1990, 1992 and 1994.
Estonian sea catches in Sub-division 32 in 1986-1991 include a small quantity of coastal catches.
Estimated non-reported coastal catches in Sub-division 25 have from 1993 been included in the Swedish statistics.

Table 3.13.11.2 Estimates of wild salmon smolt production (thousands) in Baltic rivers having natural stocks in the 1980s and 1990s.

Region, Sub-div. and country	Rivers	Reprod. area ha	Potential	1980s	1992	1993	1994	1995	Pred. 1996	Pred. 1997
Gulf of Bothnia, Subdiv. 31										
Finland	Kiiminkijoki	90	30	+	+	+	+	+		
	Pyhäjoki	100	40	+	+	+	+	+		
	Simojoki	255	75	10	17	10	12	1.4	0.6	2.3
Finland/Sweden	Torniojoki;Torneäl	5000	500	75	75	125	200	75	75	121
Sweden	Kalix älv	2500	250	50	75	88	130	44	44	60
	Råne älv +	390	20				3.2	1.2	1.3	1.3
	Pite älv +	435	33					3	3	5
	Åby älv +	80	16				3.6	1.2	1.4	1.8
	Byske älv	530	80	15	18	23	22	8.7	6.5	12
	Sävarån+	20	4							
	Rickleån+	15	5							
	Vindelälven	1000	200	25	20	23	39	15	14	14
	Öre älv+	100	20	+	+			0.9	0	0.9
	Lögde älv+	95	19	+	+		2.3	0.9	1	1
	Sum of +			5	15	20				
Total Sub-div. 31		10610	1292	180	220	289	412	151	146.8	219.3
Gulf of Bothnia, Subdiv. 30										
Sweden	Ljungan	20	10	10	10	15	4	4	4	
Total Gulf of B., Sub-divs. 30-31		10630	1302	190	230	304	416	155	151	
Main Basin, Sub-divs. 24-29										
Sweden	Emån		20		5	5	4	4	3	
	Mörrumsån		120		110	90	60	30	60	
Total Sweden			140		115	95	64	34	63	
Estonia	Pärnu									
Latvia	Irbe				10	10	10	8	7	
	Venta				15	15	15	15	15	
	Saka				10	10	10	10	10	
	Salaca				26	22	15	15	15	
	Vitrupe				5	5	5	5	5	
	Peterupe				5	5	5	5	5	
	Gauja				20	17	13	13	14	
	Daugava				5	5	5	5	5	
	Others				4	3	3	4	4	
Total Latvia					100	92	81	80	80	
Lithuania	Neumunas, (Minija) and others		150		20	20	20	20	20	
Total Estonia, Latvia and Lithuania					120	112	101	100	100	
Total Main B., Subdivs. 24-29					235	207	165	134	163	
Gulf of B.+Main B., Sub-divs. 24-31					465	511	581	289	314	
Gulf of Finland, Sub-div. 32										
Finland	Vantaanjoki	10	20							
	Kymijoki	50	100					3	3	
Russia (1)	Neva									
	Luga									
Estonia	Kunde									
	Silja									
	Loobu									
	Pirita									
	Vasalemme									
	Keila									
Total Estonia			15	15	15	15	15	7	7	
Total Gulf of F., Sub-div. 32		60	135	15	15	15	15	10	10	
Total Baltic, Subdivs. 24-32					480	526	596	299	324	

+ = Low and uncertain production.

1. No data available for Neva and Luga.

Table 3.13.11.3 M74-mortality (%) in selected stocks of Baltic salmon from 1985 to 1995 with projections for 1996.

River	Sub-div.	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Simojoki	31								46	94	75	69	
Torne älv	31								70	74	85	66	
Lule älv	31								58	66	57	48	61
Skellefteälven	31								40	49	69	49	
Ume/Vindelälven	30	40	20	25	19	16	31	45	77	88	85	74	78
Ångermanälven	30								50	77	64	45	
Indalsälven	30	4	7	8	7	3	8	7	45	72	65	52	
Ljungan	30								60	97	50		
Ljusnan	30							17	33	59	86	52	
Dalälven	30	28	8	9	20	11	9	21	79	85	53	55	55
Mörrumsån	25	47	49	65	46	58	72	65	55	96	90	65	
Neva/Åland	29								-	70	50		
Neva/Kymi	32								45	60-70	-	30	
Mean		29.8	21.0	26.8	23.0	22.0	30.0	31.0	54.8	77.3	69.1	55.0	64.7

Table 3.13.11d.1 Description of Baltic rivers with present production of wild salmon.

River	Stock	Original stock	% wild	Possibility of selfsustaining stock at present	Notes (substocks etc.)
Gulf of Bothnia, Sub-divs. 30-31					
FINLAND					
Simojoki	Simo	yes	25	yes	stockings with Simojoki stock
Kiminkijoki	Iijoki	no	< 5	no	transplanted hatchery stock,aiming at selfsustaining stock
FINLAND/SWEDEN					
Torne älv	Torne	yes	50	yes	stockings with Torne älv stock
SWEDEN					
Sw. Torne älv/Lainio älv	Torne/Lainio	yes	95	yes	substocks (Ståhl), stockings 1980-90
Kalix älv	Kalix	yes	100	yes	substocks at least 3 (Jansson), no stockings carried out at all in the river
Råne älv	Råne	yes	100	yes	no stockings carried out at all in the river
Pite älv	Pite/Skellefte	yes	100	yes	Skellefte river stock introduced earlier
Åby älv	Åby	yes	100	yes	no stockings carried out at all in the river
Byske älv	Byske	yes	90	yes	stockings in the upper part, no stockings carried out at all in the lower part
Sävarån	Sävar	yes	50	yes	stockings with Umeälv stock and Byskeälv stock
Rickleån	Ume	no	50	yes	Ume älv stock introduced
Ume älv	Vindel/Ume	yes	90	yes	Wild stock trib. Vindelälven, Stocked: Ume älv stock 1930s, later Vindelälven stock
Öre älv	Öre	yes	50	yes	stockings with Öreälv stock
Lögde älv	Lögde	yes	90	yes	stockings with Lögde älv stock
Ljungan	Ljungan	yes	20	yes	stocking 30,000 smolt per year
Main Basin, Sub-divs. 24-31					
SWEDEN					
Emån	Emån	yes	95	yes	no stockings at present, formerly small stockings
Mörrumsån	Mörrumsån	yes	80	yes	stockings mainly of underyearlings in the upper reaches, formerly smolt stockings

Table 3.13.11d.1 (continued), Main Basin

River	Stock	Original stock	% wild	Possibility of selfsustaining stock at present	Notes (substocks etc.)
ESTONIA					
Pärnu			?	yes	stockings 1989-1993, mixed local and river Salaca stock
LATVIA					
Irbe	Irbe	yes	100	yes	
Venta	Venta	yes	?	yes	stockings
Saka	Saka	yes	100	yes	
Salaca	Salaca	yes	?	yes	stockings
Vitrupe	Vitrupe	yes	100	yes	
Peterupe	Peterupe	yes	100	yes	
Gauja	Gauja	yes	?	yes	stockings
Daugava	Daugava	yes	?	no	stockings
Others		yes	100	?	
LITHUANIA					
Neumonas	Neumonas	yes	100	yes	
Minija	Minija	yes	100	yes	
Gulf of Finland, Sub-div. 32					
FINLAND					
Vantaanjoki	Neva	no	< 5	no	stockings since 1980s´, fish ladder at river mouth
Kymijoki	Neva	no	< 5	possibly	stockings since 1970s´, partial stop for ascending salmon
RUSSIA					
Neva			?		Data missing
Luga			?		Data missing
RUSSIA/ESTONIA					
Narva	Neva	no	?	no	stockings
ESTONIA					
Kunda	Kunda	yes	100	yes	Fry stockings before 1940s´ and in 1960s´
Selja	Selja	yes	100	yes	Fry stockings before 1940s´ and in 1960s´
Loobu	Loobu	yes	100	yes	Fry stockings before 1940s´ and in 1960s´
Pirita	Pirita	yes	100	yes	Fry stockings before 1940s´ and in 1960s´
Vasalemma	Vasalemma	yes	100	yes	Fry stockings before 1940s´ and in 1960s´
Keila	Keila	yes	100	yes	Fry stockings before 1940s´ and in 1960s´

Table 3.13.11d.2 Potential salmon rivers in the Baltic, which currently haven't any wild production. Only rivers known to be old salmon rivers with capacity to produce at least several thousands of smolts are included. Rivers with current wild production are presented in Table 5.2.1 and quantitative estimates are in Table 4.1.5.1.

COUNTRY, Sub-div., River	River length accessible for salmon, km	Total salmon nursery area, ha	Potential smolt production, thousands	Notes
FINLAND:				
Sub-div. 31:				
Kuivajoki	43	58	?, 300/ha*)	
Siikajoki	18, [afl 62]	32, [afl 18]	?, 300/ha*)	Regulated discharge
Pyhäjoki	80	98	?, 400/ha*)	Some repr. observed during the 1980s and early 1990s
Kalajoki	47	33	?, 400/ha*)	
Sub-div. 30:				
Merikarvianjoki	22	?	?	Neva salmon releases
SWEDEN:				
Sub-div. 31:				
Sangisälv	70	?	?	Salmon in early 1900s
Kåge älv	60	?	?	
Sub-div. 25:				
Helgeån	?	?	?	
DENMARK:				
No rivers				
GERMANY:				
No information available				
POLAND:				
Sub-div. 24:				
Drawa & tributaries	10-15 (?)	?	?	Daugava salmon releases
Sub-div. 25:				
Parseta	25-30 (?)	?	?	Daugava salmon releases
Wieprza	5-10 (?)	?	?	Daugava salmon releases
Slupia	15 (?)	?	?	Daugava salmon releases
Sub-div. 26:				
Drweca (trib. of Vistula)	15-25 (?)	?	?	Daugava salmon releases
LITHUANIA:				
Several tributaries of the R. Neumonas and possibly 3 other rivers; Basic information on existence of salmon & nursery areas is lacking.				
LATVIA:				
No rivers				
ESTONIA:				
Sub-div. 32:				
Purtse	?	?	?	Pollution, stock extinction before 1940s
Valgejogi	8	2, [ad ?]	?	Dam, wild parr in 1970s
Jägala	1.3	1, [ad ?]	?	Pollution, dam, fish ladder existed before 1940s
RUSSIA:				
No information available				

*) The potential production estimate has not been presented in the litterature, provisional estimates of the productivity are given.
[ad...] = above a dam
[afl...] = above a fish ladder

Table 3.13.11e.1 Annual nominal landings (tonnes) of sea trout in the Baltic. S=Sea, C=Coast and R=River.

Year	Baltic Main Basin												Gulf of Bothnia				Gulf of Finland		Total
	Denmark[1,4]	Estonia	Finland[2]	Germany[4]	Latvia	Lithuania		Poland		Sweden[4]			Finland[2]		Sweden		Estonia	Finland[2]	
	S + C	C	C	C	C	S	C	S + C	R	S[6]	C[6]	R	C	R	S[6]	C[6]	C	C	
1979	3	-	10	-	-	-	-	81[3]	24	-	-	3	6	-	-	-	-	73	200
1980	3	-	11	-	-	-	-	48[3]	26	-	-	3	87	-	-	-	-	75	253
1981	6	-	51	-	5	-	-	45[3]	21	-	-	3	131	-	-	-	2	128	392
1982	17	-	52	1	13	-	-	80	31	-	-	3	134	-	-	-	4	140	475
1983	19	-	50	-	14	-	-	108	25	-	-	3	134	-	-	-	3	148	504
1984	29	-	66	-	9	-	-	155	30	-	-	5	110	-	-	-	2	211	617
1985	40	-	62	-	9	-	-	140	26	-	-	13	103	-	-	-	3	203	599
1986	18	-	53	-	8	-	-	91	49	7	9	8	118	-	1	24	2	178	566
1987	31	-	66	-	2	-	-	163	37	6	9	5	123	-	1	26	-	184	653
1988	28	-	99	-	8	-	-	137	33	7	12	7	196	42	-	44	3	287	903
1989	39	-	156	18	10	-	-	149	35	30	17	6	215	37	1	78	3	295	1,089
1990	48[3]	-	189	21	7	-	-	388	100	15	15	10	318	43	-	71	4	334	1,563
1991	48[3]	1	185	7	6	-	-	272	37	26	24	7	349	54	-	60	2	295	1,373
1992	27[3]	1	173	-	6	-	-	221	60	103	26	1	350	48	-	71	8	314	1,402
1993	59[3]	1	386	14	17	-	-	202	70	125	21	2	160	43	-	47	14	704[7]	1,869
1994	33[8,3]	2	384	15[8]	18	+	+	152	70	76	16	3	124	42	-	32	6	642	1,615
1995[5]	69[8,3]	1	226	13	13	+	3	187	75	46	4	11	162	32	-	33	5	114	994

[1]Additional sea trout catches are included in the salmon statistics for Denmark until 1982 (Table 3.1.2).

[2]Finnish landings include about 70 % non-commercial catches in 1979 - 1995.

[3]Rainbow trout included.

[4]Sea trout are also caught in the Western Baltic in Sub-divisions 22 and 23 by Denmark, Germany and Sweden.

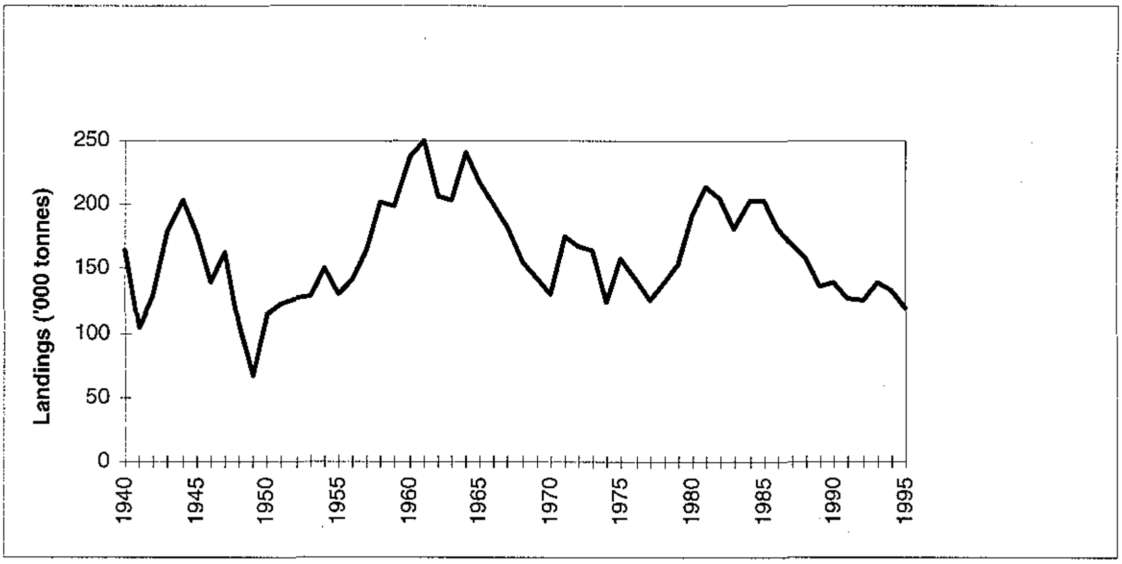
[5]Estimated.

[6]Catches reported by professional fishermen.

[7]Finnish landings include about 85 % non-commercial catches in 1993.

[8]ICES Sub-div. 22 and 24.

+ Catch less than 1 tonne.



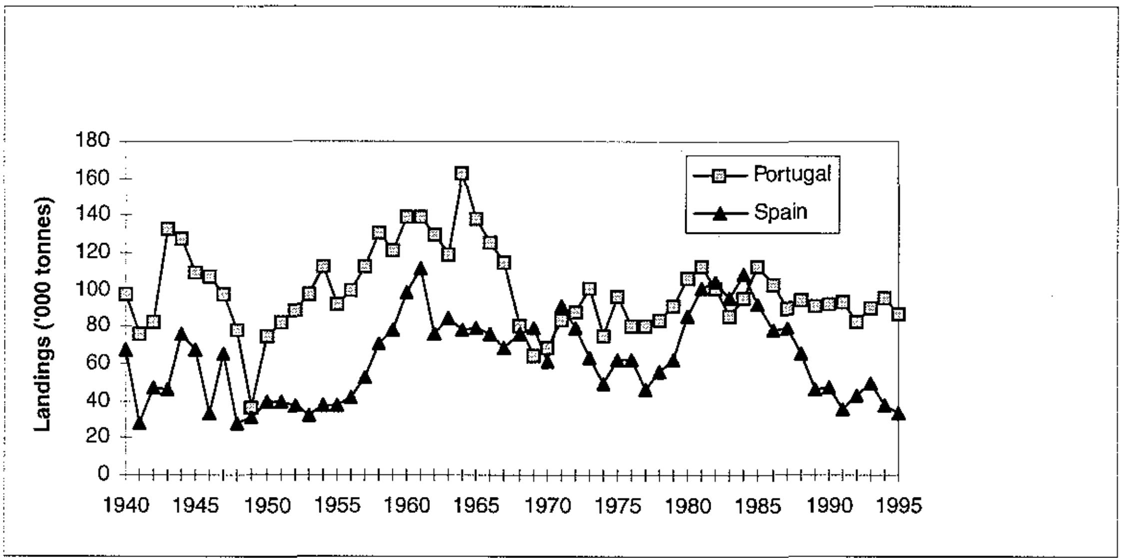


Figure 3.11.7.1 Landings of sardine in Divisions VIIIc and IXa, 1940-1995, a) total : b) by country

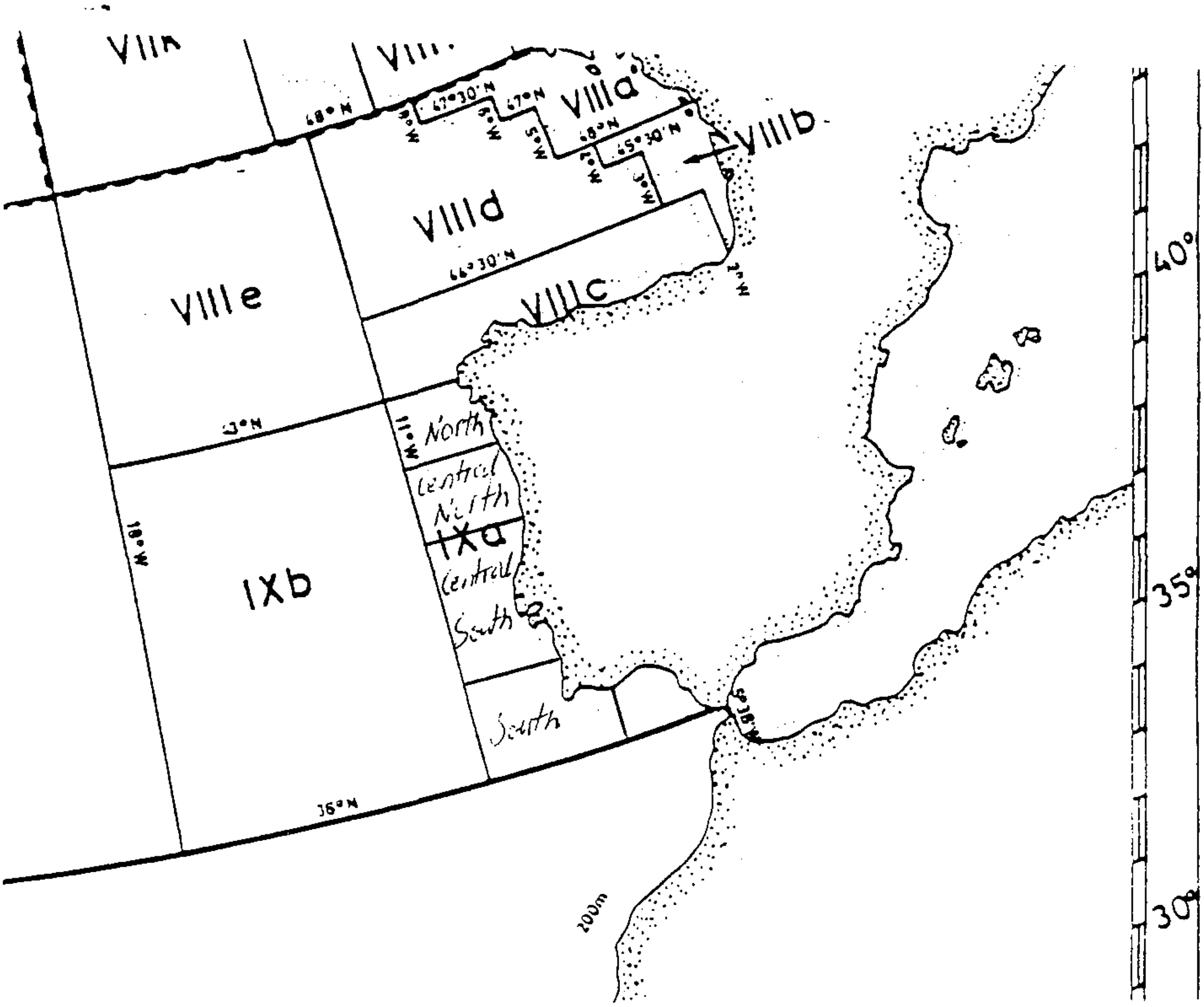
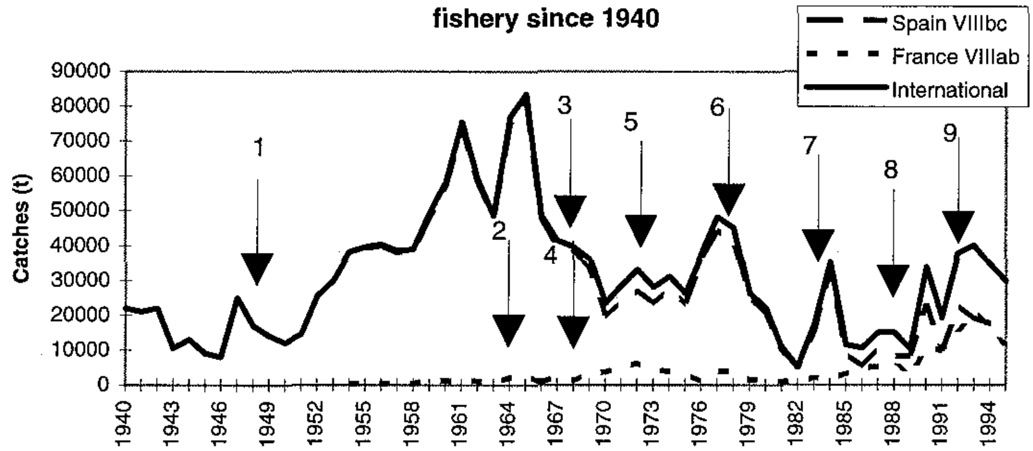


Figure 3.11.7.b.1 Boundaries of Division IXa.

Figure 3.11.8.a.1: Bay of Biscay anchovy: Historical evolution of the fishery since 1940



1. Goniometer
2. Echosounder; anchovy disappear from the coast of Galicia
3. Minimum length size : 9 cm
4. Power block
5. 8 tonnes per boat and 5 days per week for the spanish fleet;
   the spanish fleet is not allowed to come into the french 6 nautical miles
6. Radar and sonar
7. 6 tonnes per boat for the spanish fleet
8. Minimum landing size 12 cm : increase of the french pelagic fleet
9. Bilateral agreement between Spain and France : the pelagic fleet is not allowed
   to fish anchovy from the end of March to the end of June

Figure 3.12.3.b.1

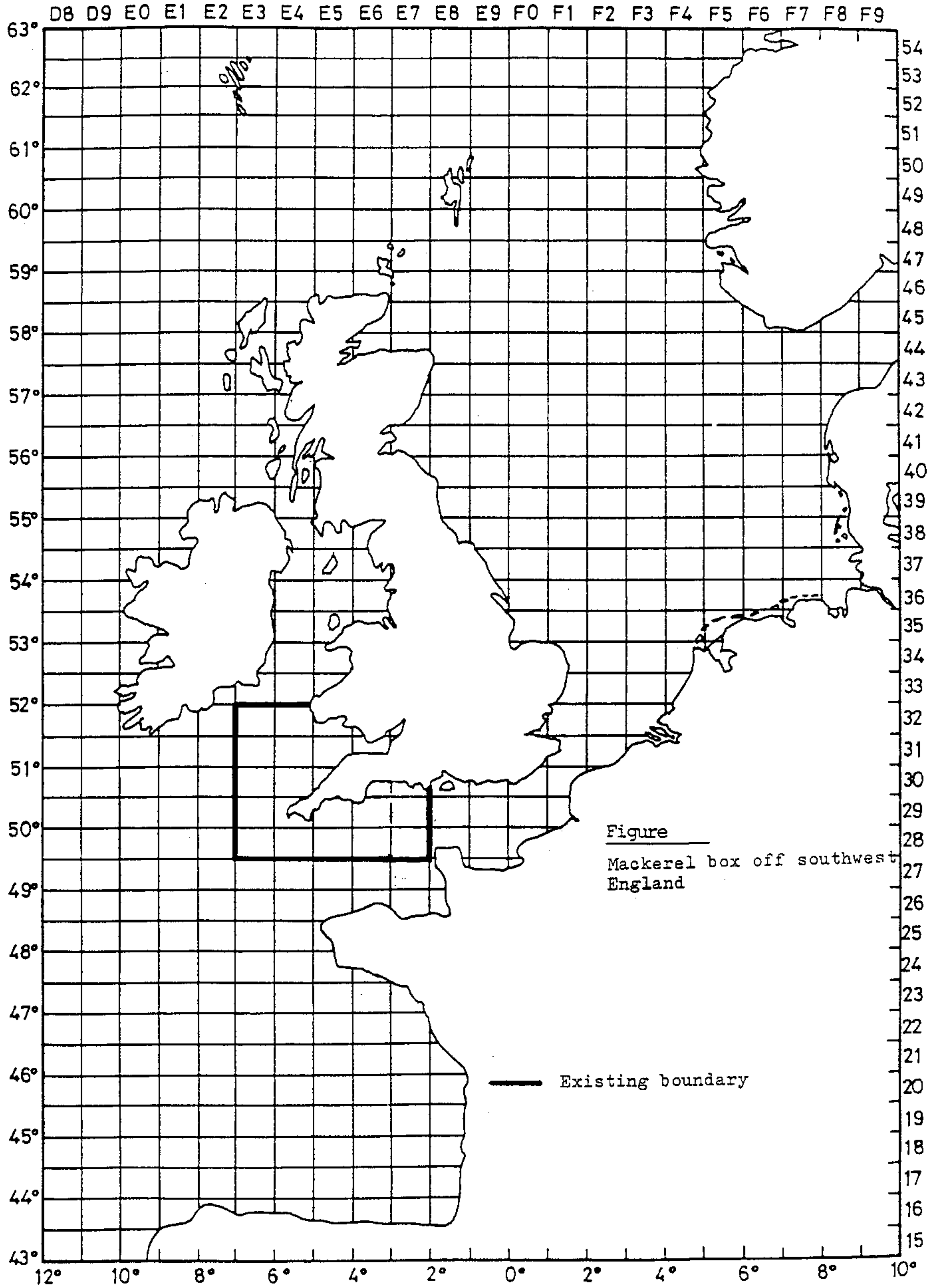
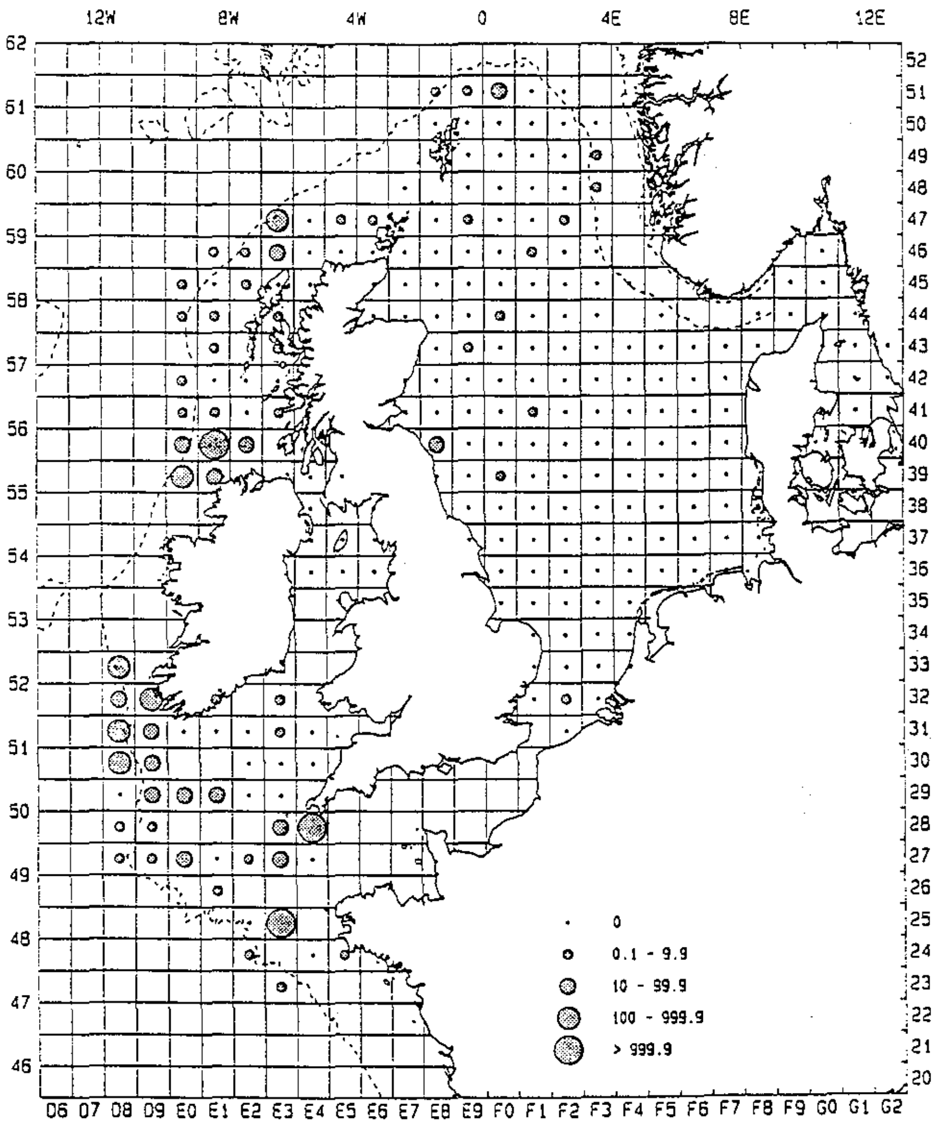


Figure 3.1.2.3.b.2 Catches rates of mackerel on surveys.

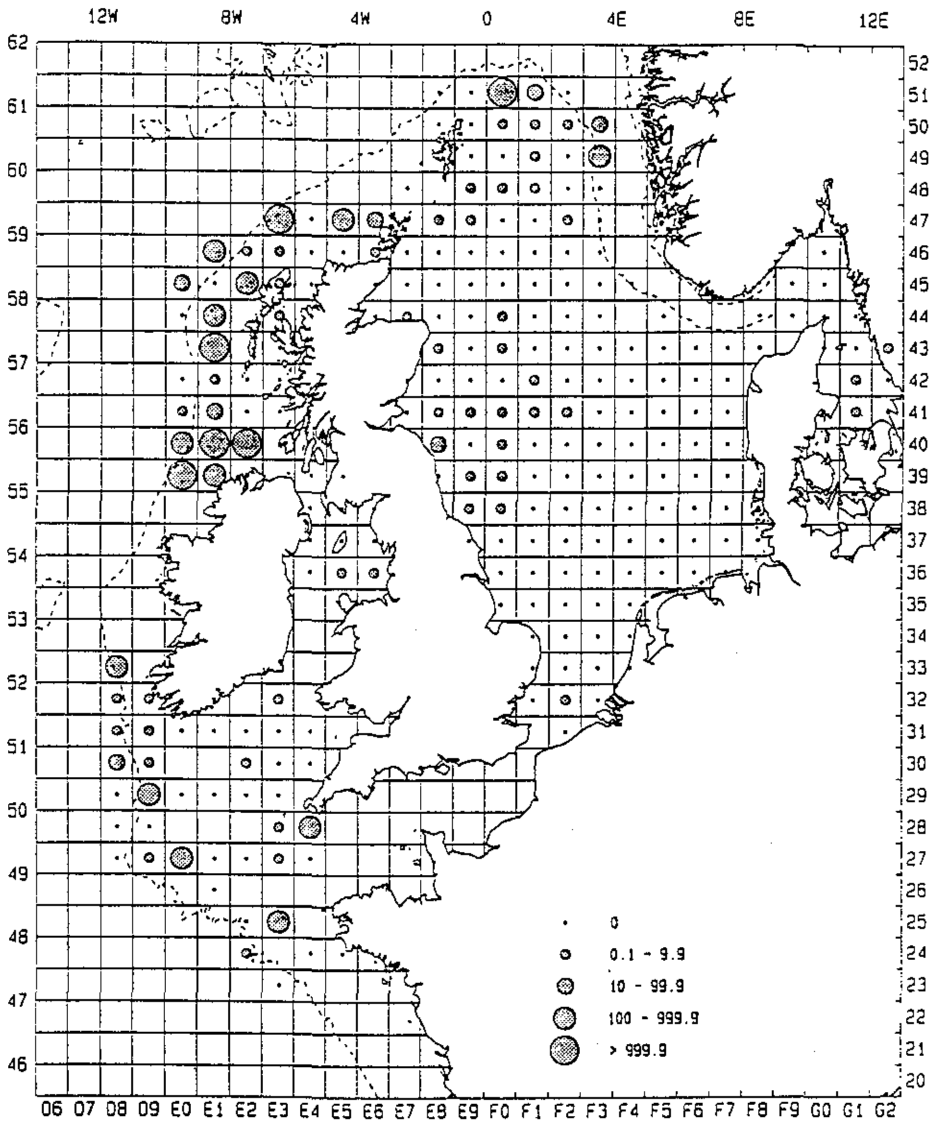
2nd Winter Mackerel (Year Class 1994) Nos/Hr Trawled —1st quarter 1996



A

Figure 3.1.2.3.b.2 Continued.

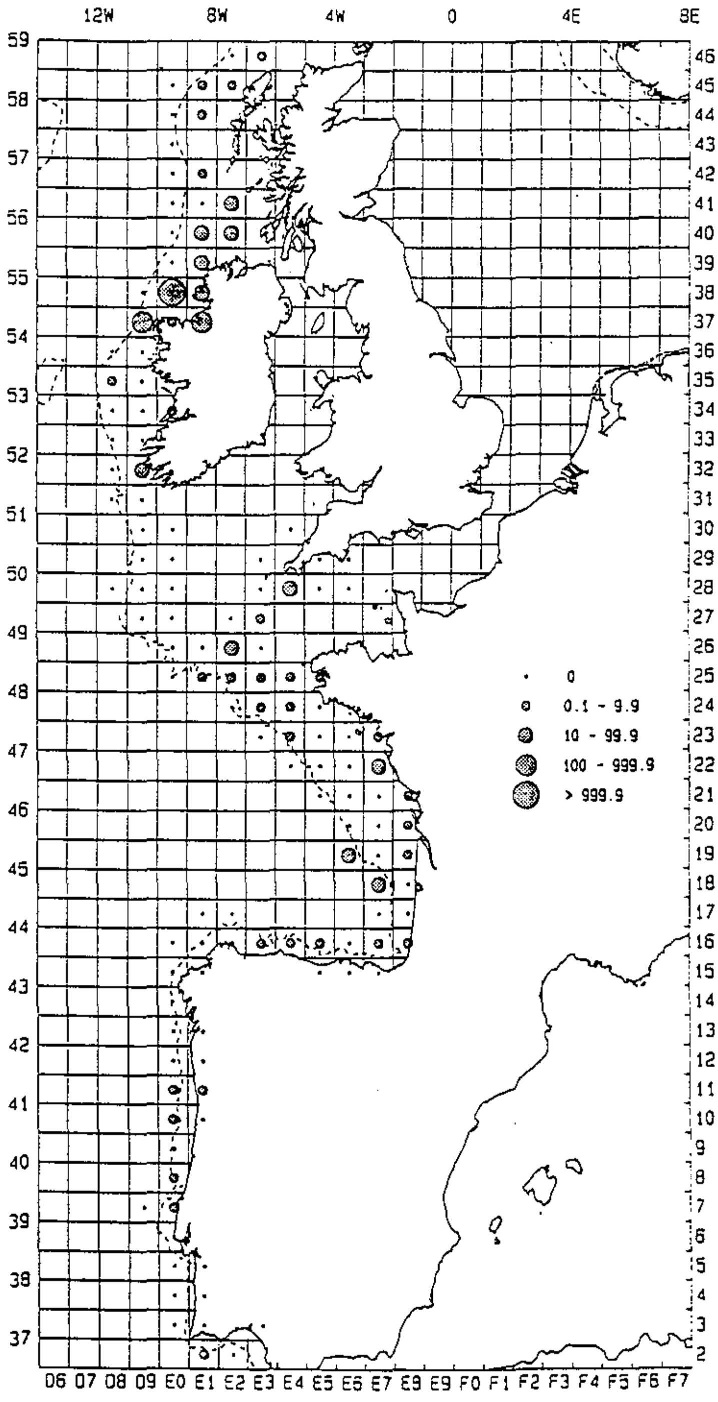
1st Winter Mackerel (Year Class 1995) Nos/Hr Trawled—1st quarter 1996



B

Figure 3.1.2.3.b.2 Continued.

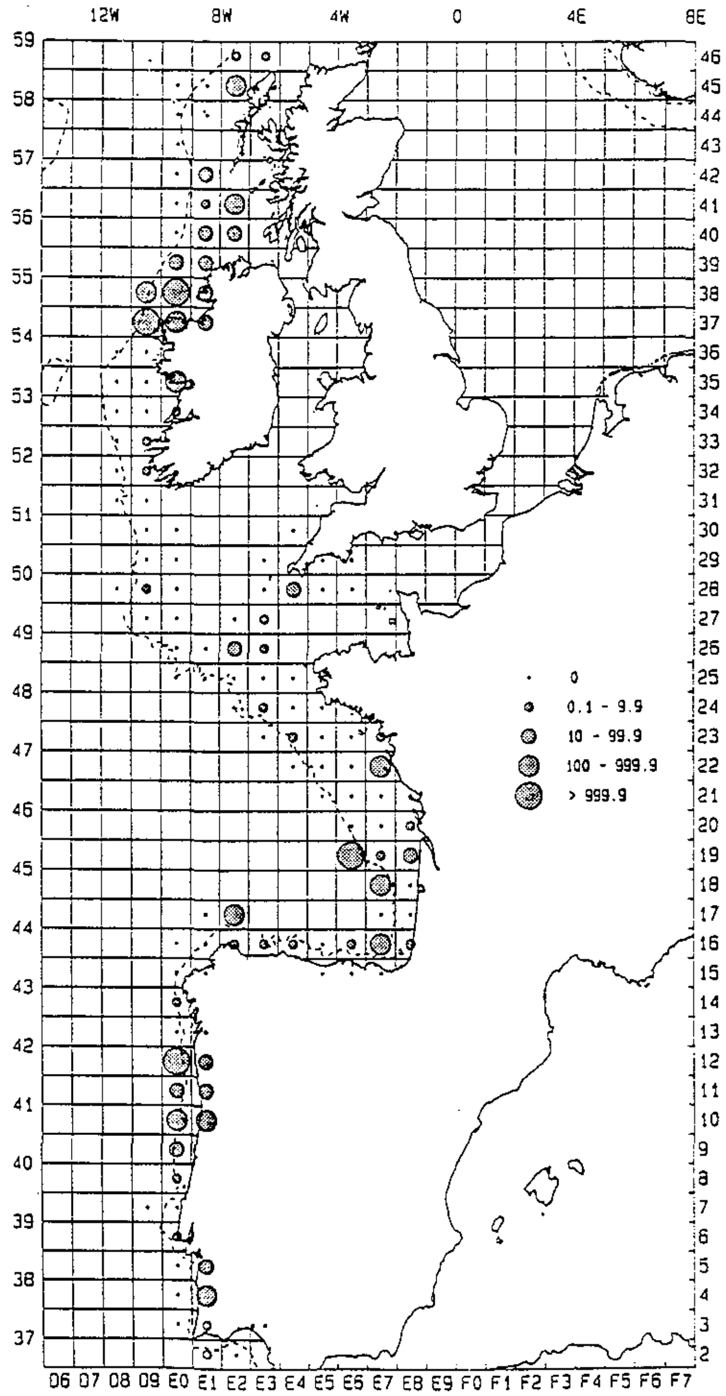
2nd Winter Mackerel (Year Class 1994) Nos/Hr trawled—4th quarter 1995



C

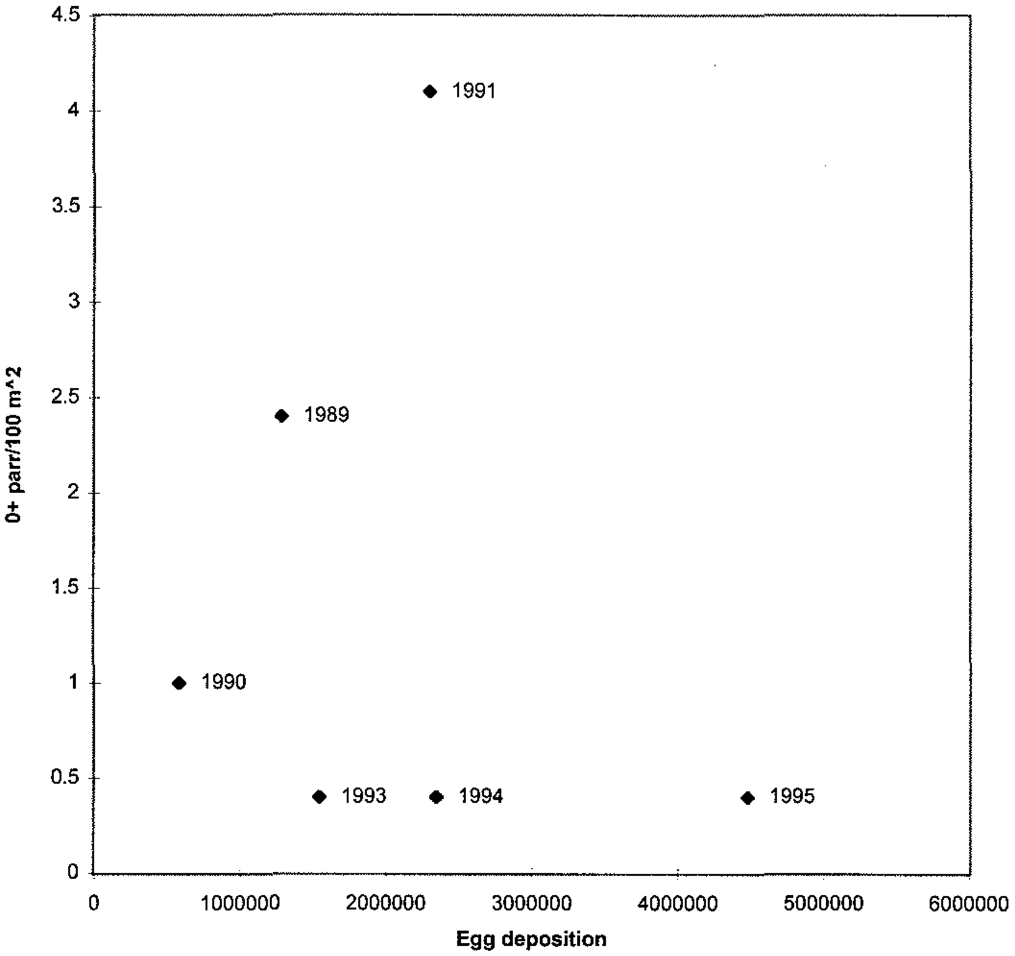
Figure 3.1.2.3.b.2 Continued.

1st Winter Mackerel (Year Class 1995) Nos/Hr Trawled—4th quarter 1995



D

Figure 3.13.11.1 Densities of 0+ salmon parr versus egg deposition in River Vindelälven in hatching years 1989-1995.



REPORT TO THE NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

Source of information: Report of the Working Group on North Atlantic Salmon, April 1996 (ICES Doc. CM 1996/Assess:11).

Sections 1–6 of this report are set out in the order of the questions from NASCO to ICES (Appendix 1).

1 EVENTS OF THE 1995 FISHERIES AND THE STATUS OF STOCKS BY COMMISSION AREAS

1.1 Overview of Catches in the North Atlantic

1.1.1 Nominal catches of salmon in the North Atlantic

Nominal catches of salmon by country in the North Atlantic for 1960-1995 are given in Table 1.1.1 and reported catches by NASCO Commission Areas for 1990–1995 are shown below (in tonnes):

Area	1990	1991	1992	1993	1994	1995
NEAC	3758	2951	3379	3348	3596	3078
NAC	915	713	524	375	358	270
WGC	275	476	242	0	0	68
Total	4948	4140	4136	3723	3954	3416

The catch data for 1995 are provisional and incomplete, but the final figure is unlikely to exceed the 1994 total (Figure 1.1.1). Catches in most countries remain below the averages of the previous 5 and 10 years. Some of the decline in catches in recent years may be accounted for by management plans which have reduced fishing effort in several countries.

1.1.2 Unreported catches of salmon in the North Atlantic

The total unreported catch within the NASCO Commission areas in 1995 was estimated to be 1,050 t, a decrease of 18% compared with 1994 and 38% below the 1990–1994 five-year mean of 1,691 t (Table 1.1.1). No estimate could be made of the unreported catch in international waters in 1995. Estimates for the Commission Areas are given below (in tonnes):

Area	1990	1991	1992	1993	1994	1995
NEAC	1779	1555	1825	1471	1157	942
NAC	111	127	137	161	107	98
WGC	n/a	n/a	n/a	12	12	< 10
International waters	180-350	25-100	25-100	25-100	25-100	n/a

For most countries, information on unreported salmon catches is based upon the local knowledge of fishery managers or bailiffs who are familiar with the fisheries. The values are generally termed 'guess-estimates', indicating that they are not derived from annual surveys of fisheries or analyses of catch data. However, these values are usually supported, in part at least, by observations and survey results. Estimation of the level of landings for local consumption at West Greenland is discussed in Section 1.4.1. Although ICES was unable to evaluate the accuracy of the processes used for developing the estimates of unreported catches, it considered that the data provided represented the best available information. It is important that assessments are based upon estimates of the total fishing mortality and these should therefore be supported by better documentation of unreported catches and continued efforts to achieve full reporting wherever possible.

1.1.3 Production of farmed and ranched salmon in the North Atlantic

The production of farmed salmon in the North Atlantic area in 1995 was 413,200 t. This is the largest production in the history of the farming industry (Figure 1.1.2) and represented a further 26% increase compared to 1994 (326,630 t) and a 61% increase on the 1990–1994 average (256,123 t).

The total production of ranched salmon in countries bordering the North Atlantic in 1995 was 309 t which is the lowest value since 1990. The majority (94%) of the ranching is conducted in Iceland, where it represents about two thirds of the nominal catch.

1.2 Fisheries and Stocks in the North-East Atlantic Commission (NEAC) Area

1.2.1 Fishing in the Faroese area

Gear and effort: In accordance with the agreement between the Faroese Salmon Fishermen's Association and the North Atlantic Salmon Fund, commercial fishing for salmon in Faroese territorial waters was suspended for the years 1991 to 1996. A research fishery for salmon continued to operate in the Faroes area in the 1994/1995 season, and one research vessel fished a total of 49 long-line sets during 5 trips. The gear used was the same as in previous seasons.

Catch: The total catch in the research fishery in the 1994/1995 season was 7 t and the preliminary catch for the calendar year 1995 was 5 t, excluding fish that were tagged and released. The proportion of fish less than 60 cm (which should be discarded in the commercial fishery) was 15.1%, which is at the upper end of the range observed since the 1982/1983 season.

Catch per unit of effort: The mean CPUE for the 1994/1995 season was 36 salmon per 1,000 hooks (Figure 1.2.1). This is the lowest value (equal with 1984/1985) since the 1981/1982 season. However, the CPUE data for the research fishery (since 1991/1992) may not be directly comparable with those for the commercial fishery (prior to 1991/1992).

Origin of the catch: In the 1994/1995 season 20% of the fish were estimated to be of farm origin. This is similar to 1993/1994 (19%) but is much lower than in the 1989/1990 to 1992/1993 seasons (31–46%). Figure 1.2.1 shows the CPUE for past seasons divided into wild fish and farm escapees. This suggests that the high CPUE values in the 1988/1989 to 1992/1993 seasons were due in part to the large numbers of farmed fish in the catch.

External tags and coded wire tags were recovered from countries regularly represented in the tag recovery programmes. As in the past, the highest recapture rates were from releases in Norway and Sweden; recapture rates from other areas were low.

In the 1992/1993 to 1994/1995 fishing seasons, a total of about 5,300 salmon caught on long-line were tagged and released in the open sea north of the Faroes. After three fishing seasons (i.e. 1993–1995) 98 tagged fish have been reported recaptured in 10 countries as shown below:

	Recaptures	
Country	**Total to date**	**%**
Norway	58	59
Scotland	12	12
Ireland	9	9
Russia	5	5
Sweden	5	5
Canada	4	4
Denmark	2	2
England	1	1
Iceland	1	1
Spain	1	1
Total	**98**	**99**

Further tag recoveries are expected, and the recovery data have not been analysed to take account of the age composition or proportion of farmed/reared fish in the tagged groups or weighted for different exploitation rates in homewater fisheries. The results do not therefore quantitatively indicate the origin of the salmon in Faroese waters, although they support earlier information that the majority of salmon in the Faroese area originate from Norway. Between 17% and 33% of the tagged fish were assumed to be of farm origin, and the recapture rate for these fish has been lower than for wild fish.

Exploitation Rates at Faroes: As there has been no commercial fishery, the exploitation rate on all monitored stocks in Faroese waters in 1994/1995 was very low.

1.2.2 Homewater fisheries in the NEAC area

Gear and effort: Minor changes in commercial and recreational salmon fishing effort were reported in 1995, continuing the reduction in commercial fishing effort in the North-East Atlantic area in recent years. These reductions mainly arise from conservation measures in the respective countries and the reduced value of commercially caught salmon.

Catch: Provisional figures suggest that nominal catches of salmon in North-East Atlantic countries in 1995 were at a similar level to, or below those in 1994. The final figures for 1994 were slightly higher than in the previous year but still below the previous 5 and 10 year averages.

CPUE: CPUE varies considerably among fisheries. In UK (Northern Ireland) and UK (England & Wales) levels in 1995 were similar to 1994.

Composition of catch: The proportion of 1SW fish in national catches varied from 58% to over 90%. The lowest proportions of 1SW fish in catches were reported in Norway, Finland and France (rod fishery) and the highest in Ireland, France (net fishery), Iceland and Russia. No significant changes in the 1SW/MSW salmon ratio were reported compared to the previous year. In Norway, the number of 2SW salmon was high following the high proportion of 1SW fish in 1994.

Origin of catch: Ranched fish continue to comprise the majority of the Icelandic catch and some straying is observed into rivers. In Norway, the proportion of farm origin fish in samples from coastal fisheries has increased slightly compared to 1994. Fish farm escapees are also observed at variable levels in coastal and in-river fisheries in UK (Scotland) and in small numbers in catches in Ireland and UK (Northern Ireland).

Exploitation rates: Exploitation rates in homewater fisheries vary considerably among different river stocks. Mean rates (1990–1994) for a small number of monitored stocks range from less than 20% to over 80%. In recent years, exploitation rates on some stocks have declined as a result of reduced fishing effort; however, in some other cases levels of exploitation have been maintained at a high level. Levels of exploitation in 1995 were similar to previous years in most fisheries although in-river exploitation rates were reduced in several rivers in UK, probably due to low river flow conditions.

1.2.3 Status of stocks in the NEAC area

There are well over 1,000 rivers supporting salmon in the NEAC area, but for most of these there is no information on the status of the stocks.

Minimum biologically acceptable levels (MBAL) have been established for 7 river stocks in the NEAC area. As yet, spawning targets have not been established for these stocks.

In three of the stocks, egg deposition exceeded MBAL in 1995 and in a fourth it was within 10% of MBAL. In the remaining three rivers egg deposition was less than 70% of MBAL. Of the five rivers for which data are available for at least 10 years, three exceeded the reference egg deposition level in at least 72% of years while the other two failed to meet their reference levels in at least 77% of the years.

Examination of the general trends suggests that there has been no significant change in smolt production in the North-East Atlantic as a whole. Adult runs in western European rivers appear to be increasing or at least remaining stable, probably due to lower exploitation in recent years.

Survival indices to homewaters for both wild and hatchery-reared 1SW and 2SW stocks showed a downward trend over the past decade. The wild and hatchery-reared 2SW stocks also showed a decrease over the last 5 years.

The implications of these observations for the management of salmon stocks in the NEAC area are discussed in Section 5.

1.2.4 Changes in natural mortality

Natural mortality may be affected by a wide range of factors. Changes in environmental factors and freshwater habitat may cause both short and long-term changes in mortality which may affect stock abundance. Some diseases (e.g. UDN) and parasites (e.g. *Gyrodactylus salaris*) have had significant impacts on some stocks, but they do not generally cause obvious problems. The effects of predators are often difficult to determine. Populations of a number of predators, including seal species and cormorants, are known to have been increasing in recent years, but their effects on salmon populations are not generally known.

Available estimates of the natural mortality throughout the marine phase of the life cycle for European stocks vary from about 70% (River Bush wild salmon) to over 97% (Drammen River hatchery-reared salmon). Levels have been variable and have generally been increasing over the last 5–10 years. Mortality is generally higher on hatchery-reared salmon than wild fish.

1.2.5 Surface trawl surveys in the NEAC area

Scientific surveys using surface trawls in the North-East Atlantic caught significant numbers of post-smolts off north-west Scotland in June 1995 and in the Norwegian Sea in July and August (Figure 1.2.2).

1.2.6 Data deficiencies and research needs for the NEAC area

ICES supports the continuation of the research fishing programme in the Faroes area and recognises that the results from the project will improve the possibility of assessing the stocks in the North-East Atlantic.

Norwegian scientists have obtained important preliminary information on the distribution of post-smolts in the North-East Atlantic area. Continued and enhanced efforts should be made by all parties to provide more information on post-smolt biology.

Methods are required for establishing the appropriate level of spawning escapement targets related to management objectives.

Spawning reference levels and escapement targets have to be developed for the majority of salmon rivers in the NEAC area as soon as possible in order to advance the development of catch advice. To facilitate this, more information is required on juvenile production in rivers based on fry/parr surveys and smolt counting. More effort is also needed in quantifying habitat types in order to extrapolate spawning targets derived from rivers which have established stock and recruitment relationships to rivers where this information is not available.

Further work should be conducted on methods to discriminate farm origin and reared salmon in catches, with particular reference to the use of intra-abdominal lesions.

Information on fishing effort should be collected in more fisheries in order to develop time series of CPUE data for use in assessing stock status.

Reporting systems should be improved to cover all catches and estimates of presently unreported catches should be improved for all fisheries, particularly those in home waters. Every effort should also be made to instigate a surveillance programme to provide reliable estimates of the fishing effort for salmon in international waters and information should be obtained on by-catches of post-smolts in the surface trawl fisheries in the Norwegian Sea.

The estimates of pre-fishery abundance of maturing and non-maturing 1SW salmon in the NEAC area should be improved and possible relationships with environmental and biological (e.g. predation) variables should be investigated.

1.3 Fisheries and Stocks in the North American Commission (NAC) Area

1.3.1 Fisheries in the NAC area

Canada

Gear and effort: Restrictions on commercial and recreational fisheries introduced in Canada in 1992 remained in force. In addition, further regulations were introduced in Labrador: in the commercial fishery the quota was reduced from 92 t to 73.5 t, the opening date was delayed and the season was reduced in length; in the recreational fishery the number of large salmon that could be retained was reduced from 2 to 1.

Catch: The provisional landings for Canada in 1995 were 270 t, a reduction of 24% from 1994 (Table 1.1.1). The landings of small salmon (72,389) and large salmon (33,224) represented reductions of 6% and 23% respectively from 1994. First Peoples' landings were 78% of their 1994 landings and 10% below the previous 5 year mean. The recreational landings totalled 65,862 small and large salmon, the second lowest total recorded since 1974. The commercial landings in Labrador and Quebec declined to less than 100 t in 1995 from a peak of more than 2,400 t in 1980. The increased restrictions were partly responsible for the reduction in catches.

Composition and origin of catch: No tagged fish of USA origin were reported from Canadian fisheries in 1995.

Returns to the majority of rivers in Newfoundland and Labrador comprised exclusively wild salmon. Hatchery origin fish were most abundant in returns to rivers in the Bay of Fundy and the Atlantic coast of Nova Scotia.

Aquaculture escapees were found in samples from a number of rivers in the Bay of Fundy, in the Conne River, Newfoundland, and in at least one river from Cape Breton. Approximately 90% of the salmon caught in the Macaguadavic River were of aquaculture origin in 1995.

USA

The retention of sea-run Atlantic salmon was prohibited in 1995 (from 9 June in the State of Maine) and the sport fishery was restricted to catch and release. As a result there were no landings of salmon. A total of 370 salmon were caught and released, a 41% increase over 1994.

France (Saint-Pierre and Miquelon Island)

The harvest of salmon by commercial nets was 414 kg. No estimate of the harvest by recreational nets is available.

1.3.2 Status of stocks in the NAC area

The North American Run-Reconstruction Model was used to update the estimates of pre-fishery abundance of non-maturing and maturing 1SW salmon from 1971–1995. The 1994 estimate of pre-fishery abundance of non-maturing 1SW salmon was the lowest on record (Figure 1.3.1). The 1995 estimate of pre-fishery abundance of maturing 1SW salmon is slightly below that of 1994 and the lowest on record. The results suggest at best a levelling off of a decline to historical low levels. In addition to the steady decline in recruits over the last 10 years, there has been a steady increase in the proportion of the North American stock maturing as 1SW fish. This proportion has risen from about 45% at the beginning of the 1970s to around 70% in the last three years.

The estimate of the total number of 1SW salmon returning to Labrador and Newfoundland rivers and coastal waters of other areas of North America in 1995 is slightly lower than the estimate for 1994 and is the fifth lowest observed in the time series, 1971–1995. The estimates of returns were quite variable before 1988 and subsequently declined to the 1995 level. The estimate of 2SW returns is slightly above the estimates for 1993 and 1994 but well below levels in the 1970s (Figure 1.3.2).

The rank of the estimated returns in 1995 in the 1971–1995 time series for six regions in North America is shown below:

Region	Rank of 1995 returns in 1971-95 time series (1=highest)		Estimate of 2SW spawners as proportion of escapement target
	1SW	2SW	(%)
Labrador	18	1	69
Newfoundland	15	11	120
Quebec	14	24	30
Gulf	24	17	105
Scotia-Fundy	23	24	31
USA	17	19	6

In most regions the returns of both 1SW and 2SW fish are near the lower end of the 25 year time series. However, returns of 2SW salmon to Labrador in 1995 were the best in the time series.

The text table above also shows the estimated total spawning escapement of 2SW salmon in each region expressed as a percentage of the spawning escapement target. Only in Newfoundland and the Gulf of St. Lawrence were targets exceeded in 1995. The overall 2SW spawning escapement target for Canada could have been met or exceeded in only 3 of the past 25 years (considering the mid-points of the estimates) (1974, 1977 and 1980). In the remaining years, spawning targets could not have been met even if all in-river harvests had been eliminated.

The majority of the USA returns were recorded in the rivers of Maine, with the Penobscot River accounting for about

76% of the total. Salmon returns to the Penobscot River were 29% higher than the previous year, but were 35% lower than the previous 5-year average and 50% lower than the previous 10-year average.

Egg depositions exceeded or equalled the specific river targets in 22 of the 73 rivers which were assessed in Canada and were less than 50% of target in 22 other rivers. Large deficiencies in egg depositions were noted in the Bay of Fundy and Atlantic coast of Nova Scotia where 10 of the 12 rivers assessed had egg depositions which were less than 50% of target (Figure 1.3.3).

The implications of these observations for the management of salmon stocks in the NAC and WGC areas are discussed in Section 4.

1.3.3 Possible predators and natural mortality of salmon in the NAC area

One cause of natural mortality in the sea is predation, but little is known about levels on salmon stocks. However, there is good evidence that marine mammals, especially seals, prey on salmon at some stage in their life. Grey, harbour, and ringed seals are known predators on salmon and all of these species occur in Canada. In 1993, the Canadian grey seals population was estimated to be 144,000 (82,000 from the Sable Island rookery off Nova Scotia and 62,000 from the Gulf of St. Lawrence) and increasing at 13% and 8% per year in the two areas respectively. The population of grey seals in Maine, USA, has increased from approximately 30 animals in 1980 to between 600–1,200 in recent years.

Various fish species may also prey on salmon in marine areas. The successful striped bass (*Morone saxatilis*) restoration programme along the east coast of the USA has resulted in the possibility of increased predation upon Atlantic salmon smolts.

Studies suggest that cormorants and mergansers may consume substantial numbers of juvenile salmon in New Brunswick, Nova Scotia and Prince Edward Island, at least at some times and places. Cormorants are estimated to have consumed less than 7% of the hatchery-reared smolts stocked in the Penobscot River during the period 1992–1994, and most of the predation occurred in the head ponds of various mainstream hydro dams.

Available estimates of the natural mortality throughout the marine phase of the life cycle for North American stocks vary from around 95% (e.g. Western Arm Brook wild salmon) to over 99% (Penobscot River hatchery-reared salmon). Estimates of natural mortality rates indicate increasing trends in several North American stocks. Mortality rates are generally higher and more variable for hatchery than wild stocks.

1.3.4 Data deficiencies and research needs in the NAC area

Possible reasons for the apparent declines in 2SW returns to SFAs 15–23 and Q1–Q10 need to be evaluated.

Estimates should be developed of total recruits prior to all fisheries for each SFA for which estimates have not been made.

There is a need for improved habitat surveys for rivers in Labrador so that spawner requirements can be developed based on habitat characteristics.

The possible changes in the biological characteristics (mean weight, sex ratio, sea-age composition) of returns to rivers, spawning stocks, and total recruits prior to fisheries should be reviewed. As new information becomes available, estimates of spawning requirements in USA and Canada should be refined by incorporating new information such as on biological characteristics for individual stocks, habitat measurements and stock and recruitment analysis.

Annual estimates of smolt-to-adult salmon survival rates need to be obtained for Labrador, New Brunswick and Nova Scotia.

Sea survival rates of hatchery and wild salmon should be examined to determine if changes in survival of hatchery releases can be used as an index of sea survival of wild salmon.

1.4 Fisheries and Stocks in the West Greenland Commission (WGC) Area

1.4.1 Fishery in WGC area

Catch: After the suspension of the commercial fishery in 1993 and 1994, the salmon fishery at West Greenland (NAFO Sub-area 1) was re-opened for the period 14 August–15 October 1995. However, catches in the first two weeks approached the full quota (77 t) and so the fishery was closed on 1 September. The preliminary nominal catch figure is 68 t (Table 1.1.1) which is the lowest recorded catch since 1960 (excluding the years when fishing was suspended).

There have been no surveys of the landings taken for local consumption in the WGC area. Calculations based on tagging experiments in the Penobscot River, USA, suggest that these landings could be substantially greater than the 10–12 t given in Section 1.1.2, but there are some uncertainties about this analysis. There is therefore a need for independent survey data to support the results and further studies are encouraged.

Gear and effort: Only vessels of less than 42 ft (<12.8 m) were permitted to participate in the commercial salmon fishery in Greenland coastal waters in 1995. The commercial fishery was conducted under quotas, distributed at the community level and assessed through daily licensee reports to the License Control Office. Entry into the fishery was limited to professional fishers or hunters, fishing their own gear (single hook and line; 2,000 knot, 140 mm stretched mesh fixed or drifting gill net of any length) within 40 nautical miles of the west coast or 12 nautical miles of the east coast. Licences for salmon fishing are not issued to vessels with licences for the shrimp fishery.

Fishing for private consumption was restricted to residents of Greenland, using hook and line or a single fixed, 2,000 knot, 140 mm stretched mesh gill net, or a similar 30 fathom drift net, tended daily. Salmon taken by this fishery were not permitted to be sold and were not counted against the quota.

Permits may be issued for tourists to fish with hook only. There is no daily catch limit but the catch may not be sold. Few tourist licences were sold.

Origin of catches: Based on a discriminant analysis of characteristics from scale samples collected in the fishery in 1995 it was estimated that 65% were of North American origin (PropNA) compared with 54% in 1992. This proportion is the second highest in the time series since 1969, and there has been an increasing trend over the period.

Applying the discriminant function to the reported catch indicated that 43 t (17,200 salmon) of North American origin and 25 t (9,250 salmon) of European origin were landed at West Greenland in 1995.

Biological characteristics of the catch: The 1SW salmon of North American origin were significantly shorter and lighter than the European-origin salmon. The 2SW salmon of European-origin were significantly lighter and shorter than the 2SW North American-origin salmon.

The downward trend in mean length of both European and North American 1SW salmon since 1969 continued in 1995. The mean length of European 1SW fish (62.6 cm) was the shortest observed in the 1969–1995 series. The mean length of North American 1SW fish (62.1 cm) was the same as that recorded in 1985, and is the lowest value observed in the series. Similar observations were made for the mean weights of 1SW salmon at West Greenland in 1995.

The proportion of the European origin salmon that were river-age-1 (14.7%) was well below the mean of 20.1% for the period 1969–1995, while the proportion of river-age-3 fish (27.5%) was greater than the mean of 16.8%. This may indicate some change in the stock composition in the area. Proportions of river ages of North American origin salmon were not appreciably different from the 1968 to 1992 means.

1.4.2 Status of stocks in the WGC area

The salmon caught in the West Greenland area are non-maturing 1SW salmon or older, nearly all of which would return to homewaters in Europe or North America as MSW fish if they survived. The European stocks making the greatest contribution to the fisheries in West Greenland are thought to originate from the UK and Ireland.

Returns of the MSW component of most of these stocks to homewaters have declined during the past 5 years (see Section 1.2.3). Similar declines in abundance have been noted in many North American MSW stocks that contribute to the West Greenland fishery (see Section 1.3.2). The overall status of stocks contributing to the West Greenland fishery remains poor, and as a result, the status of stocks within the West Greenland area is thought to be low compared to historical levels.

Stocks originating in North-East Atlantic: There are well over 1,000 rivers supporting salmon in the NEAC area, but for most of these there is no information on the status of the stocks.

Minimum biologically acceptable levels (MBAL) have been established for 7 river stocks in the NEAC area. As yet, spawning targets have not been established for these stocks.

In three of the stocks, egg deposition exceeded MBAL in 1995 and in a fourth it was within 10% of MBAL. In the remaining three rivers egg deposition was less than 70% of the MBAL. Of the five rivers for which data were available for at least 10 years, three exceeded the reference egg deposition level in at least 72% of years while the other two failed to meet their reference levels in at least 77% of the years.

Examination of the general trends suggests that there has been no significant change in smolt production in the North-East Atlantic as a whole. Adult runs in western European rivers appear to be increasing or at least remaining stable, probably due to lower exploitation in recent years.

Survival indices to homewaters for both wild and hatchery reared 1SW and 2SW stocks showed a downward trend over the past decade. The wild and hatchery reared 2SW stocks also showed a decrease over the last 5 years.

Stocks originating in North America: The North American Run-Reconstruction Model was used to update the estimates of pre-fishery abundance of non-maturing and maturing 1SW salmon from 1971–1995. The 1994 estimate of pre-fishery abundance of non-maturing 1SW salmon was the lowest on record (Figure 1.3.1). The 1995 estimate of pre-fishery abundance of maturing 1SW salmon is slightly below that of 1994 and the lowest on record. The results suggest at best a levelling off of a decline to historical low levels. In addition to the steady decline in recruits over the last 10 years, there has been a steady increase in the proportion of the North American stock maturing as 1SW fish. This proportion has risen from about 45% at the beginning of the 1970s to around 70% in the last three years.

The estimate of the total number of 1SW salmon returning to Labrador and Newfoundland rivers and coastal waters of other areas of North America in 1995 is slightly lower than the estimate for 1994 and is the fifth lowest observed in the time series, 1971–1995. The estimates of returns were quite variable before 1988 and subsequently declined to the 1995 level. The estimated 2SW returns are slightly above the returns for 1993 and 1994 but well below levels in the 1970s (Figure 1.3.2).

The rank of the estimated returns in 1995 in the 1971–1995 time series for six regions in North American is shown below:

Region	Rank of 1995 returns in 1971-95 time series (1=highest)		Mid-point estimate of 2SW spawners as proportion of escapement target
	1SW	2SW	(%)
Labrador	18	1	69
Newfoundland	15	11	120
Quebec	14	24	30
Gulf	24	17	105
Scotia-Fundy	23	24	31
USA	17	19	6

In most regions the returns of both 1SW and 2SW fish are near the lower end of the twenty five year time series. However, returns of 2SW salmon to Labrador in 1995 were the best in the time series.

The text table above also shows the estimated total spawning escapement of 2SW salmon in each region expressed as a percentage of the spawning escapement target. Only in Newfoundland and the Gulf of St. Lawrence were targets exceeded in 1995. The overall 2SW spawning escapement target for Canada could have been met or exceeded in only 3 of the past 25 years (considering the mid-points of the estimates) (1974, 1977 and 1980). In the remaining years, spawning targets could not have been met even if all in-river harvests had been eliminated.

The majority of the USA returns were recorded in the rivers of Maine, with the Penobscot River accounting for about 76% of the total. Salmon returns to the Penobscot River were 29% higher than the previous year, but were 35% lower than the previous 5-year average and 50% lower than the previous 10-year average.

Egg depositions exceeded or equalled the specific river targets in 22 of the 73 rivers which were assessed in Canada and were less than 50% of target in 22 other rivers. Large deficiencies in egg depositions were noted in the Bay of Fundy and Atlantic coast of Nova Scotia where 10 of the 12 rivers assessed had egg depositions which were less than 50% of target (Figure 1.3.3).

1.4.3 Data deficiencies and research needs in the WGC area

The mean weights, sea ages and proportion of fish originating from North America and Europe are essential parameters used by ICES to provide catch advice for the West Greenland fishery. It should be emphasized that these parameters have changed in the past and thus that they should be updated with new data periodically to ensure the greatest possible accuracy in the quota calculation.

Efforts should be made to improve the annual estimates of the harvest of salmon taken for local consumption at West Greenland.

2 RECENT RESEARCH DEVELOPMENTS

2.1 Possible Explanations for Changes in Sea-Age at Maturity

The sea-age at which each salmon becomes sexually mature is determined by both genetic and environmental factors. In a biological context, environment is defined to include all sources of non-genetic variation affecting growth, development and sexual maturity. Effects evident in the fisheries or among spawners may be caused by factors affecting the fish at any earlier stage.

In many populations and stocks males are more prevalent among 1SW fish than females and females predominate in the older classes.

Assessing the relative importance of environmental or genetic effects on sea-age at maturity in natural stocks or populations is difficult because the effects are not independent. Complex patterns of variation may result from interactions between factors at different stages of the life-cycle.

The relatively large estimates of heritability in aquaculture fish strongly suggest that a substantial genetic component is likely to exist for sea-age at maturity in all salmon - including wild salmon in natural environments.

The physical environment is likely to affect sea-age at maturity mainly through somatic growth which in turn affects the events that lead to sexual development. Growth and development in each successive phase of life is partly related to the outcome of earlier phases. Indeed, sea-age at maturity may be affected by juvenile development

The sexes differ in their tendency to become mature at particular ages in fresh water and in the sea. Many males become sexually mature as parr. Parr maturity is associated with additional natural mortality that causes the sex ratio among smolts to be biased in favour of females.

Fisheries that occur at particular times of year or that are size selective may select fish of a particular sea-age. Because of the genetic component in sea-age at maturity this will also alter the genetic composition of populations at spawning. The genetic make up of the next generation can therefore be affected by fisheries. The magnitude of these changes will be related to the intensity of the fisheries, the extent of the bias of fishery mortality on the different sea-age classes and the magnitude of the genetic effect being expressed in sea-age at maturity.

2.2 Criteria for Defining Salmon Stocks

The salmon's homing behaviour results in relatively closed groups of individuals returning to reproduce in their natal rivers. Within any given river, subgroups may also develop (e.g. within tributaries). Natural selection acts to adapt the stocks to the conditions they will face in the home river and along their migration routes, and they become the best equipped to survive and reproduce. The subgroups which occur within the same river system are best described as 'Mendelian populations'.

There is a need to define management units encompassing one or more such populations as a practical basis for fishery management while still helping to ensure the conservation of the contributing populations. These units may be termed "stocks" and should be defined by managers after considering the following criteria *(No attempt has been made to prioritise these concerns)*:

1. The number and size of populations in the fishery area - (i.e. the more populations, the greater the risk of over-exploiting any individual population).
2. The proportion of fish from each population in the area - (i.e. this will affect the relative levels of exploitation on each population).
3. The number of fish in each population required to meet spawning targets - (i.e. more productive stocks or stocks experiencing less natural mortality can be exploited more heavily).
4. The proposed levels of exploitation on each population - (i.e. at high exploitation rates, smaller stock units are required to protect individual populations).
5. The percent of catches that are expected to be taken in mixed stock fisheries in distant and homewaters, and/or in-river fisheries (i.e. if a lower percentage of the total catch is taken in mixed stock fisheries, then larger stock units may be used).
6. Population structures and distribution (i.e. populations with greater temporal and spatial distribution are less vulnerable to the risk of extinction caused by local changes in natural or fishing mortality).
7. The probability of making management errors due to unanticipated or unavoidable events (e.g. errors in assessments, unpredictable shifts in environmental conditions, etc.).
8. Jurisdictional considerations (e.g. competing claims for resource use, problems in mounting effective enforcement).

2.3 A New Method for Identifying Reared Salmon

In Norway more than 90% of the farmed salmon are vaccinated as pre-smolts using intra-peritoneal injections of oil adjuvanted vaccines. A Norwegian study has shown that intra-peritoneal vaccination in commercial rearing produces a visible marker permitting simple and rapid discrimination of farmed and wild salmon on internal examination. This could be a valuable method for estimating the contribution of reared fish to fisheries and stocks.

2.4 Use of Strontium: Calcium Ratios in Otoliths to Determine Maturation Status

Elements may be differentially deposited in the otoliths of salmon during their life in response to changes in environmental variables such as temperature and salinity or physiological mechanisms, such as growth and maturation. In the case of maturation, chemical composition of otoliths may reflect sexual readiness and spawning events and thus provide a record of the variation that occurs between individuals and populations.

Salmon caught in Greenland were found to have declining strontium:calcium ratios in the outer zones of their otoliths. The ratios for immature fish suggested that sexual readiness was achieved during the feeding migration and that maturation regression occurred in the absence of cues to begin a spawning migration. Maturing fish were found to have similar Sr:Ca ratios to the immature fish of the same stock during the post-smolt period. A hypothesis has been developed that post-smolts that make a northerly migration after their first sea winter are influenced by environment not to mature as 1SW fish.

3 EVALUATION OF THE EFFECTS OF SOME MANAGEMENT MEASURES ON THE STOCKS AND FISHERIES OCCURRING IN THE RESPECTIVE COMMISSION AREAS

3.1 Quota Management and Closures Implemented after 1991 in the Canadian Commercial Salmon Fisheries

Newfoundland: The effect of the five-year moratorium on the commercial salmon fishery in insular Newfoundland in 1992 was evaluated by estimating the number of fish that would not have returned if the measures had not been taken. These estimates are summarised below:

	Total returns		Salmon saved due to closure	
Year	**Small salmon**	**Large salmon**	**Small salmon**	**Large salmon**
	(,000)	(,000)	(,000)	(,000)
1992	116-232	16-32	58-116	11-22
1993	131-262	8-16	66-131	6-11
1994	95-191	8-16	48-92	6-11
1995	111-224	9-18	56-112	6-13

There were significant increases in returns of small and large salmon in SFAs 4, 5, and 14A in years since the moratorium, 1992–1995, compared with the pre-moratorium period. For southern SFAs (SFAs 9–11) returns of small and large salmon decreased in three rivers and increased in three rivers. These results imply that southern stocks may not have benefited by the closure of the fisheries to the same extent as northern stocks. However, other factors such as natural mortality may have contributed to the decline in returns. The proportion of large salmon increased at all monitoring facilities in SFAs 4, 5, 10, 13, and 14A; however, decreases in this proportion were observed in three of the four rivers in SFAs 9 and 11.

Smolt to adult survival rates increased for several rivers, which is consistent with a decline in marine fishing mortality.

Labrador: Changes in the exploitation rates in the commercial fishery in Labrador since 1992 have been estimated, based on the reduction in fishing effort (indexed by number of fishing licences) and assumed levels of exploitation in 1991:

Year	Exploitation rate Small salmon	Exploitation rate Large salmon
1991	0.3 - 0.5	0.7 - 0.9
1992	0.22 - 0.39	0.58 - 0.83
1993	0.13 - 0.25	0.38 - 0.62
1994	0.1 - 0.2	0.25 - 0.43
1995	0.08 - 0.15	0.1 - 0.33

Levels of exploitation on salmon returning to the Sandhill River (SFA 2) have been observed to have declined in 1994 and 1995 compared with the early 1970s as a result of various changes in the fisheries, as shown below:

	Exploitation rate	
	1970–1973	1994–1995
Small salmon	0.62	0.12
Large salmon	0.95	0.45

These reductions in exploitation rates in Labrador would imply that the returns to the rivers in 1993–1995 were two to three times greater than would have occurred if there had been no management changes.

The effect of the shortened season on salmon landings in Labrador in 1995 was estimated by examining the temporal pattern of catches in 1993–1994. The estimated reductions are summarised below:

SFA	Reduction in landings resulting from shortened season			
	Small salmon		Large salmon	
	%	t	%	t
1	0.8 %	<1	91.5	< 1
2	19.1 %	2	52.0	27
14B	16.1 %	<1	50.8	1

Thus, the shorter 1995 commercial salmon fishing season in Labrador may have resulted in a reduction in landings of 1,026 small salmon (2.2 t) and 7,485 large salmon (29.4 t), an overall reduction in landings of 36%.

Quebec: The closure of the commercial fishery on the Quebec North Shore fishery in 1994 is estimated to have resulted in 86–121 small salmon and 866–1103 large salmon not being caught, assuming that exploitation rates in 1995 would have been the same as in 1990–1992, if there had been no management change.

Other Areas: Although the Newfoundland and Labrador commercial salmon fisheries used to harvest small and large salmon with origins in Nova Scotia, New Brunswick, Quebec, and USA, increases in returns to these provinces cannot be quantified. The estimates of returns of 2SW salmon to SFAs 19–23, Q1–Q11, and USA from 1992–1995 are lower than the returns in 1987–1991 which is inconsistent with a reduction in marine fishing mortality.

3.2 Suspension of Commercial Fishing Activity at the Faroes Since 1991

Since 1991, the Faroese fishermen have agreed to suspend commercial fishing for the salmon quota set by NASCO in exchange for compensation payments. The number of fish saved from the fishery is estimated by subtracting the numbers of fish killed in the research fishery from the number that are expected to have been killed if the commercial fishery had operated. The increase in returns to all homewaters is then estimated by subtracting the fish that would have died on their homeward migration. The great majority of these would be expected to return to European rivers although a small number of salmon tagged in the fishery have returned to North America. The expected catch in the Faroese fishery was estimated to be equal to the mean catch in the 1988/1989 to 1990/1991 seasons, a slightly different approach to that used in the ICES advice to NASCO in 1995. The estimates of the increased returns to homewaters in Europe for the years 1992–1995 are shown below:

Year	Increased returns to homewaters in Europe	
	1SW	MSW
1992	1,618	40,327
1993	5,852	55,466
1994	9,967	64,207
1995	6,412	67,936

In addition, nearly 90,000 escaped farmed fish are expected to have been saved from the Faroes fishery over the four seasons of the suspension. It is not known whether these fish will have returned to the areas from which they escaped.

The numbers of 1SW fish saved is very small and will have increased returns to all European rivers by less than 1%. The expected increase in returns of MSW salmon will have increased from 2–5% in 1992 to 5–10% in 1995. However, the majority of these fish are believed to have returned to Scandinavia, Finland and Russia (perhaps 75%). The estimated increase in the number of returns to these countries is therefore as summarised below:

Year	Estimated proportion of MSW salmon returning to Scandinavia, Finland and Russia derived from suspension of Faroes fishery	
	number	%
1992	30,245	3 - 7 %
1993	41,600	5 - 9 %
1994	48,155	7 - 13 %
1995	50,952	7 - 14 %

Although the additional returning fish are expected to have contributed to catches and spawning stocks, it appears that any increase in catches has been too small to be detected as a statistically significant change above the normal annual variation or has been masked by other factors such as reduced marine survival or reduced exploitation rates in homewaters.

3.3 Suspension of Commercial Fishing Activity During 1993 and 1994 at West Greenland

The fishermen at West Greenland suspended commercial salmon fishing in 1993 and 1994 in accordance with an agreement between the Organisation of Hunters and Fishermen in Greenland and the North Atlantic Salmon Fund, although a small subsistence fishery was allowed to continue. The number of salmon saved from the fishery as a result of the 213 t and 157 t quotas not being taken in the West Greenland fishery in 1993 and 1994 is estimated from the quotas and the means weights of fish in the fishery. This number is adjusted to take account of non-catch fishing mortality and then divided into North American and European groups using the proportions obtained from the sampling programme. The increase in returns to homewaters in 1994 and 1995 is estimated by subtracting the fish that would have died on their homeward migration and is shown below:

	Increased returns of MSW salmon	
Year	N America	Europe
1994	44,524	37,928
1995	33,236	28,312

The estimates provided by ICES in 1995 were smaller than this because they only included 2SW fish and did not take account of non-catch fishing mortality.

The additional returns of 2SW salmon to North America represented 30–52% of the total estimated returns of 2SW fish in 1994 and 21–38% in 1995.

The results of smolt tagging experiments conducted over the past 25 years and adult tagging studies in the early 1970s suggest that the majority of the European fish would have returned to rivers in southern Europe. Assuming that all of the saved wild European salmon returned to Southern European countries (UK, Ireland, France and Spain) they will have represented about 5–10% of the returns of MSW fish in 1994, and 4–9% in 1995.

Although the additional returning fish are expected to have contributed to catches and spawning stocks, it appears that any increase in catches has been too small to be detected as a statistically significant change above the normal annual variation or has been masked by other factors such as reduced marine survival or reduced exploitation rates in homewaters.

4 MANAGEMENT CONSIDERATIONS FOR THE NORTH AMERICAN AND WEST GREENLAND COMMISSION AREAS

Management advice for salmon stocks in the NAC and WGC areas is based upon spawning escapement targets to provide optimum smolt production.

4.1 Review of Age Specific Target Spawning Levels in Canadian Rivers

The revised 2SW spawning escapement target for the whole of North America is 180,495, a decrease of 3% from the previous estimate (186,486). The target number of 2SW spawners for Canada has been revised to 151,296 on the basis of an extensive review of the best available information. This represents a marginal decrease (4%) from the target of 157,287 used in 1995. Most (84%) of the 2SW North American target spawner escapement arises from rivers in Canada.

A theoretical analysis of the probabilities of achieving female spawning escapement for different stock sizes and stock complexes was also examined. To reduce the risk of female spawner under-escapement, more fish must be released, the additional releases being a relatively decreasing proportion of the target escapement level for the river as the size of the stock (target number of fish) increases.

A similar analysis shows the effect of treating North American salmon as a single stock or as 6 or 24 stocks. The total spawning escapement required to have a 50% probability of achieving the female spawning target is 180,495 (equal to the target). If North American salmon are treated as 24 stocks (corresponding to the fishing areas in Canada plus USA) this number increases to 188,500 assuming all stocks were producing to their potential.

Consideration should therefore be given to the number of distinct stocks used to develop the catch advice for mixed stock fisheries.

4.2 Development of Catch Options with an Assessment of Risks Relative to the Objective of Achieving Target Spawning Escapement

Pre-fishery abundance forecast

ICES addressed the concern expressed previously that in the forecast model used in 1995 all of the residual values since 1988 had been negative, indicating that the actual values would be considerably lower than those predicted. ICES also wished to include a biological component in the model which was hitherto simply a regression model with a single environmental variable.

A revised model was developed which includes an index of potential smolt production from Canada. The index is based on the number of spawners in the years contributing to the smolt run in each region, weighted according to the mean age composition of the smolts produced in that region. Data for spawners from the Gulf of St. Lawrence region were not included. The spawning escapement in this region has exceeded the target level in recent years and variation in the numbers of spawners above this level would not be expected to affect smolt recruitment. Thermal habitat data for February alone have been used because this gives the lowest residuals in recent years. Although the new model still tends to overestimate the pre-fishery abundance in recent years (Figure 4.2.1, Table 4.2.1), the residuals from 1988–1994 were smaller and the R^2 slightly higher than those obtained from the 1995 model formulation.

The forecast estimate of pre-fishery abundance of non-maturing 1SW North American salmon for 1996 based on this model is 178,099. The probabilities that the 1995 forecasts are less than a particular value were estimated and are shown in Table 4.2.2.

Development of catch options for 1996

The procedure for estimating the quota for West Greenland is summarised in Appendix 2. In addition to the estimate of pre-fishery abundance, this calculation requires estimates of the proportion of the stock at West Greenland which is of North American origin [PropNA], mean weights of North American and European 1SW salmon [WT1SWNA and WT1SWE, respectively], and a correction factor for the expected sea age composition of the total landings [ACF]. Exponential smoothing model forecasts for 1996 utilising data collected during the 1995 fishery and using interpolated values for 1993 and 1994, with approximate 50% confidence limits, are summarised below.

Parameter	Forecast	Minus 1SE	Plus 1SE
PropNA	0.592	0.506	0.678
WT1SWNA	2.420	2.268	2.572
WT1SWE	2.620	2.430	2.810
ACF	1.133	1.030	1.236

Greenland quota levels for the forecast of pre-fishery abundance were computed with the revised model and are shown in Table 4.2.3 for different probable abundance levels and varying proportions of the harvestable surplus taken at West Greenland.

The 50% risk level is intended to produce spawning escapements in North America that will meet the summed target levels for all rivers 50% of the time. Even if this overall target is achieved (estimated to be a 50% probability), it is likely that some stocks will fail to meet their individual target spawner requirements while others will exceed target levels. This may result from random variation between years or from systematic differences in the patterns of exploitation on fish from different rivers or regions. In the latter case, adoption of a 50% probability level may result in some stocks failing to meet target levels over an extended period if the full TAC is harvested. This would be likely to result in the long-term decline in those stocks.

The table indicates that even with a zero TAC on non-maturing 1SW salmon the overall spawning target for North America 2SW salmon is not expected to be met.

Catch advice

It is evident from indicators of stock status, including the current and predicted estimates of pre-fishery abundance, that the North American stock complex is in a tenuous condition. We are observing record low abundance despite almost complete closures of mixed and single stock fisheries, a continuing trend of below target spawning escapements for 2SW salmon, and some of the lowest marine survival rates for monitored stocks. If catch quotas are set as in 1995, by selecting the risk neutral level, the TAC will be zero. **ICES recommends that fishing mortality on salmon in the West Greenland and North American Commission areas should be reduced to the lowest possible level; and that there should be no landings of salmon from the West Greenland Commission area in 1996 and no landings of salmon from the North American Commission area in 1996 and 1997 except for in-river harvests from stocks in individual rivers which are above biologically-based escapement targets.**

5 MANAGEMENT CONSIDERATIONS FOR THE NORTH-EAST ATLANTIC COMMISSION AREA

Management advice for salmon stocks in the NEAC area is currently based partly upon estimates of the minimum biologically acceptable level for a number of stocks. Spawning escapement targets for management have not been specified.

5.1 Estimates of Age Specific Spawning Reference Levels and Spawning Escapement Targets

In Section 1.2, data are presented on 7 rivers for which reference spawning levels have been established in the NEAC area. Reference levels are being developed and should be available for all rivers in a number of countries in the next 1–3 years. However, little progress is being made in some other countries. **ICES recommends that if spawning escapement targets are to be used to develop management advice on the same basis as that derived for the North American stock all countries should establish preliminary spawning targets for all their rivers as soon as possible.**

5.2 Development of Catch Options

Pre-fishery abundance estimates for the NEAC area

ICES revised and extended the preliminary estimates of the pre-fishery abundance of maturing and non-maturing 1SW salmon in the NEAC area prepared in 1995. Figures 5.2.1–5.2.4 show the range of estimates of the pre-fishery abundance of maturing and non-maturing 1SW salmon in the NEAC area for the period 1970 to 1994 for northern and southern European stocks as defined below:

Southern European countries:	Northern European countries:
Ireland	Iceland
France	Finland
UK (England & Wales)	Norway
UK (Northern Ireland)	Russia
UK (Scotland)	Sweden

Overall it appears that both maturing and non-maturing components of the Southern European group have declined, with the non-maturing component declining more rapidly (Figures 5.2.1 and 5.2.2). These stocks are probably at their lowest level in the last 25 years. The maturing 1SW component from Northern European countries has remained relatively stable, although abundance may have been reduced in 1978 and 1982 rapidly (Figures 5.2.3 and 5.2.4). The non-maturing 1SW component appears to have declined in 1977, then increased rapidly to 1980 and declined again thereafter, probably to its lowest level in 25 years.

Relationship between thermal habitat and pre-fishery abundance of European stocks

ICES conducted an exploratory analysis of the effect of thermal habitat on the southern European non-maturing 1SW stock component. The area of 6 to 8°C water between Iceland and Greenland (29°W to 51°W) in the winter months was well correlated with the pre-fishery abundance (Figure 5.2.5). The regression line between abundance and habitat reveals a strong positive relationship with reasonable confidence limits on the regression (Figure 5.2.6). This relationship is remarkably similar to that observed for the North American non-maturing stock complex. However, there are a number of statistical issues that need to be addressed before these data can be applied in predictive models.

Catch advice

In view of the apparent decline in pre-fishery estimates to the lowest levels historically observed for maturing and non-maturing 1SW salmon in Southern European countries, non-maturing 1SW salmon in Northern European countries and near-lowest levels for maturing 1SW salmon in Northern Europe, it appears that these stocks in aggregate may be below minimum biologically acceptable levels (MBAL). The tenuous condition of these stocks is reinforced by downward trends in indices of survival from smolts to homewaters for wild and reared 1SW and 2SW stock components over the past decade and an increase in the proportion of maturing 1SW fish in the fisheries. These conditions are similar to those of North American stocks. **ICES recommends that, except for in-river fisheries on stocks in individual rivers which are above MBAL, measures should be introduced to reduce fishing mortality and increase escapement of salmon in the North-East Atlantic, especially for that component which spawns as multi-sea-winter fish.**

6 COMPILATION OF TAG RELEASE AND FINCLIP DATA FOR 1995

Data on releases of tagged and finclipped salmon in 1995 were provided by ICES and will be compiled as a separate report. In 1995, a total of just over 3.35 million salmon were marked and released, a substantially lower number than in 1994 (4.42 million). Most marks were applied to reared parr and smolts (3.27 million) and with only small numbers of wild parr and smolt (0.065 million) and adult fish (0.021 million) being marked.

APPENDIX 1

DECISION OF THE COUNCIL OF NASCO TO REQUEST SCIENTIFIC ADVICE FROM ICES

1) With respect to Atlantic salmon in each Commission area:

   a) describe the events of the 1995 fisheries,

   b) describe the status of the stocks and, where appropriate, evaluate the causes for any changes in salmon abundance with special reference to changes in natural mortality,

   c) identify data deficiencies and research requirements relevant to the management of salmon stocks;

2) Report on significant research developments which might assist NASCO with the management of salmon stocks, with special reference to:

   a) possible explanations for changes in sea-age at maturity of Atlantic salmon,

   b) the criteria for defining salmon stocks;

3) Update the evaluation of the effects of the following measures on the stocks and fisheries occurring in the respective Commission areas:

   a) quota management and closures implemented after 1991 in the Canadian commercial salmon fisheries,

   b) the suspension of commercial fishing activity at the Faroes since 1991,

   c) the suspension of commercial fishing activity during 1993 and 1994 at West Greenland;

4) With respect to the fishery in the West Greenland Commission area:

   a) review the age specific target spawning levels in Canadian rivers,

   b) provide catch options with an assessment of risks relative to the objective of achieving target spawning escapement;

5) With respect to fisheries and stocks in the North-East Atlantic Commission area:

   e) provide estimates of age specific spawning targets,

   f) provide catch options with an assessment of risks relative to the objective of achieving target spawning escapement;

6) With respect to Atlantic salmon in the NASCO area, provide a compilation of microtag, finclip and external tag releases by ICES Member Countries in 1995.

APPENDIX 2

COMPUTATION OF CATCH ADVICE FOR WEST GREENLAND

The North American Spawning Target (SpT) for 2SW salmon has been revised to 180,495 fish in 1996.

This number must be divided by the survival rate for the fish from the time of the West Greenland fishery to their return of the fish to home waters (11 months) to give the Spawning Target Reserve (SpR). Thus:

Eq. 1. $SpR = SpT * (\exp(11*M)$ (where $M = 0.01$)

The Maximum Allowable Harvest (MAH) may be defined as the number of non-maturing 1SW fish that are available for harvest. This number is calculated by subtracting the Spawning Target Reserve from the pre-fishery abundance (PFA).

Eq. 2. $MAH = PFA - SpR$

To provide catch advice for West Greenland it is then necessary to decide on the proportion of the MAH to be allocated to Greenland (f_{NA}). The allowable harvest of North American non-maturing 1SW salmon at West Greenland NA1SW) may then be defined as

Eq. 3. $NA1SW = f_{NA} * MAH$

The estimated number of European salmon that will be caught at West Greenland (E1SW) will depend upon the harvest of North American fish and the proportion of the fish in the West Greenland fishery that originate from North America [PropNA] [1]. Thus:

Eq. 4. $E1SW = (NA1SW / PropNA) - NA1SW$

To convert the numbers of North American and European 1SW salmon into total catch at West Greenland in metric tonnes, it is necessary to incorporate the mean weights (kg) of salmon for North America [WT1SWNA][1] and Europe [WT1SWE][1] and age correction factor for multi-sea winter salmon at Greenland based on the total weight of salmon caught divided by the weight of 1SW salmon [ACF][1] . The quota (in tonnes) at Greenland is then estimated as

Eq. 5. $Quota = (NA1SW * WT1SWNA + E1SW * WT1SWE) * ACF/1000$

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[1] New sampling data from the 1995 fishery at West Greenland were used to update the forecast values of the proportion of North American salmon in the catch (PropNA), mean weights by continent [WT1SWNA, WT1SWE] and the age correction factor [ACF] in 1996.

Table 1.1.1 Nominal catch of SALMON by country (in tonnes round fresh weight), 1960-1995. (1995 provisional figures).

Year	Canada (1)	Den.	Faroes	Finland	France	East Grld.	West Grld. (2)	Iceland	Ireland (3, 4)	Norway (5)	Russia	Spain (6)	St. P. & M.	Sweden (West)	UK (E & W)	UK N.Ireland (4,7)	UK (Scotland)	USA	Other (8)	Total Reported Catch	Unreported catches: NASCO Areas	Unreported catches: International waters (9)	Total Catch
1960	1636	-	-	-	-	-	60	100	743	1659	1100	33	-	40	283	139	1443	1	-	7237	-		-
1961	1583	-	-	-	-	-	127	127	707	1533	790	20	-	27	232	132	1185	1	-	6464	-		-
1962	1719	-	-	-	-	-	244	125	1459	1935	710	23	-	45	318	356	1738	1	-	8673	-		-
1963	1861	-	-	-	-	-	466	145	1458	1786	480	28	-	23	325	306	1725	1	-	8604	-		-
1964	2069	-	-	-	-	-	1539	135	1617	2147	590	34	-	36	307	377	1907	1	-	10759	-		-
1965	2116	-	-	-	-	-	861	133	1457	2000	590	42	-	40	320	281	1593	1	-	9434	-		-
1966	2369	-	-	-	-	-	1370	106	1238	1791	570	42	-	36	387	287	1595	1	-	9792	-		-
1967	2863	-	-	-	-	-	1601	146	1463	1980	883	43	-	25	420	449	2117	1	-	11991	-		-
1968	2111	-	5	-	-	-	1127	162	1413	1514	827	38	-	20	282	312	1578	1	403	9793	-		-
1969	2202	-	7	-	-	-	2210	133	1730	1383	360	54	-	22	377	267	1955	1	893	11594	-		-
1970	2323	-	12	-	-	-	2146	195	1787	1171	448	45	-	20	527	297	1392	1	922	11286	-		-
1971	1992	-	-	-	-	-	2689	204	1639	1207	417	16	-	18	426	234	1421	1	471	10735	-		-
1972	1759	-	9	32	34	-	2113	250	1804	1568	462	40	-	18	442	210	1727	1	486	10955	-		-
1973	2434	-	28	50	12	-	2341	256	1930	1726	772	24	-	23	450	182	2006	2.7	533	12770	-		-
1974	2539	-	20	76	13	-	1917	225	2128	1633	709	16	-	32	383	184	1708	0.9	373	11957	-		-
1975	2485	-	28	76	25	-	2030	266	2216	1537	811	27	-	26	447	164	1621	1.7	475	12236	-		-
1976	2506	-	40	66	9	<1	1175	225	1561	1530	772	21	2.5	20	208	113	1019	0.8	289	9557	-		-
1977	2545	-	40	59	19	6	1420	230	1372	1488	497	19	-	10	345	110	1160	2.4	192	9514	-		-
1978	1545	-	37	37	20	8	984	291	1230	1050	476	32	-	10	349	148	1323	4.1	138	7682	-		-
1979	1287	-	119	26	10	<1	1395	225	1097	1831	455	29	-	12	261	99	1076	2.5	193	8118	-		-
1980	2680	-	536	34	30	<1	1194	249	947	1830	664	47	-	17	360	122	1134	5.5	277	10127	-		-
1981	2437	-	1025	44	20	<1	1264	163	685	1656	463	25	-	26	493	101	1233	6	313	9954	-		-
1982	1798	-	865	54	20	<1	1077	147	993	1348	354	10	-	25	286	132	1092	6.4	437	8644	-		-
1983	1424	-	678	58	16	<1	310	198	1656	1550	507	23	3	28	429	187	1221	1.3	466	8755	-		-
1984	1112	-	628	46	25	<1	297	159	829	1623	593	18	3	40	345	78	1013	2.2	101	6912	-		-
1985	1133	-	566	49	22	7	864	217	1595	1561	659	13	3	45	361	98	913	2.1	-	8108	-		-
1986	1559	-	530	37	28	19	960	310	1730	1598	608	27	2.5	54	430	109	1271	1.9	-	9274	-		9274
1987	1784	-	576	49	27	<1	966	222	1239	1385	564	18	2	47	302	56	922	1.2	-	8160	2788		10948
1988	1311	-	243	36	32	4	893	396	1874	1076	419	18	2	40	395	114	882	0.9	-	7736	3248		10984
1989	1139	-	364	52	14	<1	337	278	1079	905	359	7	2	29	296	142	895	1.7	-	5900	2277		8177
1990	911	13	315	60	15	<1	274	426	586	930	315	10	2	33	338	94	624	2.4	-	4948	1890	180-350	6838
1991	711	3.3	95	70	13	4	472	505	404	876	215	15	1	38	200	55	462	0.8	-	4140	1682	25-100	5822
1992	522	10	23	77	20	5	237	635	630	867	166	16	1.3	49	186	91	600	0.7	-	4136	1962	25-100	6098
1993	373	9	21	70	16	-	-	656	543	923	140	14	1.8	56	270	83	547	0.6	-	3723	1644	25-100	5367
1994	355	6	6	49	18	-	-	448	817	996	138	15	2.7	44	319	91	649	0	-	3954	1276	25-100	5230
1995 (10)	270	-	5	48	9	-	68	439	712	839	129	9	0.4	37	311	83	457	0	-	3416	1050	n/a	4466
Means																							
1990-1994	574	8	92	65	16	5	328	534	596	918	195	14	2	44	263	83	576	1	-	4180	1691	-	5871
1985-1994	980	-	274	55	21	8	625	409	1050	1112	358	15	2	44	310	93	777	1	-	6008	-	-	7638

1. Includes estimates of some local sales, and, prior to 1984, by-catch.
2. Includes catches made in the West Greenland area by Norway, Faroes, Denm
3. Until 1994, includes only those catches sold through dealers.
4. Catch on River Foyle allocated 50% Ireland and 50% N. Ireland.
5. Before 1966, sea trout and sea charr included (5% of total).
6. Weights estimated from 1994 mean weight. Early years may be underestimates.
7. Not including angling catch (mainly 1SW).
8. Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.
9. Estimates refer to season ending in given year.
10. Includes provisional and incomplete data

Table 4.2.1 Pre-fishery abundance, thermal habitat derived from sea surface temperature data for February, and logged spawners; predicted pre-fishery abundance of non-maturing 1SW North American salmon from H2 and SNLQ spawner model; and residuals (difference between predicted and observed values) from 1978–1996.

Year	Prefishery abundance midpoint	Thermal habitat for February	Lagged spawners	Prefishery abundance from H2 & SNLQ spawners	
				Predicted	Residual
1978	312202	1951	43284	452312	-140110
1979	696631	2058	51166	598639	97992
1980	602723	1823	53198	537571	65152
1981	589035	1912	55314	599527	-10492
1982	491090	1703	54354	507980	-16890
1983	268266	1416	48110	315973	-47707
1984	280453	1257	46603	235863	44590
1985	460860	1410	45202	274574	186286
1986	493787	1688	46360	394755	99032
1987	454006	1627	45536	360720	93286
1988	354961	1698	47060	407930	-52969
1989	284988	1642	50634	434962	-149974
1990	249462	1503	47601	341854	-92392
1991	292418	1357	41742	208075	84343
1992	181756	1381	40228	196728	-14972
1993	139902	1252	45268	216020	-76118
1994	141120	1329	42681	210178	-69058
1995		1310	39431	159294	
1996		1470	36356	178099	
Average 1988-94	234944			267970	-53029

Table 4.2.2 Probability that the forecast of 1996 pre-fishery abundance of non-maturing 1SW North American salmon is less than a particular level, from H2-SNLQ regression model and probability levels between 25–75%.

Cumulative Density Function %	Forecast
25	119,000
30	136,000
35	149,000
40	163,000
45	175,000
50	190,000
55	202,000
60	217,000
65	229,000
70	244,000
75	259,000

Table 4.2.3 Quota options (in tonnes) for 1996 at West Greenland based on H2-SNLQ regression forecasts of fishery abundance. Proportion at West Greenland refers to the fraction of harvestable surplus allocated to the West Greenland fishery. The probability level refers to the pre-fishery abundance levels derived from the probability density function.

Prob.	Proportion at West Greenland (Fna)										
level	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
25	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	1	1	1	1	2	2	2	2
60	0	7	15	22	30	37	45	52	59	67	74
65	0	13	26	40	53	66	79	92	105	119	132
70	0	20	41	61	81	102	122	142	163	183	203
75	0	28	55	83	110	138	165	193	220	248	275

Sp. res =	201,483
Prop NA =	0.59224
WT1SWNA =	2.42
WT1SWE =	2.62
ACF =	1.133

Figure 1.1.1 Nominal catches of salmon in four North Atlantic regions.

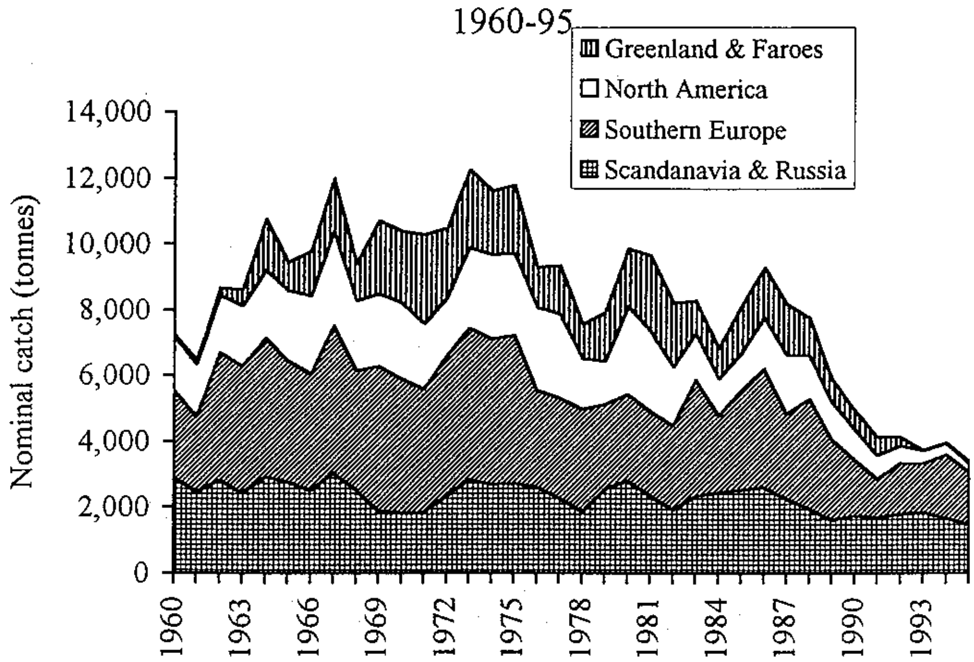


Figure 1.1.2 Production of farmed salmon (tonnes round fresh weight) in the North Atlantic, 1980–1995.

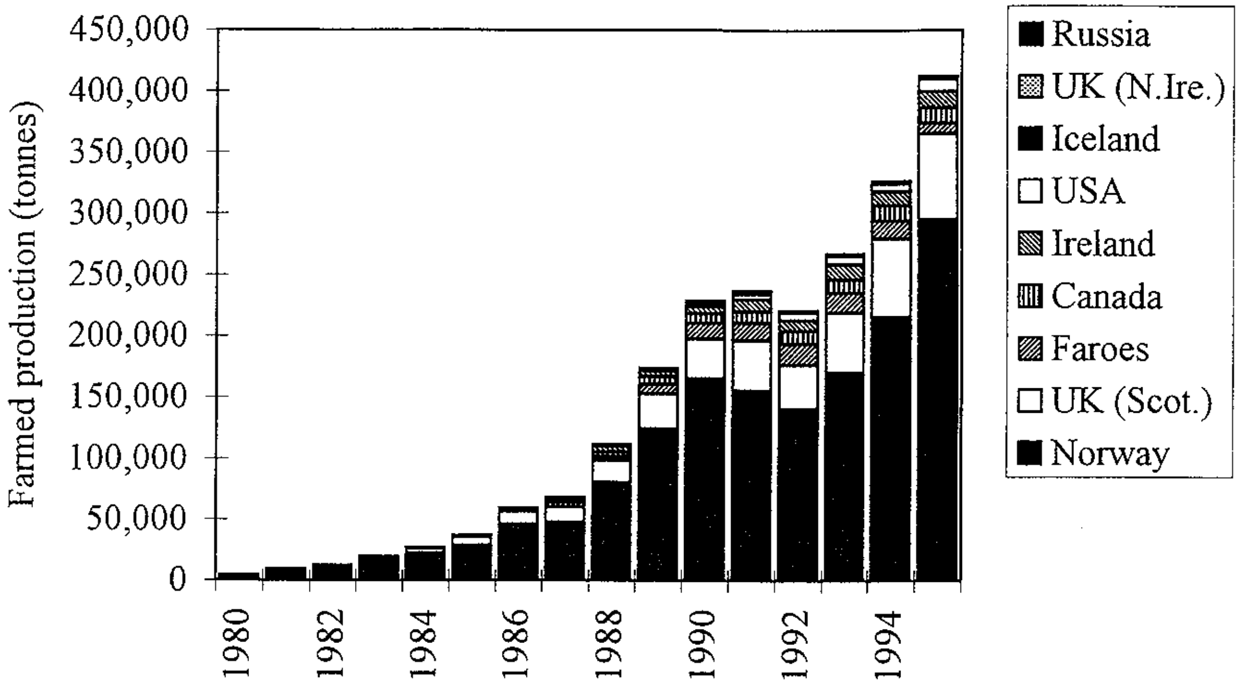


Figure 1.2.1 Catch per 1000 hooks (CPUE) in the Faroese fishery inside the EEZ since the 1982/1983 fishing season. The catch is broken into wild and farmed fish.

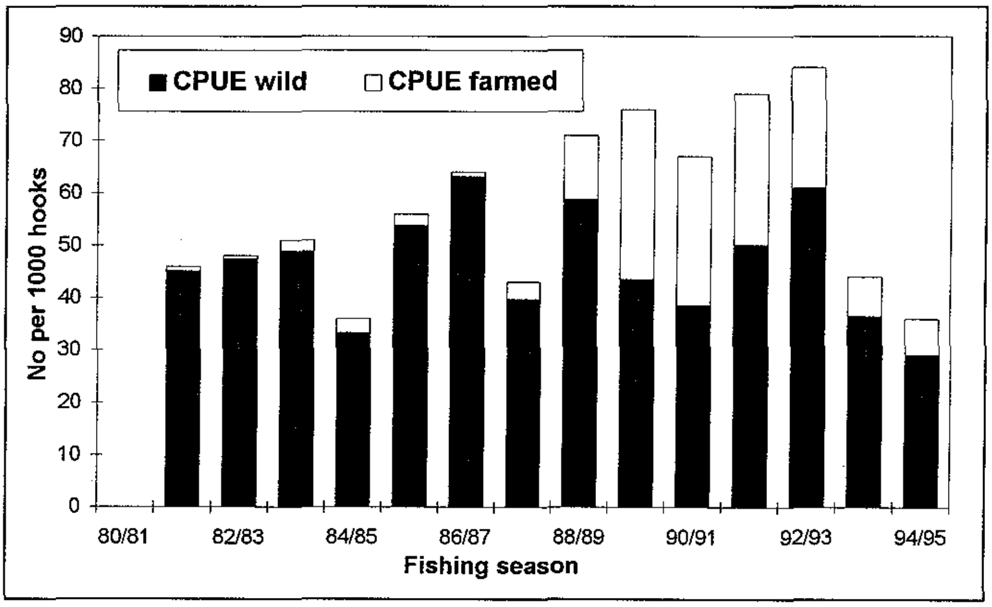


Figure 1.2.2 Post-smolt catches in surface trawl hauls during three research cruises in 1995. Stars show position of trawl stations without smolt catches while numbers indicate position and numbers of smolts caught. Stations south of 62°N were sampled in June. Stations north of that latitude were sampled in July. (From: Holm *et al.*, 1996).

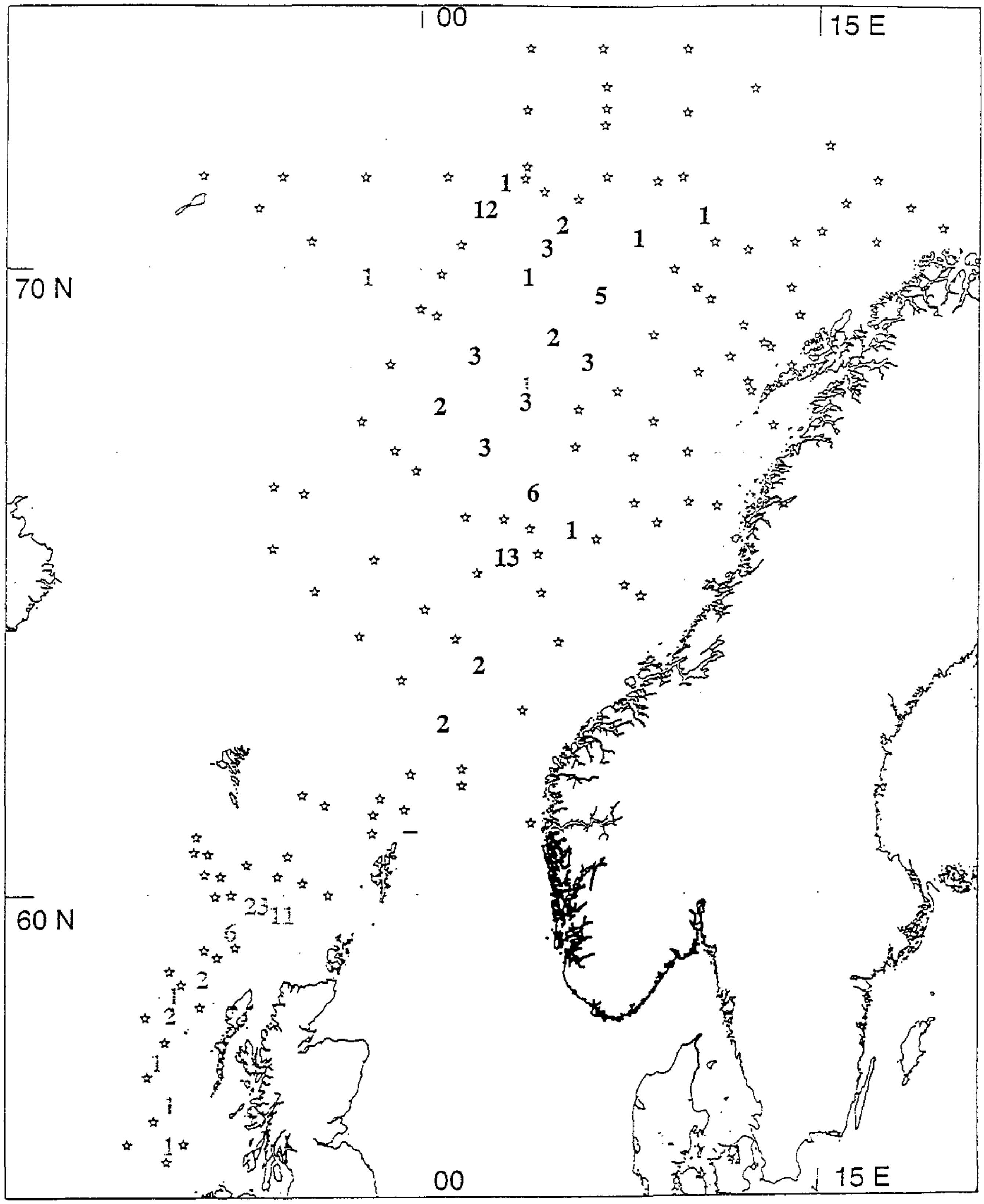


Figure 1.3.1 Pre-fishery abundance of maturing and non-maturing salmon in North America. (A) Total abundance and (B) proportion of the smolt class maturing after 1SW.

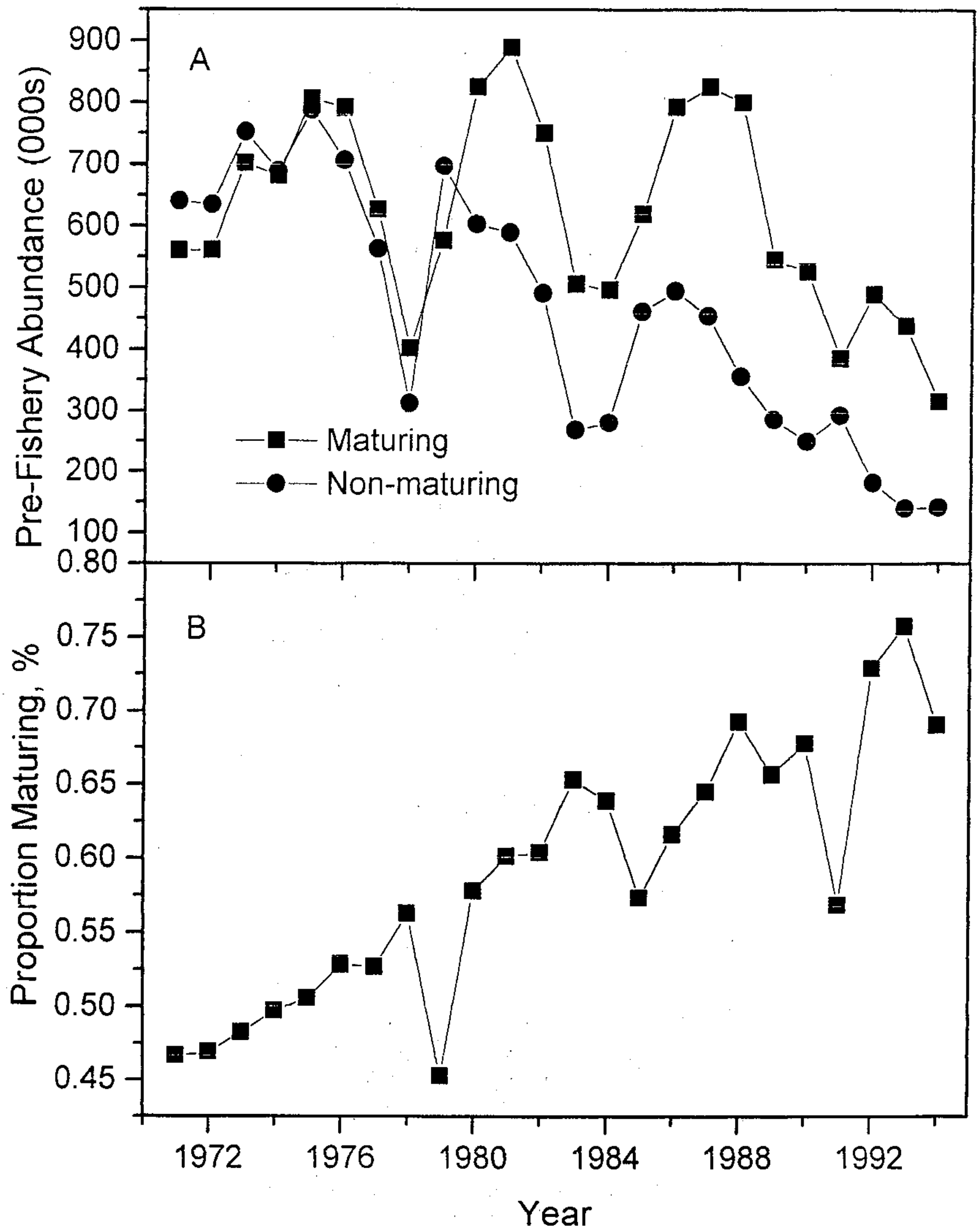


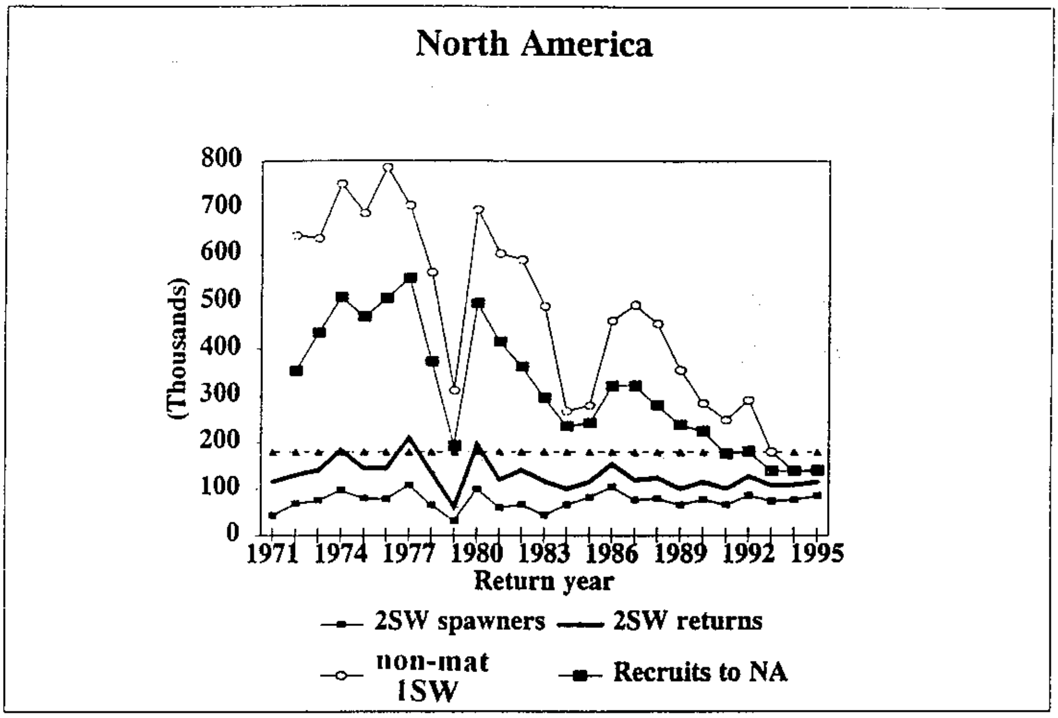
Figure 1.3.2 North American stocks of Atlantic salmon.

Top panel: 2SW fish (non-mature at 1SW), for 1971–1995 return year

a) pre-fishery abundance after 1sea winter: open circles,
b) number returning to coastal waters after 2 sea winters (after ocean fishery): large filled squares,
c) number entering river after 2 sea winters (after coastal fishery): solid line,
d) number spawning after 2 sea winters (after in-river fishery): small filled squares,
e) spawning escapement target: dashed line.

Bottom panel: 1SW fish (mature at 1SW), for 1971–1995 return year

a) pre-fishery abundance after 1 sea winter: filled triangles,
b) number entering river after 1 sea winter (no ocean fishery, after coastal fishery): solid line,
c) number spawning after 1 sea winter (after in-river fishery): small filled squares.



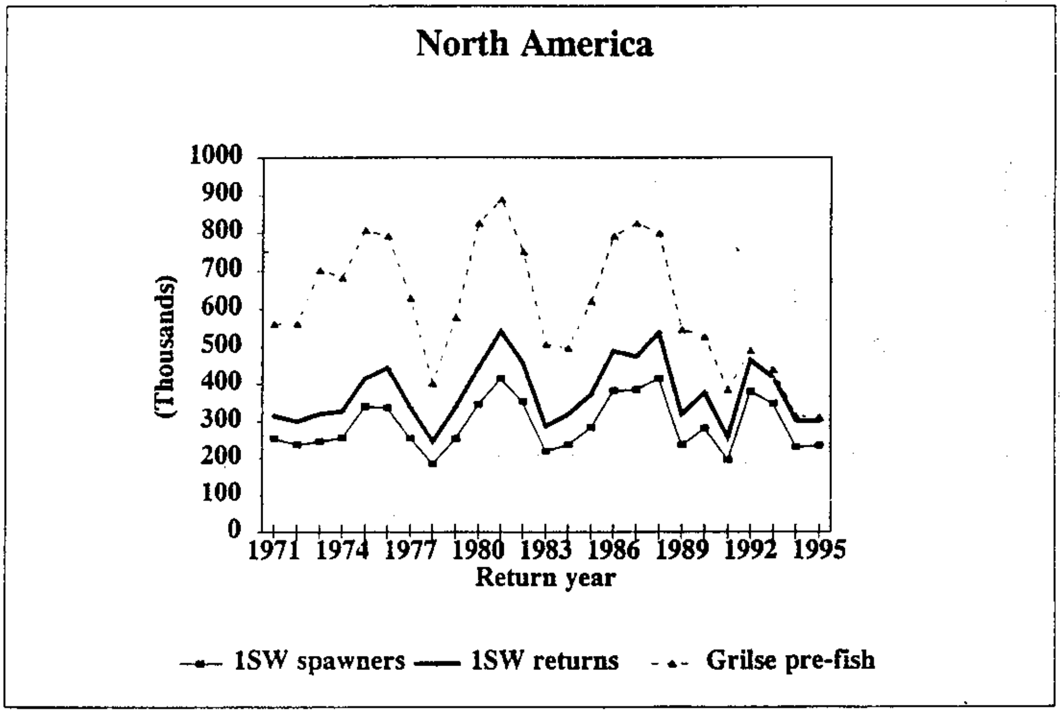


Figure 1.3.3 Proportion of egg deposition target attained in the rivers assessed in four geographic areas of eastern Canada, 1984 to 1995. The vertical line represents the range, the rectangle represents the interquartile range and the horizontal line is the median. The number above the range line indicates the number of rivers assessed in each year.

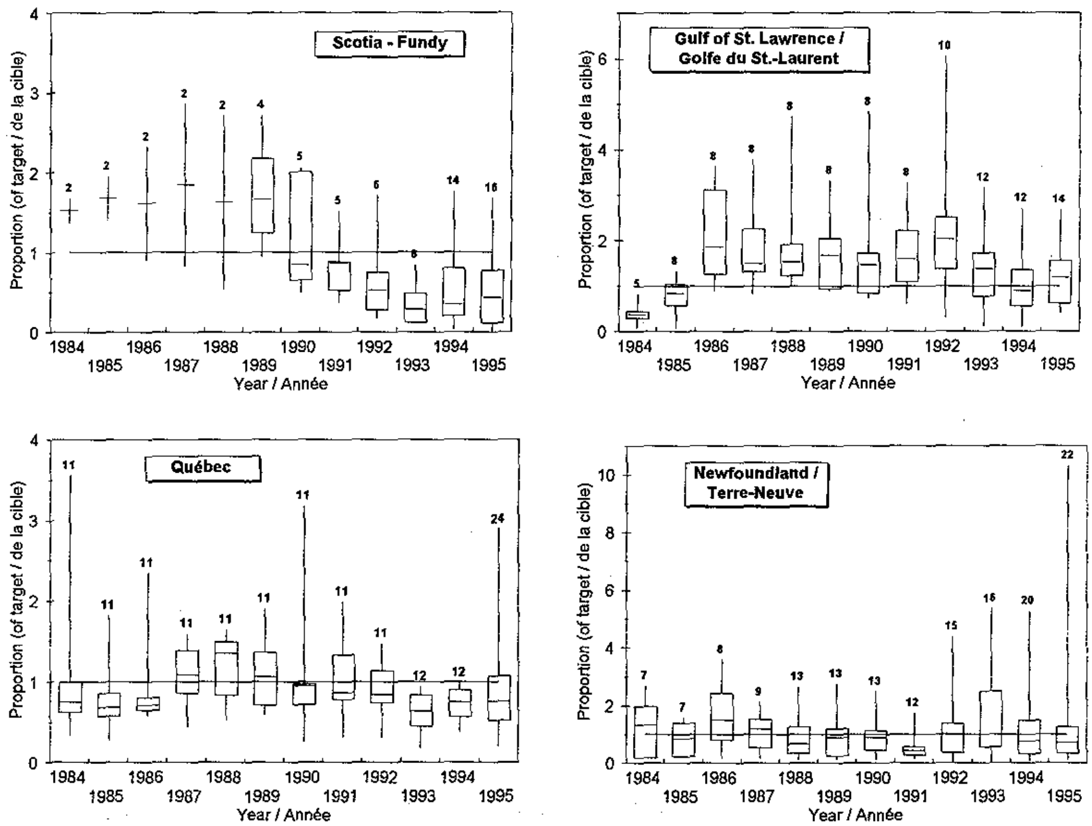


Figure 4.2.1 Observed (1979–1994) and predicted (1978–1996) pre-fishery abundance of non-maturing 1SW North American salmon.

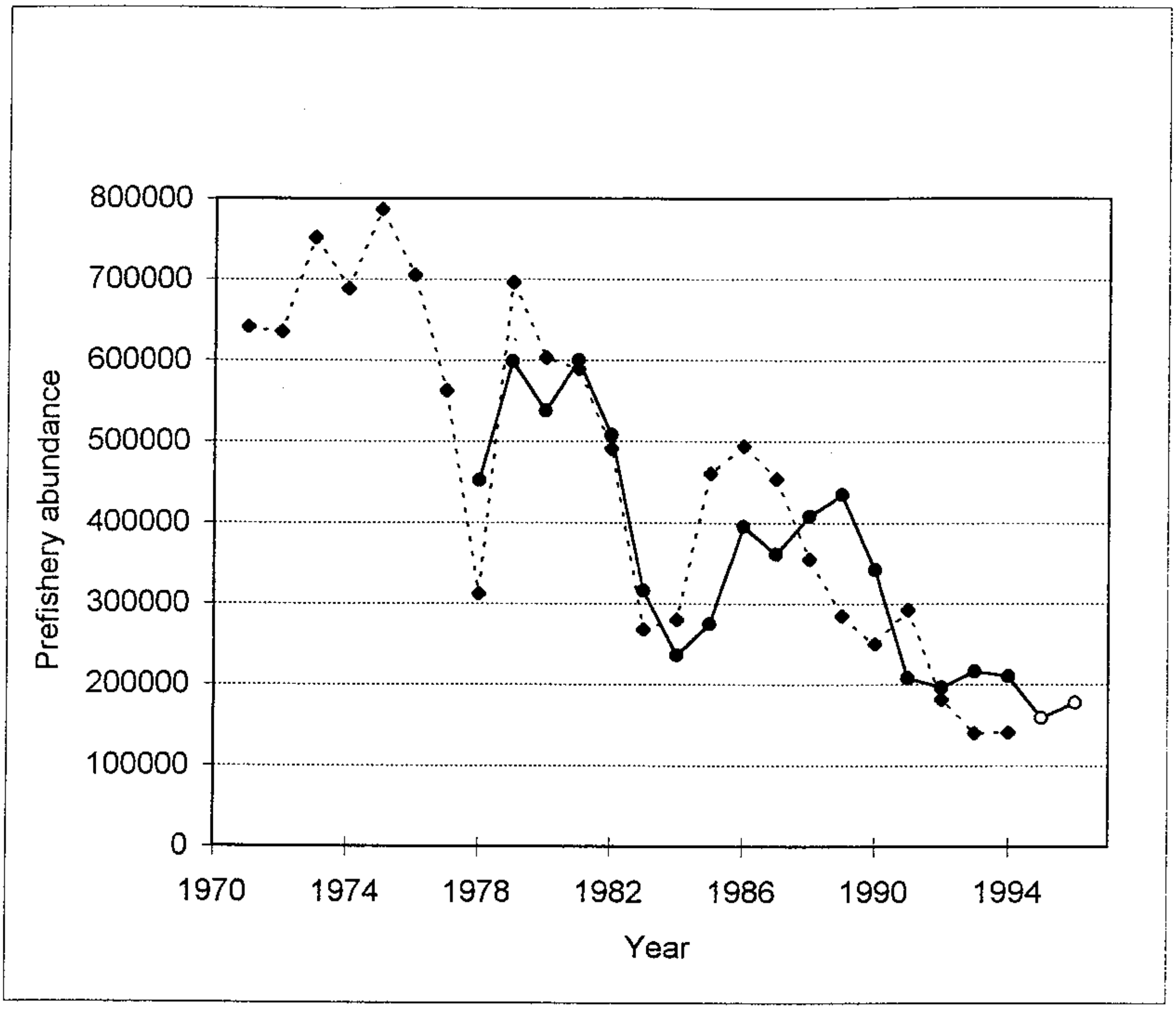


Figure 5.2.1 Maximum and minimum estimates of recruitment of maturing 1SW salmon in southern European countries.

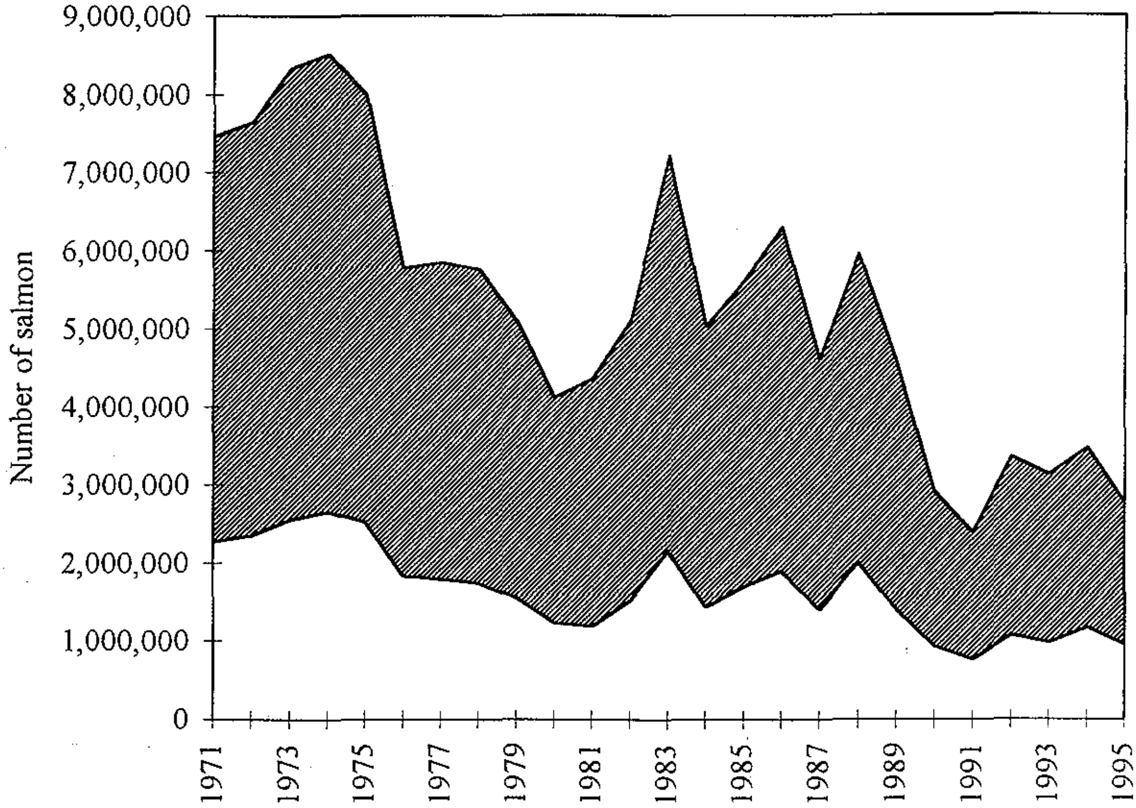


Figure 5.2.2 Maximum and minimum estimates of recruitment of non-maturing 1SW salmon in southern European countries.

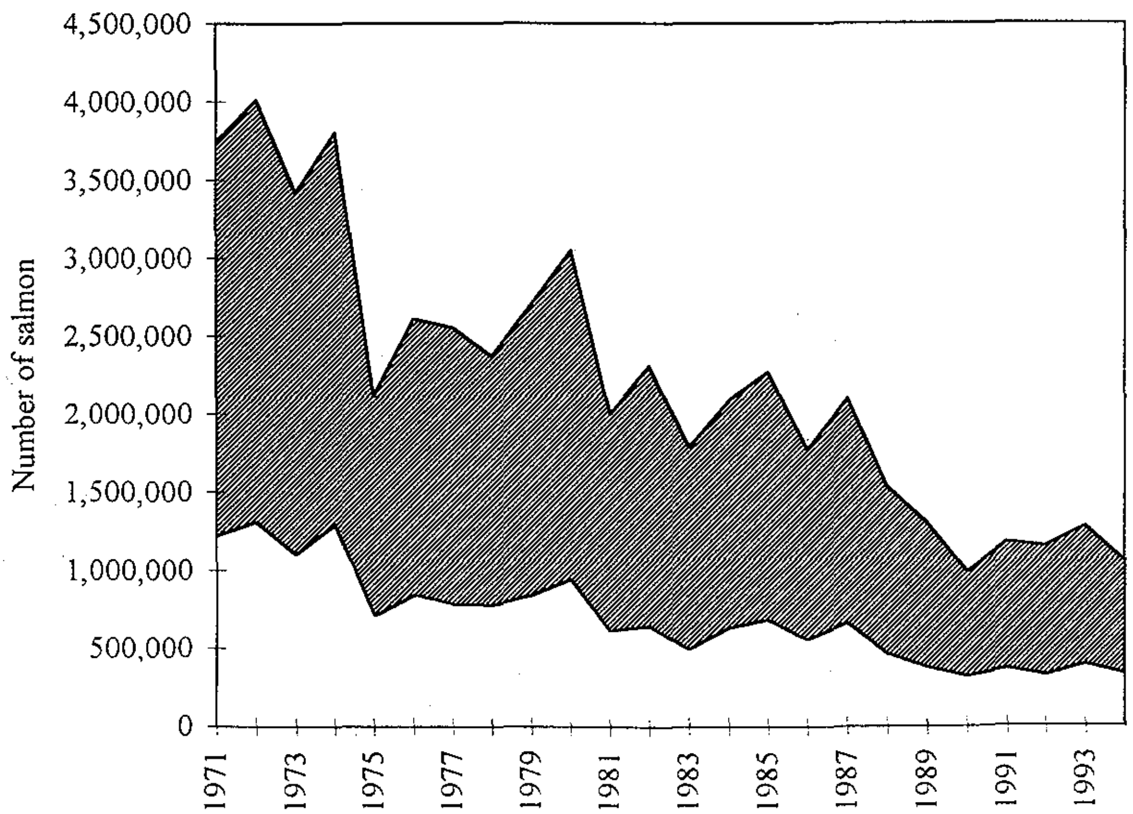


Figure 5.2.3 Maximum and minimum estimates of recruitment of maturing 1SW salmon in northern European countries.

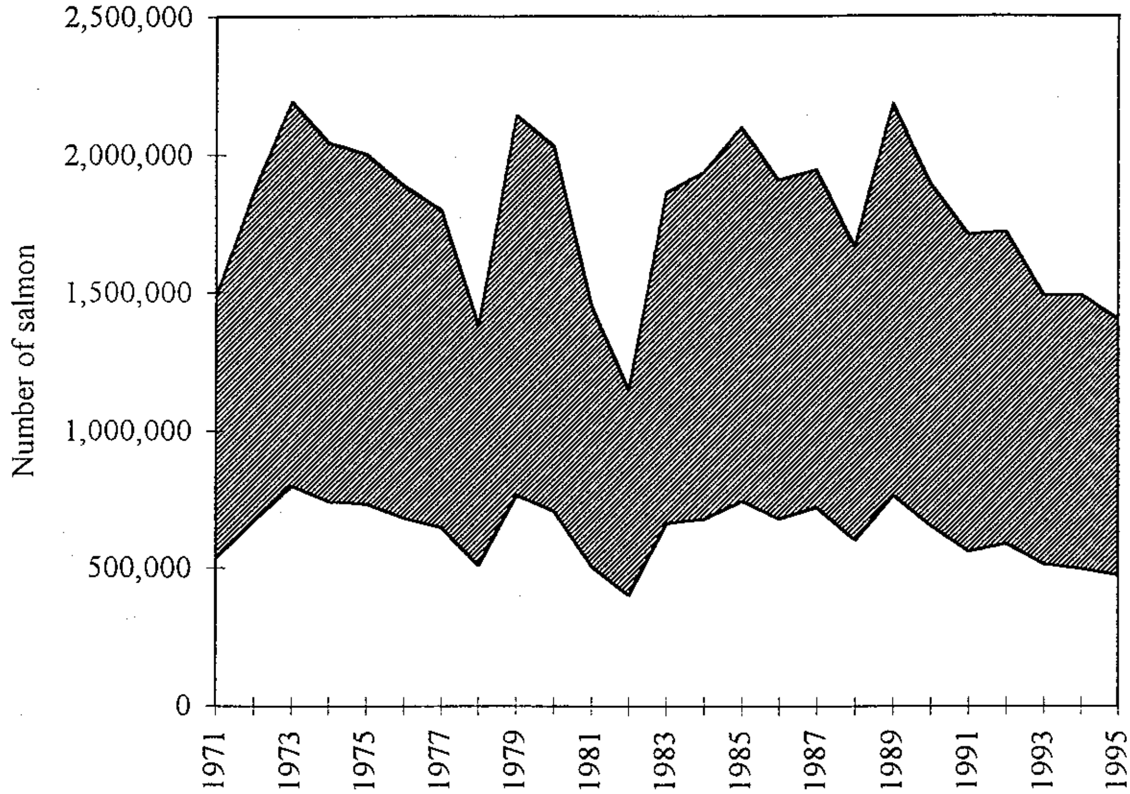


Figure 5.2.4 Maximum and minimum estimates of recruitment of non-maturing 1SW salmon in northern European countries.

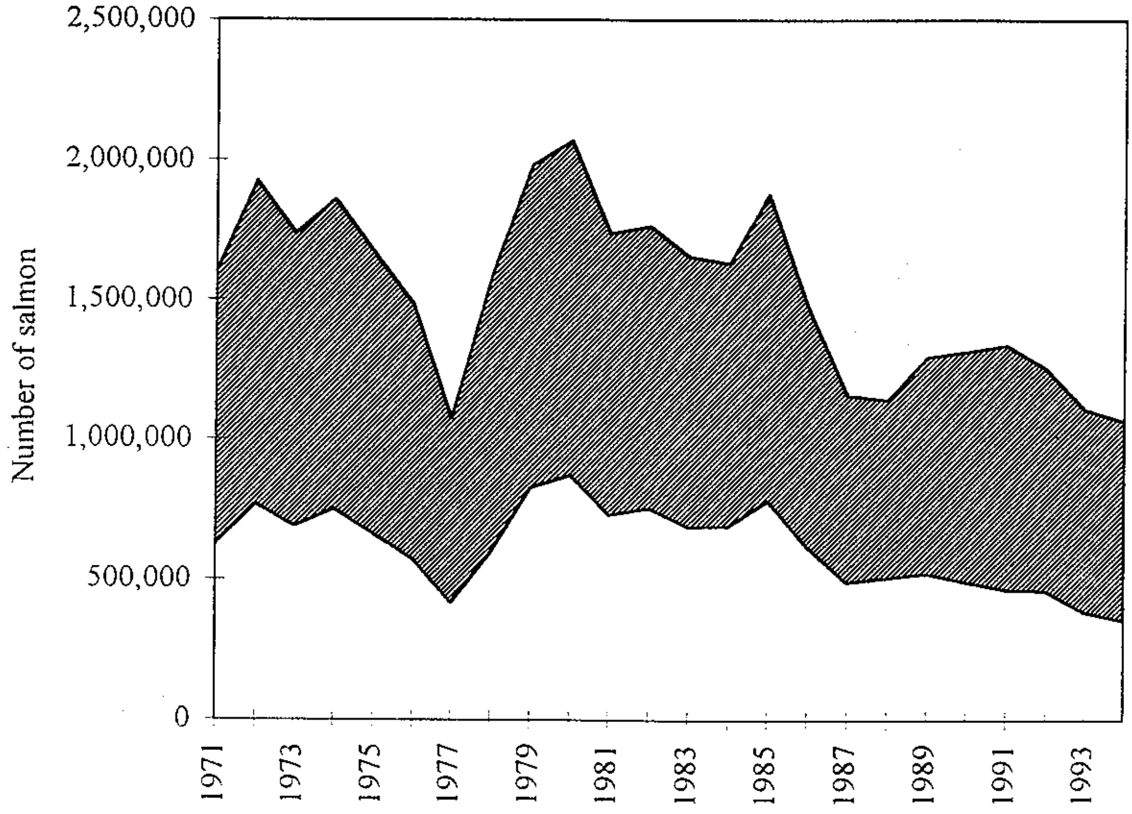


Figure 5.2.5 Time series trends of thermal habitat area and the abundance of non-maturing stock from southern Europe.

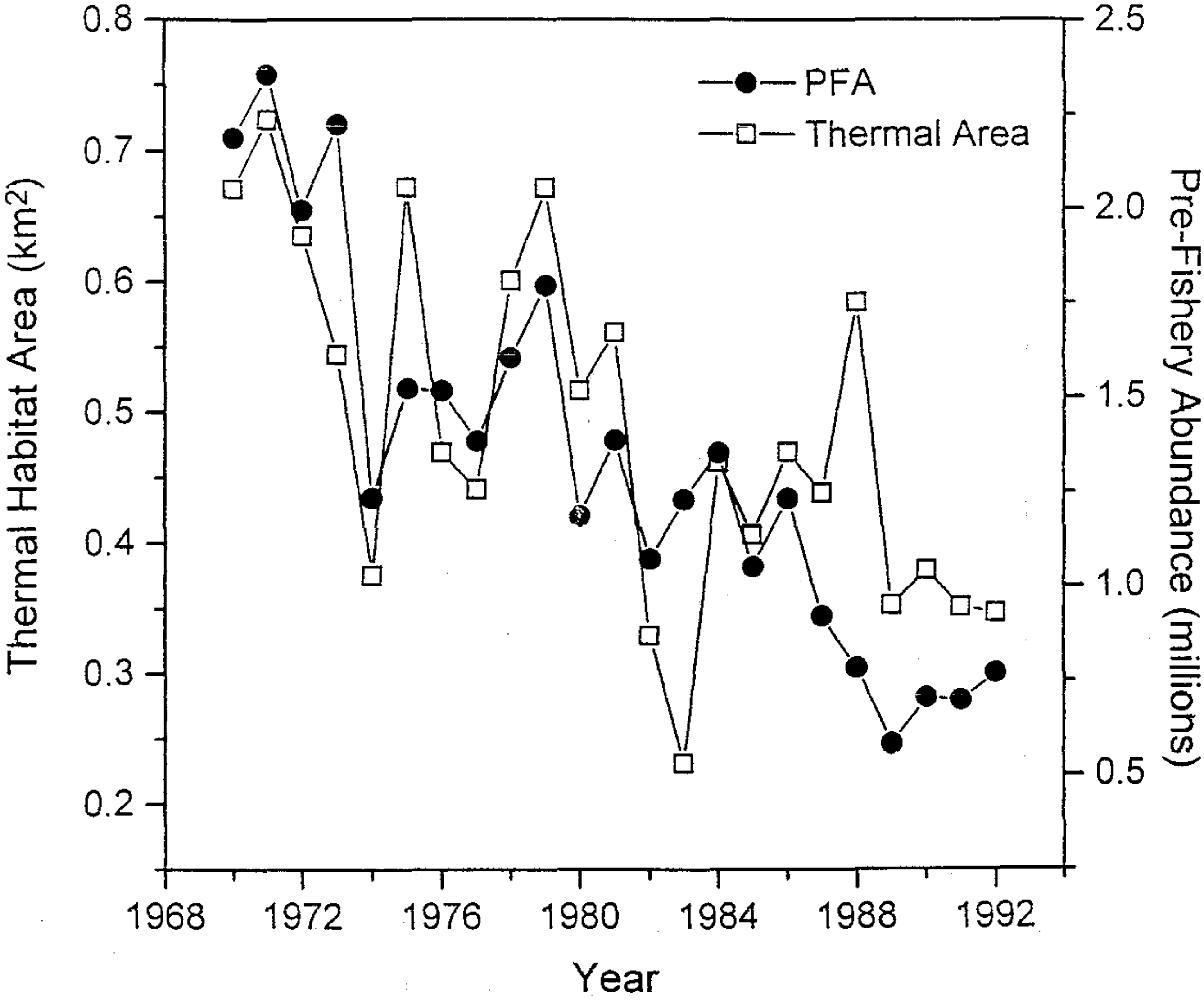
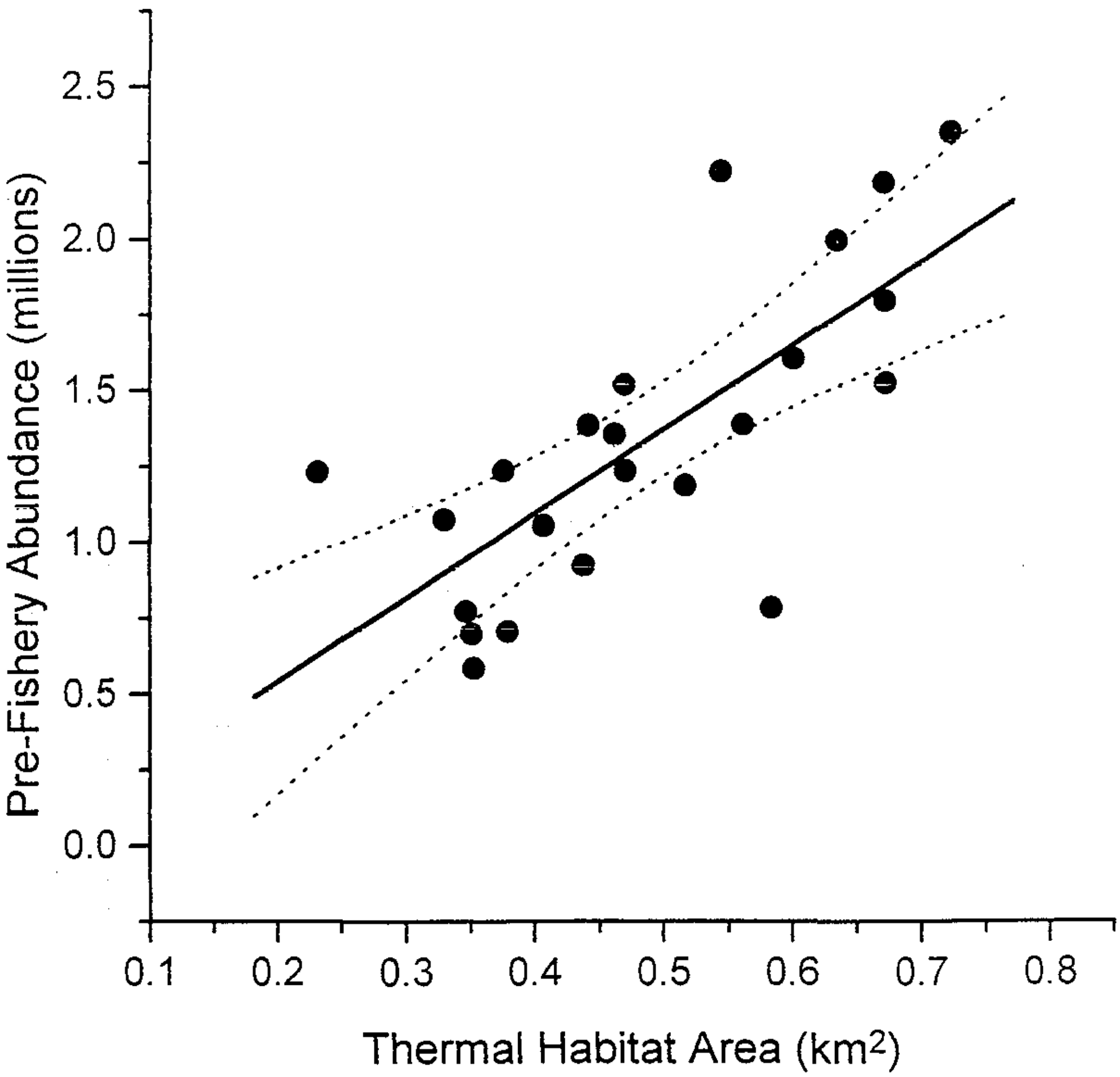


Figure 5.2.6 Relationship between thermal habitat area and the abundance of non-maturing stock from southern Europe.



REPORT TO THE NORTH ATLANTIC MARINE MAMMAL COMMISSION (NAMMCO)

Preamble

Following the Inaugural Meeting of the North Atlantic Marine Mammal Commission (NAMMCO) in 1992, the Commission requested ICES, *inter alia*, to:

> provide an assessment of the state of the pilot whale in the north eastern Atlantic, based on the information sampled from the Faroese drive fishery and the NASS (North Atlantic Sighting Survey) sighting surveys.

The following report was prepared jointly by the Advisory Committee on Fishery Management (ACFM) and the Advisory Committee on the Marine Environment (ACME) at their meetings in 1996.

The Status of the Long-finned Pilot Whale (*Globicephala melas*) in the North Atlantic

Catch Data:

Number of pilot whales caught, including strandings, by **A)** 50-year periods for 1700–1995 and **B)** annually for 1986–1995.

A)

Year	Mean Annual Catch by Period		
	Western Atlantic	Eastern Atlantic	North Atlantic
before 1700	0	<1	<1
1700–1749	0	584	584
1750–1799	0	91	91
1800–1849	47	1227	1274
1850–1899	254	887	1141
1900–1949	209	1063	1272
1950–1995	1271	1596	2867

B)

Year	Annual Catch		
	Western Atlantic	Eastern Atlantic	Total
1986	190	1824	2014
1987	46	1450	1496
1988	184	1738	1922
1989	77	1260	1337
1990	316	939	1255
1991	30	722	752
1992	55	1572	1627
1993	131	808	939
1994	0	1201	1201
1995	132	228	360

Historical Development of Catches:

Few pilot whales are recorded as having been caught before 1700. From the beginning of the 1700s to about 1750 catches were only taken by the Faroe Islands and averaged about 600 animals per year. In the period 1756-1793 virtually no catches were recorded. From about 1800 catches increased steadily and peaked in 1845 at over 4000 animals caught by the Faroe Islands, the United Kingdom and the United States. In the period 1850-1930 catches averaged about 1000 animals per year, mainly taken by the Faroe Islands, but the United Kingdom and the United States also contributed. Since 1930 catches have increased considerably to an annual average of about 2500 animals per year, mainly due to increased catches by Canada (1950-1970). Recent catches from 1986-1995 have been 1300 animals annually.

State of Populations:

Sighting surveys in a part of the eastern Atlantic in 1987 and 1989 suggest a total abundance of 778,000 long-finned pilot whales for the area surveyed. Surveys in 1995 gave significantly lower abundance estimates than the earlier surveys for areas around the Faroe Islands. Estimation of historical abundance back to the year 1700 by means of a population simulation model showed that, within a suitable range of possible population growth rates, abundance in the eastern Atlantic has been very stable. Restricting the model to limited areas of the eastern Atlantic gives results which show a decrease in abundance ranging from 0% to 50% depending on the choice of annual population growth rate and size of areas.

Annual catches of less than 2000 individuals in the eastern Atlantic correspond to an exploitation of 0.26 % of the standing population, given the recent abundance estimate.

Stock Affinities in the North Atlantic:

Based on different genetic approaches, there has been no indication of more than one component in the north Atlantic. Morphometric studies lead to the conclusion that more than one stock is present in the north Atlantic. Sighting surveys indicate that catches in the Faroe Islands derive from a larger east Atlantic stock component.

Conclusions:

The relevance of the estimate of the exploitation rate given above to the stability of the population or populations is critically dependent on whether the catches are taken from a population distributed over the entire northeast Atlantic area or from a population restricted to a much smaller area, in which case the population exploitation rate could be considerably higher. In the current state of knowledge about the stock structure of pilot whales in the north Atlantic, it is not clear which of these alternatives applies.

Future Research Requirements:

In order to determine the stock structure in the north Atlantic more precisely, tagging studies with satellite tags are recommended as the most urgent research project.

Source of information:

Report of the Study Group on Long-finned Pilot Whales, April 1996 (ICES CM 1996/A:6).