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INTERNATIONAL COUNCIL FOR THE
EXPLORATION OF THE SEA

C.M. 1974/F : 6
Demersal Fish (Northern) Committee

REPORT OF THE NORTH SEA FLATFISH WORKING GROUP

Charlottenlund, 6-8 March 1974.

*) Secretary General of the International Council for the
Exploration of the Sea,
Charlottenlund Slot, Charlottenlund, Denmark.

https://doi.org/10.17895/ices.pub.9527

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1. Terms of Reference and Participation

The North Sea Flatfish Working Group met in Charlottenlund from 6-8 March 1974 at the request of the Liaison Committee to undertake, in conjunction with the North Sea Roundfish Working Group, mesh assessments for the North Sea demersal species. The Flatfish Working Group contributed to mesh assessments on sole and plaice. With the agreement of the Liaison Committee the Flatfish Working Group also gave further consideration to the likely effect of a closed area in coastal waters on the catches of sole and plaice. The following members participated:

V. Anthony	U.S.A.
D.W. Armstrong	United Kingdom (Scotland)
R.C.A. Bannister	United Kingdom (England)
R. De Clerck	Belgium
E. Heijerdahl	U.S.A.
Mrs. E. Nielsen	Denmark
K. Popp Madsen	Denmark
G. Rauck	Federal Republic of Germany
J.F. de Veen (Chairman)	The Netherlands

Mr. D. de G. Griffith (ICES Statistician) also participated in the meeting.

2. Mesh assessments

For sole and plaice mesh assessments were made using the method of Gulland (1961), providing estimates of the short-term and long-term effects resulting from increases in mesh size.
In order to apply the method length-composition data on catch, selectivity and mortality estimates are required.
Table I gives the permille length composition of the average sole catches used in the calculations, together with the average total number caught in thousands. For Belgium data for 1970-1972 were available, for The Netherlands data for the years 1968-1972 were used and for England the average of the 1969-1973 data was calculated. In the Danish trawlfisheries sole catches are declining to a low level and in the Danish gill-net fishery the effective mesh size is over 100 mm so that for both fisheries no mesh assessment was undertaken.
Table 2 gives the permille length distributions of the average plaice catches used in the calculations with the average annual number of plaice caught.

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Although German and Belgian data on length frequencies were presented at the meeting no mesh assessments were made based on these data for it was apparent that there would be practically no short term nor long term effects of increases up to 100 mm mesh size.
For sole and plaice information on discards was available for the Dutch sole fishery for 1969/70 and assuming that this rate of discarding has not changed since 1969/70 the average length composition for the Dutch sole and plaice catches in tables 1 and 2 have been calculated. For the other countries no data on discards exist and it was assumed that the length distributions given, based on landings, do not differ significantly from the catch length distributions.
Data on selectivity were taken from Table 37 in the Report of the Working Group on Assessment of Demersal Species in the North Sea (Coop. Res. Rep. Ser. A. 9, 1969) and selection ogives were calculated for the mesh sizes 73, 75, 80, 85, 90 and 100 mm using the selection factor 3.3 for sole and 2.2 for plaice, and selection ranges 4 cm for sole and 1.6 cm for plaice. Tables 3 and 4 give these selection ogives for sole and plaice.
In addition Table 5 gives the 50 % ages corresponding with the 50 % length of each selection ogive.
It was assumed that for the fish in the selection ranges of the mesh sizes concerned, the exploitation rate could be considered constant. For sole an exploitation rate of E = .88 and for plaice an E = .70 was used. The natural mortality rate for sole was assumed to be M = .10 and for plaice M = .15.
In order to convert numbers into weight the most recent weight data were used. They are given in Table 6.
The assessments carried out gave the following results.

2.1 - Sole

Table 7 gives the immediate losses in percentages and also in actual fresh weight in tons, based on the 1973 situation. Immediate losses are fairly large especially in the Dutch beamtrawl fishery. However, part of the losses consist of undersized soles normally discarded at sea. This means that increases in mesh size diminishes the amount of discarding. The fresh weight of the quantity of discarded soles, now saved, increases from 2,399 tons in the case of the 80 mm mesh to 3.129 tons in a 100 mm mesh.
Immediate losses in the weight of sized soles rapidly increases in the Dutch and Belgian beamtrawl fisheries from 8.4 and 5.2 % resp. in a 80 mm mesh to 47.6 and 43.5 % in a 100 mm mesh. In the case of the English ottertrawl with an effective mesh size of 80 mm at present, immediate losses will be less but for a 100 mm mesh they will approach the level of the Dutch and Belgian losses.

Long term gaines are shown in Table 8 in percentages as well as in actual weight in tons based on the 1973 situation. Long term gains in percentage are lowest in the Dutch beam trawl fisheries and highest in the English otter trawl fishery, but when long term gains are expressed in actual weight, it is obvious that the Netherlands may expect the largest long term gains and an increase in mesh size to 95 mm may eventually lead to a catchlevel of

$$16\,398 \text{ tons (1973)} + \frac{7\,695 + 9\,701 \text{ tons}}{2} = 25\,096 \text{ tons fresh weight for that country}$$

The international catch will also benefit from an increase in mesh size and for a 95 mm mesh this catch may reach

$$19\,560 \text{ tons (1973)} + \frac{9\,426 + 12\,293 \text{ tons}}{2} = 30\,420 \text{ tons fresh weight.}$$

This long term gain is strictly in terms of weight; it will lead to losing the smaller sized soles. In the case of a 95 mm mesh the 50 % retention length will increase to 31.4 cm.

2.2. - Plaice

Mesh assessments were carried out for 80, 85, 90 and 100 mm mesh for The Netherlands beam trawl, for 85, 90 and 100 mm for the English otter trawl and for 100 mm for the Scottish otter trawl and seine. For Belgium and Germany the length-compositions were such that no effects could be expected even for a 100 mm mesh. For Denmark it was assumed that their effective mesh size and length distributions were similar to the English and thus the same effects as for the English gear were adopted for Denmark. 1)
Inspection of Table 9 reveals that immediate losses are practically nil in most countries. Even in the Netherlands fisheries losses will be very low indeed and will consist only of undersized fish, thus leading to a decrease in the rate of discarding.
Long term gains, given in Table 10 are low. An increase in mesh size to 95 mm will for The Netherlands only amount to some 2 % gain. For the other countries the long term gains may rise to 4.7 % for a 95 mm mesh.

1) Information was received that at present the mesh size in both the Danish seine and otter trawl is 100 - 120 mm.

3. The effect of closed areas

A closed area could be effective either by reducing adult mortality or by increasing recruitment.
In the case of sole and to some degree also for plaice both the effects might be achieved by closing the coastal waters to fishing.
Consequently the Group considered the possible effects of a permanent ban on fishing inside zones of 15 and 30 nautical miles along the North Sea coasts.

An estimate of the possible effect on adult mortality is that fraction of the total landings which is taken inside the two limits under consideration. From 1972 data on the distribution of the Dutch sole fisheries in the southern and central North Sea, which accounts for about 85 % of the total North Sea catch of sole, the following figures were arrived at:

	Sole	Plaice
15 miles zone	14 %	10 %
30 miles zone	39 %	31 %

These figures would indicate the order of decrease in the Dutch landings if a permanent closure was introduced and if the effort hitherto exerted in the closed areas would not be deployed on the same species outside the limits.
As the latter assumption is unrealistic and as the Dutch catches of plaice, mainly being a by-catch in the fisheries for sole, accounts for about 40 % of the total North Sea plaice landings, it is reasonable to assume that the coastal closures considered will only result in a slight reduction in the high level of fishing mortality in sole and that the redeployment of effort would not lead to a reduction but could even increase the fishing mortality on plaice.

An estimate of the increase in recruitment to the adult stocks which could also be an effect of closing coastal areas to fishing, depends to a large degree on the natural mortality of the youngest age groups. Assuming the following mortalities:
0-group 25 %, I-group 20 %, II-group 15 % and III-group 10 % and adopting the stock numbers of 2-year old fish as estimated by the virtual population analysis, the following percentages of juveniles destroyed by the shrimp fisheries and by the Dutch sole fisheries were calculated as follows:

	sole 1954/67	plaice 1954/67	sole 1969/70	plaice 1969/70
all shrimp fisheries	17 %	19 %	17 % *)	19 % *)
Dutch sole fishery	22 %")	17 % ")	34 %	27 %
Total	39 %	36 %	51 %	46 %

*) average of 1954-67 assumed for 1969/70
") data for 1967 only.

The percentages above may be overestimates as discarded I-group fish are added directly to the numbers of discarded II-group fish in the Dutch sole fisheries and as the investigations in 1969/70 only refer to a year in which the I-group was strong. The investigations were, on the other hand, partially carried out outside the 30 miles zone where the discarding of young fish is less. Although this effect was taken into account in the Dutch study, the amount of discarding within and outside the coastal areas was not assessed separately. It is obvious, however, that closing coastal areas will only partially end discarding and thus will not increase recruitment by the order of magnitude indicated by the discard percentages given in the table above. Moreover the inevitable displacement of effort will increase the effect of discarding outside the closed areas.
Closure of coastal zones in the North Sea will adversely affect a number of other fisheries e.g. beamtrawling for shrimps, the Danish gill net fishery for sole, ottertrawling for plaice, sole, cod and eel and the Scottish seine fishing for plaice and lemon sole.
The continuation of these fisheries inside the closed areas will greatly increase the difficulties of exerting an efficient control.

4. Summary and conclusions

In its two previous Reports the Flatfish Working Group has already fully acquainted the Liaison Committee with the immediate need to regulate the fisheries for sole and plaice in the North Sea, Bristol Channel and Irish Sea by means of setting appropriate total allowable catches. A summary of the Working Group's findings is as follows:

1. For North Sea sole a TAC of 6 000 metric tons for 1974 was calculated to reduce fishing mortality in that year by 60 % and to increase the stock by 23 % above that to be expected in 1974, if no regulations were made.
   A TAC of 10 000 metric tons for 1974 would reduce fishing mortality in that year by 40 % and increase the stock by 12 %.

2. For the North Sea plaice stabilisation at the present optimum level and protection for the stock against the effects of diversion of effort from elsewhere or from other species require an immediate catch limitation scheme for this species too. The recommended TAC for plaice was 115 000 metric tons for 1974.

3. For the Irish Sea and Bristol Channel sole which are likely to suffer from the effects of diversion from regulated North Sea fisheries, the Working Group recommended allowable catches of 1 300 metric tons for the Irish Sea and 670 metric tons for the Bristol Channel.

In addition reference was also made to the point that for sole eumetric fishing requires an increase in mesh size above that currently in use in the North Sea. It was pointed out that in addition to achieving long term gains, such an increase, to at least 95 mm, would prevent fishermen from taking the sole quota from the grounds stocked by the small recruit age groups, and that the large immediate losses occurring at the beginning of the transitional phase must actually contribute to the reduction in catch demanded by the setting of a TAC.

In this Report the effect on sole and plaice catch of increase in the mesh size is presented in more detail to show, that for plaice an increase to 95 mm mesh will hardly affect the present catch level and immediate losses and long term gains will be small only.
In the sole an increase to 95 mm should lead to an overall long term gain of 48.5 % or 9 500 tons (in terms of the 1973 situation) by weight.
For the main sole fishing nation, the Netherlands, the long term gain will be 42.5 % or 7 000 tons.
Compared with former mesh-assessments carried out by the Flatfish Working Group in 1970 short-term and long-term effects are larger now. This is mainly caused by a considerable increase in the amount of discarding in sole, which could be taken into account in the present assessment.

The immediate losses in sole resulting from an increase to 95 mm will be about 38 % or 7 400 tons. If this increase in mesh size could be speedily and effectively enforced this loss could be a considerable contribution to the reduction in catch necessitated by the TAC's for sole of 6 000 and 10 000 tons.

For this reason the Group recommends that in addition to the TAC proposals for sole and plaice an increase in mesh-size to 95 mm should be considered.

Reference:

Gulland, J.A. (1961) - The estimation of the effect on catches of changes in gear selectivity.
J. Cons. perm. int. Explor. Mer, 26 : 204-14.

Joint statement by the North Sea Flatfish and Roundfish Working Groups.

The two Working Groups met for a short time on March 8th to make a multispecies mesh assessment. This was discussed but it was agreed that at present there were neither the data nor the biological knowledge necessary for doing this.
The Working Groups therefore had no alternative but to make mesh assessments for each species separately and to consider the implications of the results in a general way. This was done for sole, plaice, cod, haddock and whiting.
It was agreed that there would be a long term gain to the fishery for each species from an increase in mesh size to at least 90 mm.
The effect of this on national fisheries in the North Sea is shown in Table 11.

NORTH SEA SOLE

Table 1 - Average length frequency distributions and total catch used in the calculations.

Length group (cm)	1971, 1972 Belgium beamtrawl (‰)	1968 - 1972 Netherlands beamtrawl (‰)	1969 - 1973 England ottertrawl (‰)
15.5		5.2	
16.5		7.0	
17.5		27.0	
18.5		29.7	
19.5		33.5	
20.5		71.1	0.1
21.5		67.0	0.3
22.5		51.8	1.7
23.5		31.2	5.1
24.5	38.5	43.0	14.4
25.5	41.5	60.6	23.4
26.5	57.6	74.1	37.2
27.5	75.8	75.5	55.6
28.5	81.7	66.3	69.5
29.5	91.4	58.3	69.8
30.5	79.8	48.7	71.0
31.5	73.5	42.5	81.2
32.5	69.2	39.5	81.7
33.5	66.4	34.2	80.6
34.5	56.7	30.8	77.1
35.5	52.7	27.5	67.9
36.5	47.0	20.7	60.8
37.5	38.2	15.7	50.6
38.5	39.6	11.4	43.0
39.5	32.6	9.1	30.0
40.5	24.0	6.6	23.2
41.5	16.3	4.7	18.3
42.5	9.3	3.2	13.0
43.5	8.1	2.0	8.7
44.5		1.2	5.8
45.5		0.8	3.8
46.5		0.3	2.2
47.5		0.1	1.5
48.5+			1.6
Total ‰	999.9	1000.3	999.1
Total annual catch in '000	1,415	107.772	1,432

NORTH SEA PLAICE

Table 2 - Average length frequency distributions and total catch used in the calculations.

Length group (cm)	1968 - 1972 Netherlands beamtrawl (‰)	Scotland ottertrawl (‰)	Scotland seine (‰)
9.5	4.2		
10.5	9.7		
11.5	12.4		
12.5	2.7		
13.5	5.7		
14.5	4.7		
15.5	5.6		
16.5	9.4		
17.5	10.2		
18.5	11.7		
19.5	13.1		
20.5	17.4		
21.5	27.9	0.0	1.3
22.5	25.5	0.6	1.5
23.5	29.9	2.8	2.4
24.5	27.8	6.5	5.6
25.5	41.3	13.3	31.6
26.5	49.5	26.2	54.0
27.5	60.9	35.1	70.5
28.5	88.9	42.8	76.3
29.5	82.1	51.0	77.9
30.5	74.0	54.0	73.2
31.5	64.6	54.5	71.6
32.5	59.5	63.8	60.9
33.5	50.9	70.1	61.3
34.5	42.9	65.7	50.2
35.5	35.7	63.4	61.7
36.5	29.4	69.0	53.4
37.5	23.8	61.3	48.1
38.5	18.1	52.1	38.7
39.5	13.8	48.9	40.2
40.5	10.7	38.2	26.9
41.5	8.1	34.2	20.8
42.5	6.6	26.8	16.2
43.5	5.0	21.8	11.5
44.5	3.9	17.2	10.5
45.5	2.9	14.6	6.6
46.5	2.3	11.0	4.9
47.5	1.7	10.0	5.0
48.5	1.3	8.4	3.4
49.5	1.0	6.4	3.4
50.5	0.8	5.2	2.3

Length group (cm)	1969 - 1973 England combined seine - ottertrawl (‰)
20-24	0.3
25-29	42.1
30-34	352.3
35-39	397.8
40-44	143.3
45-49	41.2
50-54	10.2
55-59	2.3
60-64	0.4
65-69	0.1
Total ‰	1.000.0
Total annual catch in '000	56,386

Table 2 - continued.

Length group (cm)	1968 - 1972 Netherlands beamtrawl (‰)	Scotland ottertrawl (‰)	Scotland seine (‰)
51.5		4.4	1.8
52.5		3.7	1.1
53.5		2.8	1.5
54.5		2.5	1.4
55.5		1.8	0.7
56.5		1.7	0.6
57.5		0.9	0.5
58.5		0.6	0.5
59.5		0.5	0.5
60.5		0.3	0.1
61.5		0.3	0.1
62.5		0.3	0.0
63.5		0.1	0.1
64.5		0.0	0.1
65.5		0.2	0.0
Total ‰	997.6	1.000.0	1.003.7
Total annual catch in '000	166,128	814	8,145

SOLE

Table 3 - Selection ogives used in the calculations.

Length (cm)	Mesh (mm)	73	75	80	85	90	100
17.5							
18.5		.02					
19.5		.06	.03				
20.5		.12	.07				
21.5		.20	.14	.05			
22.5		.30	.22	.10	.02		
23.5		.43	.34	.17	.06		
24.5		.55	.46	.27	.12	.03	
25.5		.68	.59	.40	.20	.08	
26.5		.79	.71	.52	.30	.14	
27.5		.89	.83	.64	.43	.23	.01
28.5		.94	.91	.77	.55	.34	.06
29.5		.98	.96	.86	.67	.48	.13
30.5		1.00	.99	.93	.79	.59	.21
31.5		1.00	1.00	.97	.89	.72	.32
32.5		1.00	1.00	1.00	.94	.83	.44
33.5			1.00	1.00	.98	.91	.56
34.5				1.00	1.00	.96	.69
35.5					1.00	.99	.80
36.5					1.00	1.00	.89
37.5						1.00	.94
38.5						1.00	.98
39.5							1.00
40.5							1.00
41.5							1.00

PLAICE

Table 4 - Selection ogives used in the calculations.

Length (cm)	Mesh (mm)	73 (mm)	75 (mm)	80 (mm)	85 (mm)	90 (mm)	100 (mm)
12.5		.01					
13.5		.05	.02				
14.5		.14	.08	.01			
15.5		.32	.20	.07			
16.5		.65	.50	.19	.07		
17.5		.82	.75	.45	.18	.06	
18.5		.93	.90	.74	.42	.16	
19.5		.99	.96	.87	.73	.38	.04
20.5		1.00	1.00	.94	.87	.70	.14
21.5		1.00	1.00	.99	.93	.85	.33
22.5		1.00	1.00	1.00	.99	.93	.65
23.5				1.00	1.00	.98	.83
24.5				1.00	1.00	1.00	.91
25.5					1.00	1.00	.96
26.5						1.00	1.00
27.5							1.00
28.5							1.00

Table 5 - Showing the 50 % ages used in the calculations.

		50 % ages				
		Present mesh (mm)	80	85	90	100
Sole	Belgium beam trawl	1.9	2.2	2.6	3.1	4.8
	England trawl		2.2	2.6	3.1	4.8
	Netherlands beam trawl	1.8	2.2	2.6	3.1	4.8
Plaice	England trawl		1.9	2.1	2.3	2.5
	Scotland trawl					2.5
	Scotland seine					2.5
	Netherlands		1.9	2.1	2.3	2.5

Table 6 - Average weight at length data for sole and plaice used in the calculations.

Sole		Plaice	
Length group (cm)	Weight (gutted) (gr)	Length group (cm)	Weight (gutted) (gr)
15.5	31.5	9.5	9.0
16.5	37.8	10.5	12.1
17.5	45.3	11.5	15.8
18.5	54.3	12.5	20.2
19.5	63.8	13.5	25.2
20.5	74.3	14.5	31.0
21.5	85.5	15.5	37.7
22.5	98.0	16.5	45.1
23.5	116.5	17.5	53.6
24.5	131.5	18.5	63.1
25.5	144.5	19.5	73.4
26.5	162.5	20.5	85.0
27.5	182.0	21.5	97.8
28.5	204.0	22.5	111.8
29.5	226.5	23.5	126.7
30.5	250.5	24.5	143.3
31.5	275.5	25.5	160.9
32.5	304.0	26.5	179.8
33.5	332.5	27.5	200.3
34.5	362.5	28.5	222.4
35.5	399.5	29.5	245.6
36.5	421.5	30.5	271.3
37.5	432.0	31.5	297.7
38.5	487.5	32.5	325.9
39.5	552.5	33.5	356.6
40.5	595.0	34.5	388.0
41.5	640.0	35.5	422.2
42.5	692.5	36.5	457.0
43.5	757.5	37.5	494.5
44.5+	800.0	38.5	534.9
		39.5	575.1
		40.5	618.7
		41.5	665
		42.5	713
		43.5	762
		44.5	815
		45.5	870
		46.5	926
		47.5	986
		48.5	1048
		49.5	1111
		50.5	1178
		51.5	1248
		52.5	1320
		53.5	1394
		54.5	1472
		55.5	1552
		56.5	1635
		57.5	1720
		58.5	1809
		59.5	1901
		60.5	1995

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Table 7 - Mesh assessment

Immediate losses in %

Mesh size (mm)	80	85	90	100
Holland, beamtrawl discards	11.7	14.3	15.2	15.3
Holland, beamtrawl	8.4	17.8	27.5	47.6
Belgium, beamtrawl	5.2	13.3	22.2	43.5
England, ottertrawl		6.9	17.1	35.8

Immediate losses in tons (based on 1973 situation) (fresh weight).

Mesh size (mm)	80	85	90	100
Holland, beamtrawl discards	2,399	2,933	3,120	3,129
Holland, beamtrawl	1,714	3,636	5,619	9,745
Belgium, beamtrawl	64	164	273	535
England, ottertrawl		25	62	129

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Table 8 - Mesh assessment.

Long term gains in % E = 0.88 M = 0.10

Mesh size (mm)	80	85	90	100
Holland, beamtrawl	21.1	30.2	37.6	47.4
Belgium, beamtrawl	43.7	66.2	86.8	126.0
England, ottertrawl	51.6	78.5	99.0	155.0
Total these countries	23.3	33.6	42.1	54.9

Long term gains in tons (based on 1973 situation)
(fresh weight)

Mesh size (mm)	80	85	90	100
Holland, beamtrawl	4,319	6,180	7,695	9,701
Belgium, beamtrawl	538	814	1,068	1,550
England, ottertrawl	186	283	358	560
Other countries (Germany, Denmark)	174	247	305	482
Total these countries	5,217	7,524	9,426	12,293

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Table 9 - Immediate losses in %.

Mesh size (mm)	80	85	90	100
Holland, beamtrawl discards	0.7	1.1	1.5	3.3
Scotland, ottertrawl	-	-	-	0
Scotland, seine	-	-	-	0
England, ottertrawl + seine		0	0	0
Belgium, beamtrawl + ottertrawl	-	-	-	-
Germany, ottertrawl	-	-	-	-
Denmark, ottertrawl	-	-	-	-

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Table 10 - Long term gains in % E = 0.7 M = 0.15

Mesh size (mm)	80	85	90	100
Holland, beamtrawl	1.6	1.8	2.0	2.2
Scotland, ottertrawl	2.3	2.9	3.6	5.7
Scotland, seine	2.3	2.9	3.6	5.6
England, ottertrawl + seine	2.3	2.9	3.6	5.6
Belgium, beamtrawl + ottertrawl	2.3	2.9	3.6	5.7
Germany, ottertrawl	2.3	2.9	3.6	5.7
Denmark, ottertrawl	2.3	2.9	3.6	5.6
Total these countries	1.9	2.4	2.8	4.2

Table 11 - Effects on certain national fisheries of changes in mesh size [a]

Species	Fishery	Immediate losses in %				Long term change in yield; %			
		Mesh size (mm)				Mesh size (mm)			
		80	85	90	100	80	85	90	100
Sole	England, ottertrawl		7	17	36	+52	+79	+99	+155
	Belgian, beamtrawl	5	13	22	44	+44	+66	+87	+126
	Netherlands, beamtrawl	8	18	28	48	+21	+30	+38	+ 47
	Netherlands, beamtrawl (discards)	12	14	15	15				
	Total these countries					+23	+34	+42	+ 55
Plaice	England, ottertrawl + seine [b]		0	0	0	+ 2	+ 3	+ 4	+ 6
	Scotland, ottertrawl [b]	-	-	-	0	+ 2	+ 3	+ 4	+ 6
	Scotland, seine [b]	-	-	-	0	+ 2	+ 3	+ 4	+ 6
	Netherlands, beamtrawl	-	-	-	-	+ 2	+ 2	+ 2	+ 2
	Netherlands, beamtrawl (discards)	1	1	2	3				
	Germany, ottertrawl	-	-	-	-	+ 2	+ 3	+ 4	+ 6
	Denmark, ottertrawl	-	-	-	-	+ 2	+ 3	+ 4	+ 6
	Total these countries					+ 2	+ 2	+ 3	+ 4
Cod	England, Scotland			2				+ 3	
	Netherlands (landings)			3				+11	
	Netherlands (catch)			9				+ 4	
	U.K. + Netherlands (landings)							+12	
Haddock	England, trawl		3	6			+ 8	+14	
	England, seine		5	10			+ 6	+ 9	
	Scotland, trawl		5	9			+ 6	+11	
	Scotland, seine		8	14			+ 3	+ 5	
	Netherlands (landings)		6	13			+ 5	+ 6	
	Netherlands (catch)		12	33			-11	-18	
	U.K. + Netherlands (landings)						+ 5	+ 8	
Whiting	England, trawl		19	35			+36	+43	
	England, seine		21	41			+33	+31	
	Scotland, trawl		27	40			+ 4	+ 6	
	Scotland, seine		35	40			- 7	-11	
	Netherlands (landings)		37	52			+19	+28	
	Netherlands (catch)		53	68			-11	-15	
	U.K. + Netherlands (landings)						+14	+18	

a) Data on cod, haddock and whiting taken from the Report of the North Sea Roundfish Working Group, ICES Doc. C.M. 1974/F : 5, Table 28.

b) 0 = less than 0.5 %.