International Council for the Exploration of the Sea

C.M.1977/F:7 - APPENDIX
Demersal Fish (Northern) Committee

REVIEW OF NORWAY POUT AND SANDEEL WITHIN THE NEAFC CONVENTION AREA

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Table of Contents

NORWAY POUT

1. Distribution and Migration

The Norway pout is a small gadoid restricted to the temperate zone of the northeast Atlantic. Although caught by demersal trawls it feeds on planktonic organisms close to the sea-bed, and its distribution is centred between depths of 100m and 250m.

1.1 Adult distribution

The limits of Norway pout distribution are shown in Figure 1.1. Within the area shown, the greatest concentrations occur in the northern North Sea, and density is much lower in the northern parts of the range.

1.2 Spawning distribution

Spawning occurs in the major areas of Norway pout distribution, but detailed information is available only for the northern North Sea (Figure 1.2). The spawning season is March-April in the North Sea but in May off Iceland. Spawning first occurs at an age of 1 or 2 years, possibly depending on abundance.

1.3 Immature distribution

The distribution of pelagic 0-group Norway pout corresponds closely to the spawning areas in the northern North Sea. Subsequent dispersal is indicated by the much wider distribution of the 1-group recorded by the International Young Herring Surveys in winter, especially in the central North Sea and Skagerrak.

Little is known about the distribution of immature fish in other areas, although larvae have been recorded at low density along most of the Norwegian coast. It is possible that recruitment to Faroe Bank and plateau is partly derived from spawning areas to the north of Scotland, but there is no confirmatory evidence.

1.4 Migrations

No migrations of Norway pout are known. Raitt (1965) concluded from the incidence of an eye parasite that no emigration occurs from the west to the east of Scotland, but some dispersal in the other direction cannot be ruled out. There is no information for other areas, but presumably concentration towards the spawning areas occurs from adjacent areas.

2. Exploitation

2.1 Development of the fisheries in the North Sea (and Skagerrak)

Fishing for Norway pout with small-meshed bottom trawls with a light foot-rope commenced during the late 1950s. Since then an increasing trend in the annual landings has been observed, reaching a maximum of approximately 736 000 tons in 1974. It should be noted, however, that the recorded landings in previous years were not necessarily exact, owing to lack of adequate sampling of mixed catches. The Norwegian fishery, for instance, has to a large extent depended upon the availability of blue whiting in the Norwegian Deep, and a considerable proportion of the landings recorded as Norway pout has been blue whiting. These by-catches have been extracted using results of extensive sampling in recent years (from 1972 onwards), and the estimated Norway pout catch figures are given in Table 2.1.

The fishery is conducted by several countries, of which Denmark, Norway and the Faroes contribute the bulk of the landings. The catches are mainly reduced to fish meal and oil.

2.2 Fisheries in other areas

In recent years fisheries for Norway pout have gradually developed locally off the coast of Norway between 62°N and 64°N, and in the north Minch (Scottish west coast) and around the Faroes and Iceland (Figure 1.1).

Off Norway the landings mainly consist of blue whiting, great silver smelt and silvery pout, whereas the contribution of Norway pout is rather small. This has been accounted for in Table 2.1, which gives landings by ICES fishing areas. By-catches in the Minch fishery are small. No detailed information on catch composition in the Norway pout fisheries around the Faroes or Iceland were available to the Working Group, but off the southwest coast of Iceland up to 30% - 40% of the landings recorded as Norway pout consist of blue whiting.

2.3 Distribution of catch from the North Sea (and Skagerrak)

During the past few years there has been little change in the distribution of catches. The Danish and Faroese fisheries mainly take place in the northwestern North Sea and the Norwegian fishery in the Norwegian Deep. From the former area most catches are landed during the last half of the year, whereas in the latter area summer appears to be the peak fishing season (Table 2.3).

Most trawlers fishing for Norway pout conduct fishing on an annual basis (throughout the year), but part of the (Norwegian) fleet divert towards sandeel fishery in the summer.

Distribution of Norway pout catches in the North Sea from 1972-76 is shown in Figures 2.2.1 - 2.2.5 of Doc. C.M.1977/F:7.

3. Management Units

Since 1-group and older Norway pout are rarely found in midwater, it is unlikely that they migrate across deep water. It, therefore, seems appropriate to consider the Icelandic, Faroese and Norwegian coastal areas as having stock separate from the North Sea stock, although some recruitment from one to another by larval drift cannot be ruled out.

In the North Sea and around the British Isles the situation may be more complicated. The age composition differs between the North Sea and the Scottish west coast, but it is not known whether this is due to different mortality rates in the two areas or to emigration of fish from the North Sea. Since there is no direct evidence of the latter, the North Sea is treated here as a single management unit. Within the North Sea, the major concentrations are found in the north and there are no obvious discontinuities in the distribution within this area.

4. Regulations

Norway pout is one of the NEAFC Recommendation 2 species which may be fished with trawls of mesh size less than 50 mm. Apart from this, no direct regulatory measures have been applied to the stocks. The Norwegian fishery in the North Sea, however, was indirectly affected in 1975 as it was stopped in late November because the national whiting quota had been fished by that time.

Table 2.1 NORWAY POUT.
Estimated landings by ICES fishing areas, 1966-76 ('000 metric tons).

	Fishing areas							
Year	IIa	IIb	IIIa[1)]	IV	Va[2)]	Vb	VI	VII
1966	0.8	-	12.8	53.0	-	-	-	0.2
1967	0.5	-	13.5	182.6	-	+	-	0.2
1968	0.8	-	17.6	451.8	-	-	-	0.1
1969	2.0	-	16.4	113.5	0.9	-	-	+
1970	1.7	-	16.2	238.0	2.9	-	-	0.2
1971	1.1	-	26.1	305.3	3.0	-	2.0	0.2
1972	0.8	-	17.3	444.8	+	+	3.9	0.2
1973	1.3	-	23.8	345.8	8.5	-	11.0	0.3
1974	0.4	-	10.7	735.9	14.1	+	6.9	7.6
1975	2.2	+	19.9	559.7	4.3	+	8.7	9.7
1976	1.0	-	37.9	445.0	27.8	+	13.5	4.8

+ = less than 100 t.

1) Including minor quantities of great silver smelt, Argentina silus.

2) Including an unknown by-catch of blue whiting and other species.

Table 2.3 Monthly landings of NORWAY POUT in 1975 and 1976 ('000 metric tons).

Month	West of 2°E						East of 2°E x)			
	Denmark		Norway		Scotland		Denmark		Norway	
	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
Jan.	14.9	3.9	0.7	0.1	0.8	1.2	2.3	0.4	1.7	1.9
Feb.	11.4	6.9	2.2	0.2	4.5	1.9	3.8	1.0	11.0	5.1
Mar.	5.3	4.8	2.7	0.1	2.3	1.3	0.8	2.7	7.3	4.8
Apr.	1.3	12.4	4.9	1.0	0.5	0.2	1.9	7.3	6.5	7.2
May	0.6	9.8	1.0	4.6	0.7	0.1	10.1	1.8	25.9	10.3
Jun.	0	0.7	3.9	0.9	1.1	0.3	14.8	0.6	26.2	13.6
Jul.	12.4	19.7	11.3	3.5	3.1	1.2	18.7	5.7	12.3	6.3
Aug.	23.1	29.6	22.4	8.6	1.7	3.1	13.8	0.7	10.1	6.8
Sep.	24.0	36.5	11.6	6.8	1.5	0.7	4.0	0.5	4.5	5.5
Oct.	40.3	29.5	18.6	2.2	3.1	1.9	0.2	0.3	10.0	1.9
Nov.	21.4	31.1	8.3	9.8	2.4	2.8	1.4	0.5	8.1	3.6
Dec.	15.3	33.8	0.2	2.6	1.1	2.6	1.0	0.3	<0.1	1.5

x) Including Tampen Bank (61°30' - 62°N, 0°-2°E).

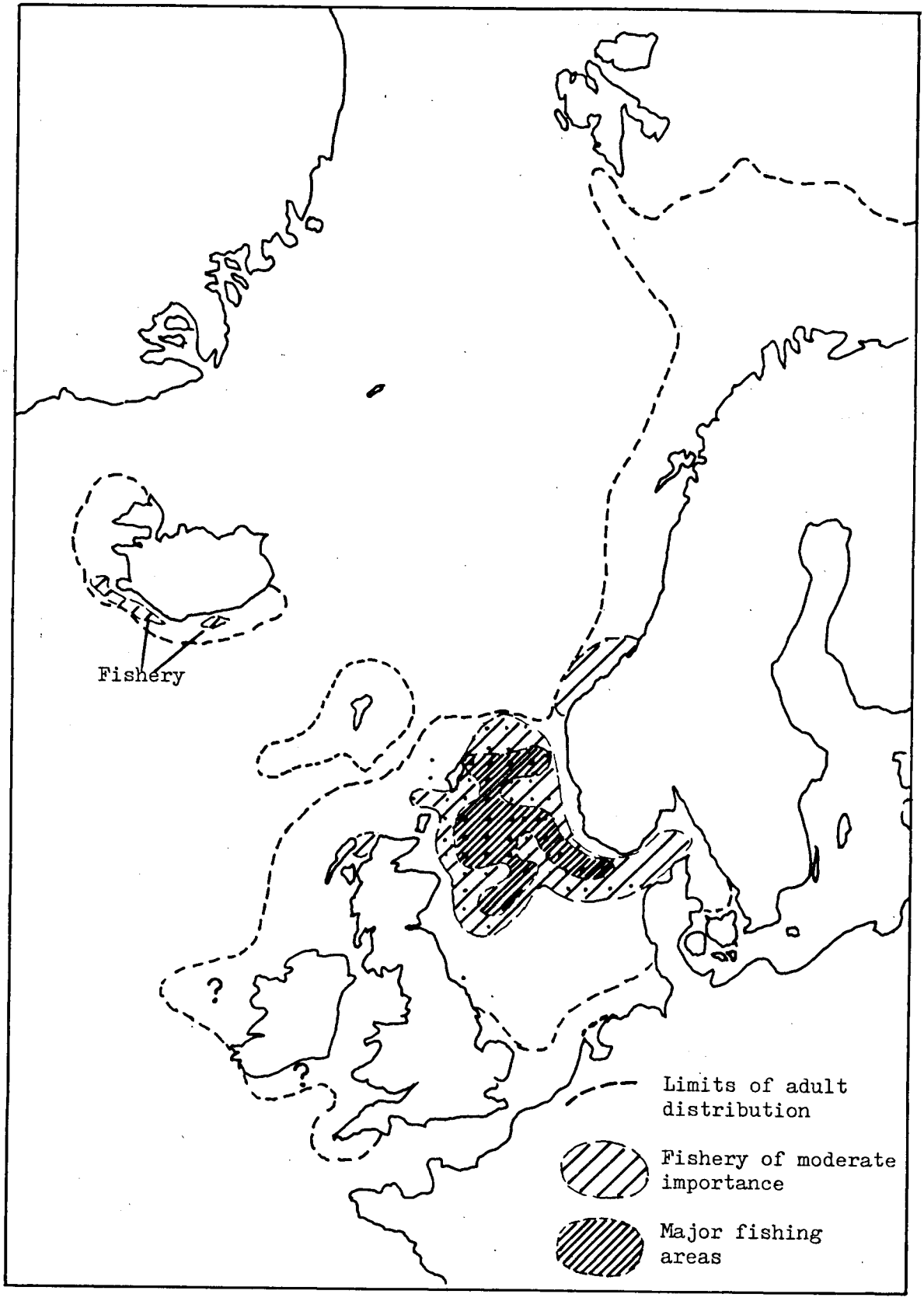

Figure 1.1. The distribution of adult Norway pout and known fishing areas.

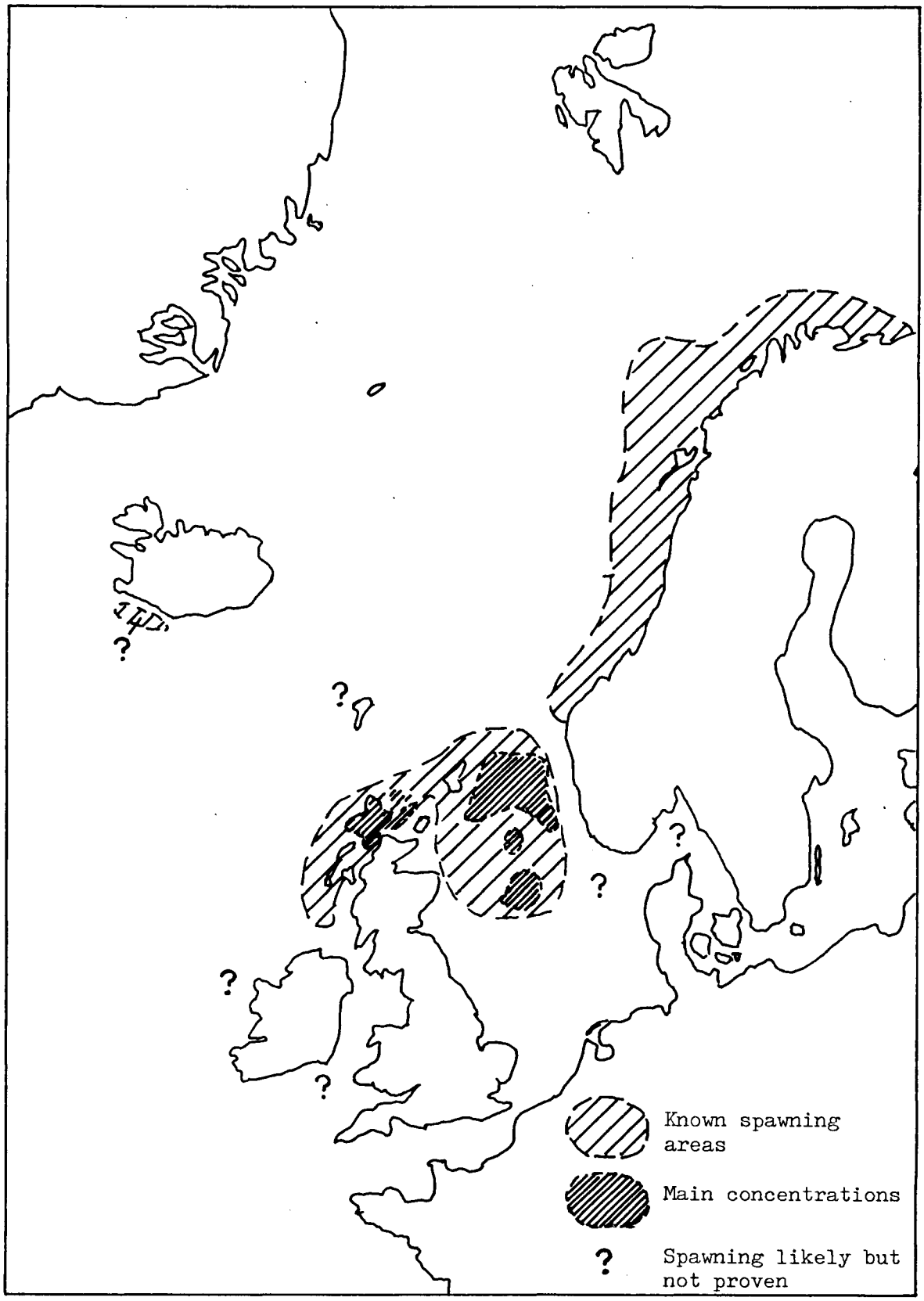

Figure 1.2. Spawning distribution of Norway pout as shown by the distribution of eggs and small larvae.

SANDEEL

1. Distribution and Migration

1.1 Adult distribution

The lesser sandeel (Ammodytes marinus, Raitt) is by far the most abundant of the five or six species of North Atlantic sandeels. The distribution of A. marinus (Figure 1.1) is boreal/boreo-arctic and confined to the continental shelf. The northern limit is about 73°N (Novaja Zemlja) while 49°N (western end of the English Channel) is the southernmost habitat hitherto recorded. A. marinus is absent from the northeastern Baltic.

The sandeel is common on clean, coarse sand within the 100 m depth contour. Dense concentrations often occur in association with relatively high current velocities, e.g. over bank ridges and along edges of shallower ground.

In the southern North Sea A. marinus is most abundant at depths of 20-40 metres. Major concentrations are found on the banks off East Anglia, on the western part of Dogger Bank, Borkum Riff, Sylt Grounds, Horns Reef and the Jutland Reef. Since 1969 the commercial fisheries have exploited additional areas in deeper water like Inner Shoal, Ling Bank and the western edge of the Norwegian Deep to Viking Bank. It is not clear whether this recent development is due to an expanded area of distribution of the North Sea sandeel or to a considerable increase in the size of a stock already present.

1.2 Spawning distribution

The main spawning grounds in the North Sea are indicated in Figure 1.2, which shows the distribution of small larvae. Apparently the occurrence of small fry is associated with the distribution of the adult sandeel. As data on the distribution of the demersal eggs are insufficient for any assessment to be made, it can be tentatively concluded that spawning occurs in the major parts of sandeel distribution and is not confined to restricted spawning areas.

Data on the occurrence of small larvae in the northeastern North Sea are insufficient to elucidate the above-mentioned development in that area.

Spawning takes place in late December in the central and southern North Sea and perhaps somewhat later in the northern part. The eggs are buried in the sand, and hatching seems to take place when the eggs are incidentally freed from the substratum by the action of water movement (Winslade, 1976). Hatching thus takes place over an extended period of time and as late as April-May pelagic sandeel larvae in all stages are caught in plankton hauls.

1.3 Immature distribution

Older larvae are dispersed over the main part of the central and southern North Sea. At about 5 cm of length the young sandeel assumes the demersal habit of the adult and occurs in the same habitats from late summer and onwards.

1.4 Migrations

Tagging experiments indicate that the adult sandeel undertakes little seasonal migration, at least in the southern North Sea. In the post-larval stage the young sandeel is assumedly capable of active movements towards areas of suitable substratum but there is no evidence of special nursery areas from which an emigration of adolescent sandeels takes place.

2. Exploitation

2.1 Gear and fishing season

Fishing for sandeel is almost exclusively carried out using a light bottom trawl with a small-meshed cod end (less than 16 mm). In the central and southern North Sea single tow is used as the rule while pair trawling may also be applied at greater depths in the northern North Sea.

The fishing season includes March to October, and more than 70% of the yearly landings are taken in May and June (see Table 2.1). This seasonality is associated with a life pattern peculiar to the sandeel. It spends the major part of its life buried in the bottom substratum interrupted by relatively short periods of high activity during which it becomes available to fishing.

The main period of activity is April to July when feeding takes place.

Table 2.1 indicates that the main fishing season in the northern North Sea takes place somewhat later than in the south.

2.2 Landings

Total landings by ICES fishing areas are given in Table 2.2. In Division IIIa the main catches are taken in Skagerrak, while sandeel fishing in the Kattegat is rather sporadic.

The distribution of the fisheries in the North Sea covers that of the adult sandeel. Until 1970 the landings were almost exclusively taken in the central and southern North Sea. After 1970 an important fishery developed east of Skagerrak and accounted for almost 2/3 of the total North Sea catch in 1974. It is at present not clear whether this extension of the fishing area is of a permanent character.

Distribution of sandeel catches in the North Sea from 1972-76 is shown in Figures 3.1.2 - 3.1.6 of Doc. C.M.1977/F:7.

3. Management Units

Owing to the sandeel's affinity to sandy bottom its distribution is markedly discontinuous. From the lack of evidence of migration habits in adult sandeels, it may be deduced that larval drift is the main mean of interchange between separate concentrations. The current-systems in the North Atlantic make it unlikely that the sandeel stocks around Iceland and the Faroes are intermingling with other stocks. They are supposedly self-contained and may be regarded as separate menagement units.

At the present state of knowledge of the biology of the sandeel in the North Sea it is not possible to define management units in that area.

4. Regulations

According to NEAFC Recommendation (2), paragraph 1, fisheries for sandeel may be carried out within the North Sea using trawl nets having meshes smaller than 16 mm in the period 1 March to 31 October. In this period not more than 10% by weight of the catch may consist of other species than sandeel (NEAFC Recommendation 5 (A)).

Table 2.1 SANDEEL.
Monthly landings in the Scottish (Div.IVa) and Danish sandeel fisheries (total North Sea).

	1974		1975		1976	
Months	Scotland (in tons)	Denmark (1 000 t)	Scotland (in tons)	Denmark (1 000 t)	Scotland (in tons)	Denmark (1 000 t)
Jan.			3.2			
Feb.			3.0			
Mar.		4.9	232.4	19.2	41.8	4.3
Apr.		40.0	1 181.4	16.9	2 374.9	34.2
May	569.0	156.5	1 407.3	132.0	1 492.2	140.5
Jun.	2 088.1	170.2	1 938.7	122.9	3 345.6	163.0
Jul.	1 558.8	19.2	3 399.4	48.5	5 501.5	38.5
Aug.	2 127.0	24.5	3 941.9	10.4	3 891.1	13.5
Sep.	1 481.4	8.6	923.3	2.0	1 160.8	20.3
Oct.	818.5	0.4	181.0	0.3	869.4	7.4
Nov.	138.6	-	-	-	19.1	0.9
Dec.	-	-	-	-	-	0.7
Total	8 781.4	424.1	13 217.6	352.1	18 696.4	423.5

Table 2.2 SANDEEL.
Total international landings of sandeel by ICES Fishing areas ('000 tons).

Year	Div.IIa	Div.IIIa	Sub-area IV[2)]
1966	1.1	18.5	161.1
1967	.4	20.7	188.8
1968	-	7.0	194.2
1969	-	1.6	113.0
1970	.6	3.2	191.4
1971	-	21.6	382.1
1972	.2	7.9	358.4
1973	-	9.9	296.9
1974	-	7.9	524.2
1975	+	16.2	428.3
1976		21.0[1)]	486.4[3)]

1) Danish landings.

2) Include catches in Norwegian fjords.

3) Danish, Norwegian and Scottish landings.

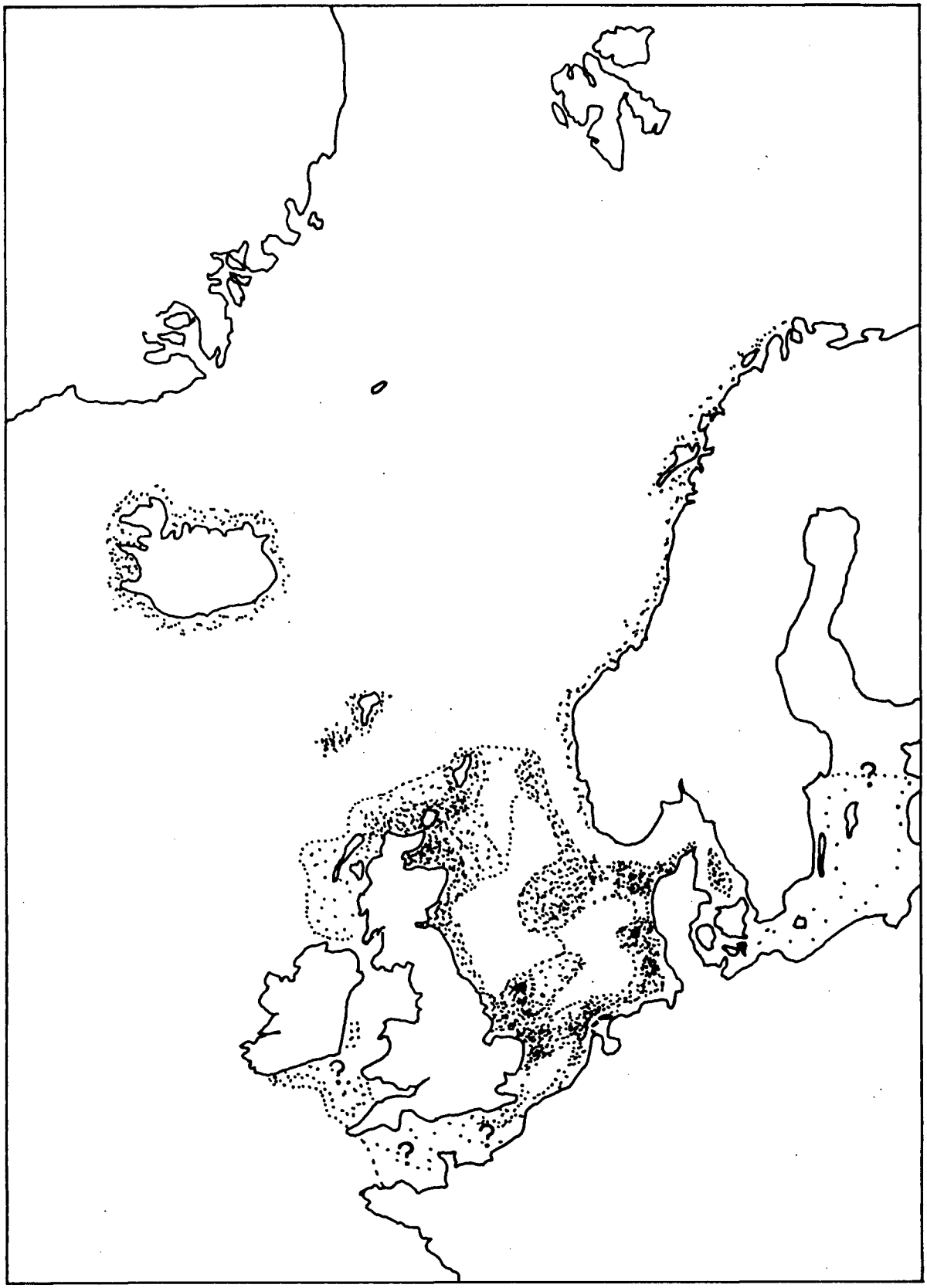

Figure 1.1. Distribution of sandeel (Ammodytes marinus).

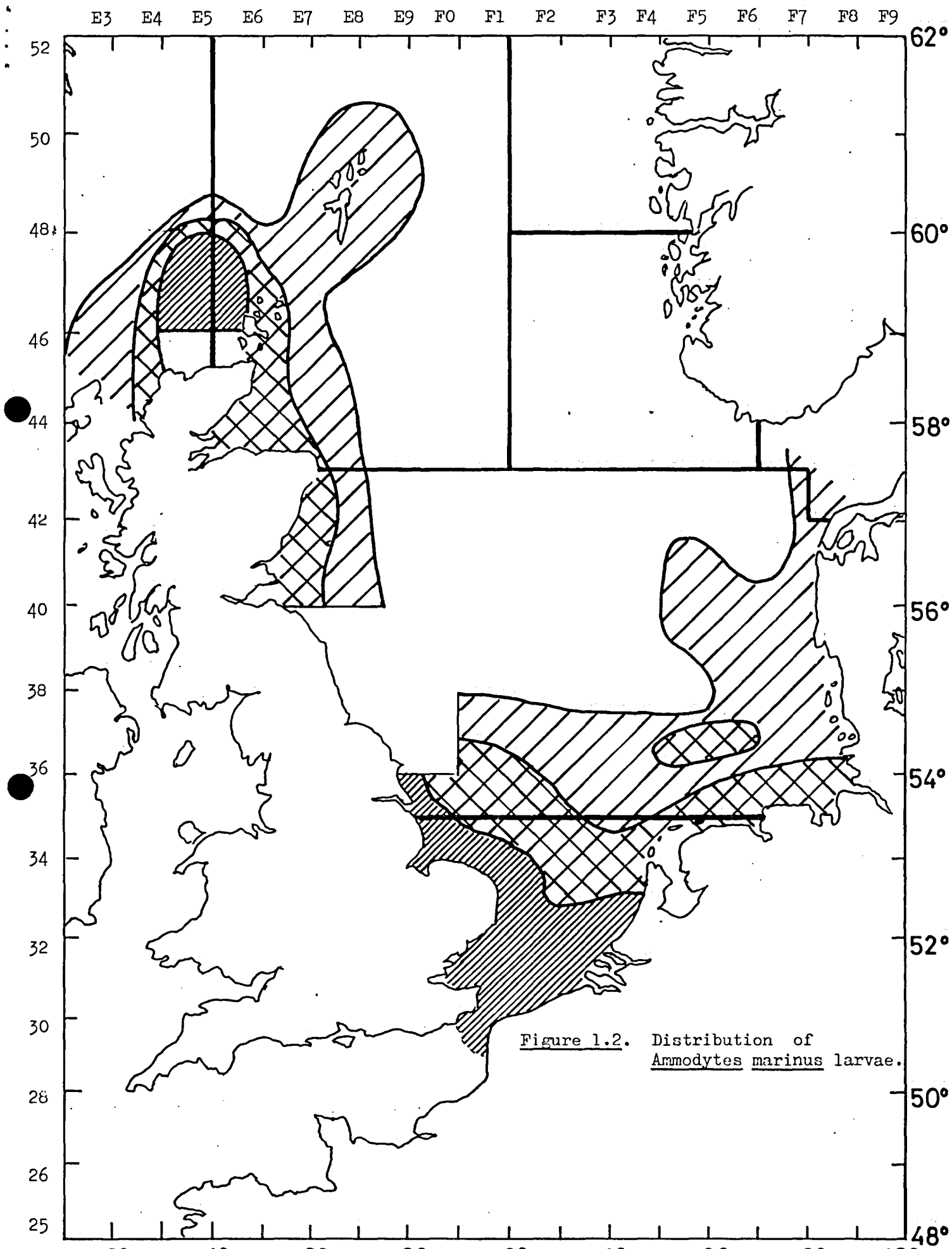

Figure 1.2. Distribution of Ammodytes marinus larvae.