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REVIEW ON THE DISTRIBUTION IN RELATION TO ZONES OF EXTENDED FISHERIES

JURISDICTION OF THE FOLLOWING SPECIES:

COD	Sub-Areas I and II
HADDOCK	Sub-Areas I and II
POLAR COD	Sub-Areas I and II
HALIBUT	Sub-Area I and Division IIb
HALIBUT	Division IIIa and Sub-Areas IV and VI
PLAICE	Sub-Areas I and II
COMMON DAB	Sub-Areas I and II
LONG ROUGH DAB	Sub-Areas I and II
CATFISH	Sub-Areas I and II
LUMPSUCKER	Division IIa

Note: This Report has not yet been approved by the International Council for the Exploration of the Sea; it has therefore at present the status of an internal document and does not represent advice given on behalf of the Council. The proviso that it shall not be cited without the consent of the Council should be strictly observed.

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The species and areas dealt with in this Appendix are:

1. Cod	Sub-area I and II
2. Haddock	Sub-area I and II
3. Polar cod	Sub-area I and Division IIb
4. Halibut	Division IIIa and Sub-area IV and VI
5. Halibut	Sub-area I and II
6. Plaice	Sub-area I and II
7. Common dab	Sub-area I and II
8. Long rough dab	Sub-area I and II
9. Catfish	Sub-area I and II
10. Lumpsucker	Division IIa

1. Cod in Sub-areas I and II

The North-East Arctic cod is the main cod stock in the areas. Smaller cod stocks are inhabiting Norwegian coastal waters (coastal cod) and Soviet coastal waters (Turiyanka and White Sea cod). The coastal stocks are to a very high degree related almost exclusively to local coastal waters. They are therefore not described further in this survey.

1.1. Spawning time and area

The North-East Arctic cod aggregate at the spawning areas along the Norwegian Coast from late January to the middle of April (Fig. 1). The peak of the spawning is located to the last week of March and the first week of April. Spawning takes place close inshore, mainly in the Vestfjord. However, some spawning also takes place along the shelf from 62°N to about 70°N.

1.2. Larval and post-larval distribution

Developing pelagic eggs drift with the northgoing stream over the Norwegian shelf (Fig. 2). They arrive as fingerlings in August/September in the

Northern part of the Norwegian zone, in the Svalbard zone and in the USSR zone (Fig. 3). The bulk of the fingerlings are at this time of the year still pelagic. They descend to the bottom during late autumn and early winter. At this time they are about 10 cm and do not make any extensive migration, but spend their first winter in the places of settlement.

1.3. Distribution and migration of juvenile and adult stock components

Two- and three-year olds are able to make active movements. They choose the warmest places in the sea for winter, and summer migrations are aimed to search for food. Differences in the distribution patterns of juveniles are in some years associated with hydrological peculiarities.

The feeding and wintering migrations become more extensive with age. Three- to four-year olds gather in large schools and 4 to 5 year olds make rather long migrations. In summer they are dispersed on shallow banks in the southern Barents Sea and around Bear Island - Spitsbergen for feeding. When the feeding season is over, cod form schools at low depths and migrate to wintering grounds situated in the south Barents Sea (off East Finnmark, West Murman coast) and on slopes of the Bear Island. In warm years the wintering grounds are extended to the Goose Bank in the South Barents Sea and to the southern West Spitsbergen banks. In cool years the wintering and feeding grounds are shifted westwards.

In spring, schools of cod enter the south Barents Sea from the west and north and move eastwards when the water is warm. They feed intensively on the banks in summer. Time and routes of seasonal migrations and the feeding areas change with changing hydrological conditions during the year. Schools of adult cod start west migrations to the wintering and spawning grounds with the onset of winter. Schools of immature cod stay in the Barents Sea in winter, and mature cod continue their migrations to the spawning grounds.

Tagging data indicate that there is no actual exchange between immature cod inhabiting the south Barents Sea and the Bear Island - Spitsbergen area.

However, some mature cod which went to the spawning grounds from the Bear Island - Spitsbergen area are observed in the south Barents Sea after spawning and vice versa.

The young cod stay in the feeding areas until maturation which normally begins at an age of 6 years. Year classes are fully recruited to the spawning stock at an age of about 12 years.

After spawning they migrate back to the Barents Sea and to the Svalbard zone. During April - May the bulk of the spent fish are passing along the Norwegian Continental shelf between the Vestfjord and the North Cape. The spent fish arrive in the Bear Island area in May - June. At least some of these pass this region and reach the Vest Spitsbergen area in July - August. Some are also reaching the Hopen Islands area. However, the main part of the spent fish pass through the northern part of the Norwegian zone and in May - July reach the Soviet zone. During the end of the year the mature fish gradually move westward again on the way to the spawning area and they reach the northern part of the Norwegian zone at the end of the year. In January the main part of the spawning stock migrate south along the coast and the bulk reach the main spawning area in late February and the beginning of March.

1.4. Description of fisheries

The bottom trawl fishery in the south Barents Sea and the Bear Island - Spitsbergen is concentrated on immature cod. Heavy catches are taken at the temperature of $-1^{\circ} - +5^{\circ}\text{C}$. The proportion of mature cod in the catches varies from month to month, but their role is always secondary.

Small quantities of cod are caught during summer and winter by long line off Bear Island (Division IIb). Off the East Finnmark coast (Sub-area I) a fishery with long line, gill net, Danish seine and handline operate during the whole year. Fisheries with other gears than trawl are based mostly on immature cod, but mature cod make up some part of the landings, at least in late autumn and early winter.

The Norway Coast fishery (Division IIa) is by gill net, long line, hand line, Danish seine and trawl. Several nations have taken part in the fishery with trawl, but other gears have only been used by Norway. The target species for all gears in the area south of 71°N is cod with by-catches of haddock, saithe and redfish. Other gears than trawl take the bulk of the nominal catches from this part of Division IIa. The importance of trawl catches are higher in the northern and eastern part of Division IIa. While mature cod is the basis for the fishery in the area south of 71°N , a higher part of the catches are immature fish in the rest of the area.

1.5. History of yield

In the period 1964-1969 the nominal catch of cod in Sub-areas I and II increased from 438 000 to 1 197 000 tons (Tables 1-4). Thereafter the catch declined year by year to 565 000 tons in 1972. From 1973 the catch increased again and the nominal catch reached 1 028 000 tons in 1974. The quota scheme introduced in 1975 stabilised the total catch to about 850 000 tons in the two following years.

The fluctuations in the landings are mainly caused by variation in year class strength. As soon as an abundant year class starts to recruit the fishery in the feeding areas (Division IIb and Sub-area I) the yield increases. When they start to mature, they get less vulnerable to the fishery in the feeding areas, and their availability increases in the spawning areas. The peak of the nominal catch in the spawning area (Division IIa) follows 3 years later than the peak in the feeding areas.

The effort data used for the feeding areas are obtained from the UK fishery. This effort is directed partly to cod and partly to haddock, saithe and redfish or all species combined. Catch per unit effort as measure of the cod abundance must therefore be taken with great reservation. Up to 1974 the effort figures show the same variation as the nominal catches from these areas, which indicate that the variation in effort is caused by the variation in stock abundance. The total effort in Division IIa based on Norwegian units has been much more stable than in the feeding areas.

1.6. Stock fluctuations

Extensive fluctuations are observed in the numerical strength of the year classes. Data obtained in the pre-recruit surveys indicate that strong year classes of cod are 100 times as abundant as poor ones. However, catch statistics indicate that strong year classes at an age of 3 years are 20 times as abundant as poor ones. In the period from 1921 to 1976 20 strong year classes (36%), 26 year classes of medium strength (46%) and 10 poor year classes (18%) have been recorded.

The total stock had a high level in the beginning of the 1950 s but it decreased gradually up to 1965. Then it increased in the following years and culminated by 1968. The lowest stock size in the 1970s was observed in 1971. A new increasing trend has been observed, and this might have culminated by 1975/1976.

The mature part of the stock has showed similar variations as the total. However, the biggest mature stock in a cycle is observed 3 years later than in the total stock. This is caused by year class variation, but intensified activity of man in recent years has become a governing factor for the status of the stock.

1.7. Exploitation pattern

From the early beginning the fishery on North-East Arctic cod was concentrated on the mature cod and to some extent on the adolescent fish. These fisheries were seasonal. The fishery for mature cod took place in January-April, followed by the spring cod fishery up to the end of June. Long lines, gill nets and hand lines were the main gears used. A trawl fishery started in the last part of the 1920s both on migrating mature cod in Division IIa and on adolescent cod in Sub-area I and Division IIb.

The relative importance of the Sub-area I and Division IIb fisheries has increased with time, at the expense of the Division IIa fishery. When the fishery started in 1946, after an almost complete stop in the Sub-area I and Division IIb fishery from 1940-1945 the landings from Division IIa was about 40% of the total landings. This part of the total landings showed a decreasing

trend during the following years, with some increasing years, caused by rich year classes.

Even with the great increase in effort observed for the fishery in the feeding areas the total catch has not increased. This fishery has increased the fishing mortality on the 3-6 year old fish, and the consequences have been that the fishery in periods has been more dependent on recruiting year classes. As soon as a strong year class has recruited the fishing area, the trawl fleet have concentrated their fishery on this in the 2-3 following years. This gives a variation in spawning stock size, and the probability of achieving a very small spawning stock increase. With a stock recruitment relationship poorer year classes might be produced. On the other hand with a situation like this the estimated TAC for the coming year has a wider confidence interval than if the stock is composed of some year classes of reasonable strength.

The increased exploitation of the 3-6 year old fish has decreased the age at first capture. With the present fishing intensity an increase in age at first capture would give a higher yield per recruit and a higher spawning stock biomass.

1.8. International and national regulations

Mesh size regulations have been the most important regulations in the trawl fishery up to the end of 1974. Legal mesh size has since 1967 been 120 mm for trawls made of polyamide. For all other materials the minimum mesh size has been 130 mm. For Danish seine it has been 110 mm for all materials.

No vessel shall use any device by means of which the mesh size in any part of a fishing net is obstructed or otherwise in effect diminished. However, it shall not be unlawful to attach to the underside of the cod end of a trawl any material for the purpose of preventing or reducing wear or tear. This device shall be fastened to the cod end along the foreward and lateral edges. However, notwithstanding this the attachment of a topside chafer or a cover made of a piece of netting, consisting of the same material as the cod end and having in all parts a mesh twice the mesh size of the

cod end is legal. The topside chafer should be fastened to the cod end along the foreward, lateral and rear edges of the netting in such a way that each mesh of the netting concides with four meshes of the cod end. This could hardly be fulfilled by this method of fastening. A more detailed fastening method should therefore be described. These requirements have to some extent been met by the Norwegian regulations which in addition require a mesh by mesh fastening of the topside chafer along the two diagonals.

Illegal chafers have several times been exposed by the international inspection at sea. The most common illegal chafer has been a netting of smaller mesh size than described. Some cod ends have even been lined inside with netting of a mesh size of 60 mm or even less.

The present minimum landing size for cod is 34 cm. This is far below the minimum landing size described by the 25% retention length for the legal mesh size. A minimum landing size of 40 cm would be in conformity with the present regulation.

The objective of introducing a minimum landing size is to reduce the temptation to use a smaller mesh size than described for the gears. If the minimum landing size is put too high in relation to the mesh size too high discarding of undersized fish has to be accepted. These fish are exposed to a very high mortality and the consequence is wasting the resources. On the other hand a too low minimum landing size increases the temptation to use a smaller effective mesh size than enforced.

According to national regulations in USSR the fishery for cod is closed when the scientists observe a too high abundance of cod less than 35 cm in an area.

Fisheries with small mesh nets for polar cod, capelin, herring and prawns are authorized in the area. The mesh size in the trawl used in these fisheries has to be between 16 and 50 mm. Conditions for using such meshes is that these gear should not be used for catching other species than given. These fisheries are in some areas mixed fisheries, and catches of protected species are unavoidable. When fishing with a small mesh net, the part of the catch not intended for human consumption may consist of 10% by weight of undersized protected species.

The present fishery seems to be within this limit, but still some investigations are going on in order to find a method to avoid catching fish when using prawn trawl. These investigations are promising and it is the hope that the by-catch of small cod, haddock and redfish would be reduced to a minimum in future.

In anticipation of these saving gears, Norwegian authorities have put a total ban on prawn trawling in coastal areas inside the 12 n.mile limit shallower than 100 m. Special sensitive fjords have been protected by a complete ban on prawn trawling.

A quota regulation was introduced for Arcto-Norwegian cod in 1975, and the same scheme was prolonged for 1976. A total quota of 810 000 tons was allocated between 10 states. Five other states might according to the Recommendation catch 500 tons each. Furthermore there should be added to the quota of Norway 40 000 tons representing the estimated average annual catch of coastal cod, which, for the purpose of the agreement is deemed to be a separate stock. For the purpose of this agreement there shall also be added to the USSR quota 40 000 tons representing the estimated average annual catch of coastal cod including the White Sea cod.

Where the cod quota is filled before the end of the year the contracting state concerned may nevertheless permit its vessel to continue to fish with gill nets, long lines or hand lines.

In order to keep the exploitation of the aggregated spawning cod in the main spawning area on a reasonable level purse seine is forbidden by Norway to be used in the main spawning area, from the end of January to the middle of April. In order to prevent some additional fishing mortality on young cod and haddock Norway has put a total ban on midwater trawl inside the Norwegian 12 n.mile limit.

2. Haddock in Sub-areas I and II

This species forms many stocks in the North Atlantic and West Polar Ocean. However, only one stock of haddock is recognised in Sub-areas I and II.

2.1. Spawning and distribution of eggs and larvae

Spawning occurs in March-April in a diffuse area on the Norwegian continental shelf from 64°N to 72°N , over the depths 350-600 m (Fig. 4). Eggs and larvae follow the north-easterly current over the Norwegian continental shelf (Fig. 5). They arrive during summer as fingerlings in the northern part of the Norwegian zone and the Soviet zone. Only fringes of each year's production of fingerlings arrive in the Svalbard zone (Fig. 6). The fingerlings adopt the bottom living habitat in late summer and autumn in the whole area of distribution.

2.2. Distribution and migrations of juvenile and adult stock components

Up to the age of two or three years, they inhabit the pelagic layer in summer and move to the off-bottom layer in October-November. The 1-group inhabit mostly coastal and western areas, whereas two- and three-year olds stay in coastal and central areas. The eastern boundary of the stock depends on the temperature conditions. For example the east border is in cool years shifted westward. Haddock start regular seasonal migrations at an age of 3 years. The abundance of juveniles is much higher in the southern Barents Sea than in the Bear Island - Spitsbergen area.

The young haddock stay within the feeding areas until maturation which begins at an age of about 4 years and finishes at an age of about 8 years.

After spawning the spent fish migrate northwards over the Norwegian continental shelf into the Soviet zone as far east as to the Kap Kanin Bank and the north edge of the Goose Bank (Fig. 4). Late in the year they return back to the spawning areas.

2.3. Description of the fishery

The main gear is trawl, but haddock is also caught by long line, hand line, and Danish seine off the Norwegian coast. Little direct fishery for haddock is taking place. It is mainly caught as by-catch in the fishery for cod.

There is no fishery on spawning concentrations. The fishery for haddock in the southern Barents Sea is based mainly on 3-6 year olds, 40-60 cm long, whereas the Division IIa fishery is based on 5-11 year olds, 50-80 cm long.

2.4. History of yields

Nominal catches from Sub-areas I and II were about 182 000 tons in 1968 (Tables 5-8). They decreased year by year up to 1971 when less than 80 000 tons were landed. An increase in catch was observed the two following years and a peak of 320 000 tons was reached in 1973. Since then a decreasing trend in nominal catches is observed.

Only a small part of the total catches have been taken in Division IIb. About 2/3 of the total landings have been taken in Sub-area I, while about 1/4 have been caught in Division IIa.

2.5. The state of the stock

Fluctuation in the catches is caused partly by stock size fluctuation and partly by fluctuation in effort. The high yield in 1972-1975 was caused by a high stock size and a diversion of effort from the cod fishery to the haddock fishery in Sub-area I. This diversion of effort was caused by the low level of the cod stock.

The fluctuation in stock size is mainly caused by year class fluctuation. A fluctuation in year class strength is observed for haddock at an age of 3 years from 1:60.

The total stock size, calculated as the fish of 3 years and older, fluctuated around 400 000 tons in the period 1950-1968, except for the period 1953-1956 with a stock size of about 700 000 tons. This higher stock level was caused by the very abundant 1950-year class. A level of 600 000 tons was reached in 1972-1973, and this was caused by the rich 1969-year class. During the last three years the stock size has dropped to about 300 000 tons, 100 000 tons below the level in the early 1950s and 1960s.

A more pronounced fluctuation has been observed for the spawning stock biomass (6 years and older fish). As for cod the peaks in the spawning stock are usually displaced 2-3 years ahead of the peak of the total stock. A low spawning stock biomass is expected in the immediate future. However, an increase in both total stock and spawning stock biomass is expected

when the 3 most recent year classes 1974-1976, which are of high abundance, recruit the stock of 3 years and older.

2.6. Exploitation pattern

Since the distribution of haddock is similar to that of cod these two species are exploited in conjunction. Being the smaller of the two resources, the haddock fishery has tended to follow the developments in the cod fishery. In absence of a well defined spawning area there is no intensive fishery for spawning haddock as there is for cod.

2.7. International and national regulations

The trawl gear regulations described for North-East Arctic cod are also applied for the fishery for North-East Arctic haddock. The minimum mesh size for trawl is 120 mm for gear made of polyamide and 130 mm for all other materials.

The present minimum landing size for haddock is 31 cm. However, a minimum landing size of 40 cm would be in conformity with the 25% retention length for a mesh size of 120/130 mm.

No quota regulation has so far been introduced for haddock. However, the contracting states of NEAFC which have exhausted their quotas for cod are not permitted to continue a directed trawl fishery for haddock in Sub-areas I and II.

It would be difficult to regulate the haddock fishery independently of the cod fishery. However, if a TAC should be introduced, this could be set at the level that would be expected as a by-catch while fishing for the cod quota.

3. Polar cod in Sub-area I and Division IIb

3.1. Distribution

Polar cod has a circumpolar distribution (Fig. 7). It is very abundant in the eastern Barents Sea, off Novaja Zemlja and near the Kolguev Island. The polar cod is less abundant in the north-western Barents Sea and off Spitsbergen. In summer, schools of Polar cod occur near the ice edge east of Franz Joseph land. The borders of the habitat are shifted to the east and north in warm years and to the west and south in cool years.

3.2. Spawning and distribution of larvae

The major spawning grounds are in the south-east Barents Sea, White Sea and Kara Sea. Some individual spawners are caught on the Bear Island - Spitsbergen shelf. The peak of spawning is in December-January. Polar cod occur in small schools in midwater on the spawning grounds.

The eggs are pelagic. The hatching of the eggs is extended from March-April to August-September with a peak in May-June. Eggs and larvae drift with currents to the north and north-east.

3.3. Distribution of juveniles and adult stock components

Each year's production of fingerlings during summer is living in the mid-water layer west of Novaja Zemlja and along West Spitsbergen (Fig. 8). They migrate during October-November to the near bottom layer.

Polar cod make winter, pre-spawning and spawning migrations to the south of the habitat in autumn - winter and feeding migration to the north in spring - summer. The majority attain sexual maturity at the age 3-4 years at the length of 16-17 cm.

3.4. Description of the fishery and history of yields

Table 9 gives the catch figures from 1965 to 1975. A regular fishery was established in 1969 on open waters in the Barents Sea. The yearly catch has fluctuated between 330 000 tons in 1971 and 50 000 tons in 1975. The

fishery covers a vast area in the eastern part of the Barents Sea from 77° to 68° N and from 40° to 59° E. The main gear is bottom, off-bottom and midwater trawls, but purse seine has also been used. The catches consist mainly of 3-5 years old, 14-26 cm long polar cod.

3.5. State of the stock and the regulations

The state of the stock is not known. No regulatory measures have been introduced.

4. Halibut in Division IIIa and Sub-areas IV and VI

The Atlantic distribution of halibut is shown in Fig. 9. This species is found along West Greenland north to Disko, Nova Scotia to Virginia, Spitsbergen and Bear Island to the Barents Sea and across to Iceland, and the North Sea southwards to Biscay. Few specimens have been observed in the Baltic.

4.1. Spawning times and areas

The halibut spawns in deep water, outside the boundaries of the three fishing areas considered here. Tåning (1936) found eggs in places where the total water depth exceeded 1 000 m (Fig. 10). McIntyre (1959) recorded halibut eggs off south west Iceland in water of a total depth between 659 m and 1 573 m (Fig. 10).

Spawning takes place between March and May-June.

4.2. Larval, post-larval and juvenile fish distribution

Most of the post-larvae recorded by Tåning (1936) were taken in the surface layers (< 30 m), mainly at stations where the total water depth was greater than 700 m. The same author found that bottom stages of 0-group fish were only obtained in inshore Icelandic waters (Faxa Bay and near the Vestmann Islands) in depths of less than 50 m (Fig. 10).

4.3. Distribution of young and adult stock components

The halibut of the North Sea and the Faroe region are predominantly immature and adolescent fish, while those at Rockall and the Icelandic grounds consist predominantly of adults.

4.4. Catch and Management

Information on the halibut fisheries in the areas under discussion is sparse. Devold (1938), drawing attention to the steady decline in North Sea halibut catches from 1920 to 1934, states that the halibut stock can easily become depleted.

Scottish vessels continued to fish with long lines in the North Sea at least up to the early 1960 s, but the principal gear in use today would appear to be the trawl.

Table 10 gives the annual catch, by countries, in fishing areas IIIa, IV and VI together with the annual catch for the whole ICES statistical area. Throughout the period 1960-1969, the halibut catch in the three fishing areas fluctuated between 800 and 1 300 tons (Table 10), but from 1970 onwards, the annual catch fell to around 600 tons. From 1960 to 1963, the total catch throughout the ICES area dropped from 20 000 tons to just over 13 000 tons, but in 1964 and 1965 a large increase in the USSR catch (mainly in the Norwegian Sea) boosted the annual total to around 25 000 tons.

The Bulletin Statistique figures for total halibut catches in 1964, 1967, 1968 and 1969 are not reliable, however, because the USSR statistical returns did not specify halibut as a separate item in these years. Notwithstanding these deficiencies, the high yields of the 1960 s have declined steadily from the 7 000 tons in 1970 to 4 500 tons in 1975 (total ICES area).

Although no effort data are available, nor estimates of mortality, the relative stability of the catches from the predominantly juvenile fisheries of IIIa, IV and VI suggests that the declining yield from the fishery as a whole is the result of excessive fishing mortality on the adult fish.

No regulatory measures have been applied to the halibut, apart from the general restrictions on the mesh size of trawls. In the fishing areas in question, the minimum mesh size is 75 mm.

Such data as are available on the selection of halibut by trawl meshes suggest that the 50% retention length of a 100-110 mm mesh is around 22-24 cm (Rae 1959). Since halibut do not generally reach maturity until 8-10 years of age regulation by mesh size is clearly inappropriate since these fish will be approximately 100 cm in length.

In the absence of a minimum legal size for halibut, therefore, any increased exploitation of the species in fishing areas IIIa, IV or VI must be viewed with some concern.

References

DEVOLD, F., 1938. The North Atlantic Halibut and Net Fishing.
Fisk.Skr. (Ser. HavUnders.) 5:6, 1-68.

McINTYRE, A.D., 1959. Scottish Investigations on Halibut, 1957. Cons. Perm.Int. Explor. Mer, Ann.Biol. 14, 31-32.

RAE, B.B., 1959. Halibut Observations on its Size at First Maturity, Sex Ratio and Length/Weight Relationship. Mar.Res. 4, 1-19.

TÅNING, Å.V., 1936. On the Eggs and Young Stages of the Halibut.
Medd. Komm. Danm. Fisk- og HavUnders. (Ser.Fisk) 10:4, 1-23.

5. Halibut (*Hippoglossus hippoglossus*, L) in Sub-areas I and II

5.1. Spawning times and areas

This halibut stock spawns at soft bottom in deep water (300-1 200 m) along the Norwegian coast and in the fjords, mainly in northern Norway. The spawning takes place from December-April, with a peak in January and February.

5.2. Larval and post-larval distribution

The larvae are hatched in deep water and the larvae rise slowly to the surface where they arrive at the time of first feeding. The halibut larvae

are pelagic up to a length of about 40 mm. Extremely few eggs, larvae and 0-group fish have been observed in Norwegian waters. In recent years a large number of 0-group halibut have been caught in some Icelandic fjords. However, no such places have yet been observed in Norway.

5.3. Distribution and migration of young and adult stock components

I - III-group halibut are often caught in shallow water in Norwegian fjords and on banks along the coast. From age group IV they seem to search for deeper water. Within all types of biotopes the juvenile halibut seem to be a rare species. Recruitment to the spawning stock takes place at an age of about 12 years.

The halibut is a solitary species and little is known about its migration. The adult stock migrate in the autumn from the continental shelf along the coast of Norway and from the Barents Sea to the spawning places along the Norwegian coast. After spawning the spent fish search for food, often in shallow water. Some return to the feeding area in the Barents Sea and others stay in the shelf. The halibut stock along the coast of Norway might not mix with the population spawning west of the Faroes - Iceland ridge.

5.4. Catch and Management

The annual catch of halibut is given in Tables 11-14. Except for 1966 only small quantities are landed from Sub-area I and Division IIb. Most of the landings are from Division IIa. For all years; except for the first one in the period 1966-1975, nearly the whole of the total catch is taken by Norway.

The only directed fishery for halibut is the Norwegian gill net fishery along the coast and in the fjords. This fishery is concentrated in the northern part of Division IIa in the winter during the migration to the spawning grounds. Norway has put a total ban on gill net fishery during the peak of the spawning season, 20 January to 1 March. A minimum mesh size of 23.49 cm bar length has been introduced for gill net and a minimum landing size of 60 cm is described. A fish of this size is 4-6 years old with a weight of 2.5 kg.

6. Plaice in Sub-areas I and II

6.1. Distribution and Biology

The plaice of the North-East Arctic are distributed mainly along the Murman coast between Rybachy peninsular and Kolguev Island, although some are to be found in the vicinity of Bear Island, Novaya Zemlja, off the coast in the central Barents Sea, and along the Norwegian coast. In general the plaice on the Murman coast occur in shallow (30-80 m) depths but during the early part of the year the adult part of the stock migrates to deeper water to spawn in March - May.

6.2. The Fishery and the State of the Stock

The main fishery for plaice in the post-war period used to be by English vessels. As fishery limits were extended to 12 nautical miles catches became reduced as the coastal fish became inaccessible to foreign vessels (Tables 15-18). In the years 1966-1972 the average annual catch was about 300 tons. In 1973 and 1974 large quantities were landed from this stock, particularly from Sub-area I. The total catches reached 16 100 and 18 007 in these two years respectively. In 1975 and 1976 the total catches dropped to 3 376 and 6 531 respectively.

There is no recent assessment on this stock or stocks.

A NEAFC minimum landing size of 29 cm is introduced for the area. Norway has a total ban on plaice fishery during the peak spawning period 1 March to 1 July. The ban is extended to 1 September in a smaller area in the Vestfjord.

7. Common dab (Limanda limanda L.1758) in Sub-areas I and II

7.1. Distribution and biology

The common dab is common in the waters along the European coast from the Barents Sea and the White Sea southwards to the Bay of Biscay, also

off Iceland and in the Baltic. Dab inhabits the shelf (20-200 m depth) in the North-East Arctic where the water temperature is above 0°C.

In summer, dab enters shallow inshore waters and migrate offshore in the beginning of the autumn. The common dab reaches sexual maturity at an age of 4-5 years at a length of approximately 22-24 cm. Dab has no special spawning grounds. Spawning takes place in depth of 20-50 m within a temperature of 2 - 10°C in inlet, bays of the Murman coast in May-August and in the White Sea in June and July.

7.2. The Fishery and the State of the Stock

Only small catches of common dab are recorded in official statistics (Tables 19-22). Common dab is regularly taken as by-catch in the fishery for cod and haddock, but either discarded or reported as unsorted, unidentified species. Therefore the catch of common dab actually taken is expected to be considerably greater than reflected in the statistics.

8. Long rough dab in Sub-areas I and II

8.1. Distribution and biology

Long rough dab occurs from the English Channel to the northernmost part of Spitsbergen, and over the entire Barents Sea. Females mature at an age of 9-11 years and males at 6 years. They spawn in the whole area of distribution, in the open sea and in coastal waters at a depth of 125-200 m with temperatures between 1 and 5°C. Spawning extends from March to July. Spawning schools are not observed. The eggs are pelagic. Larvae hatch at a length of 3-4 mm and live in the midwater layer until they are 3-4 cm. Then they migrate to the bottom. Fig. 11 shows the distribution of the 0-group fish in August/September 1976.

8.2. The Fishery and the State of the Stock

There are no directed fisheries for long rough dab in the Barents Sea. A few nominal landings are given in Tables 23-26. The actual catch, however, must be much higher since the long rough dab is very common as

by-catch in the fishery with bottom trawl for cod, haddock and redfish. The catch consists mostly of fish between 22-37 cm at an age of 5-9 years.

The state of the stock is not known, and no regulatory measures have been introduced.

9. Catfish in Sub-areas I and II

9.1. Distribution and biology

Three species of catfish: Anarchias lupus (Linné), An. minor (Olafsen) and An. lotifrons (Steenstrup et.) inhabit Sub-areas I and II. They do not spawn every year. Their eggs are pelagic and large in size.

An. lupus inhabit the 150-200 m layer in winter and move to more shallow waters during summer. They spawn in July-September. Maturity is attained at an age of 5 years or older, when their length is 36-41 cm. Specimens 40-70 cm long of 0.5-4 kg are abundant in the catches.

An. minor are recorded in concentrations off Spitsbergen, on the slopes around Bear Island, and in the central southern part of the Barents Sea. This species occurs most frequently at depths of 100-200 m. Spawning takes place in June-July. Spawning migrations are likely not to be extensive. Females attain sexual maturity at a length of 80-105 cm. Specimens 90-110 cm long of 7-17 kg dominate the catches. The largest catches are taken in March-April in the Barents Sea.

An. lotifrons occurs mostly at 150-400 m depth, at a lower depth in winter than in summer. The spawning takes place from April to October along the continental slope. Females attain sexual maturity at a length not less than 80-100 cm. Specimens 70-120 cm of 10-20 kg dominate the catches.

9.2. The Fishery and the State of the Stocks

There is no special fishery for catfish, although a directed Norwegian long line fishery occurs sporadically. Substantial by-catches of catfish are sometimes taken during February-July in the USSR cod fishery in the

southern Barents Sea, on the slopes of the Bear Island and on the Central Elevation. About 4/5 of the USSR landings of catfish constitute An. minor.

Tables 27-30 give the nominal landings of the three species combined. The total annual landings in Sub-areas I and II were fairly constant in the period 1966-1972, on the average 14 409 tons. In 1973 the catch was nearly doubled, and it reached a peak of 33 133 tons in 1974. The high catches in 1973 and 1974 were caused by increased USSR catches in Sub-area I and Division IIb, mostly An. minor.

The state of the stocks is unknown and no regulatory measures have been introduced.

10. Lumpsucker (*Cyclopterus lumpus*) in Division IIa

10.1. Distribution and biology

Young lumpsuckers are regularly caught in midwater trawls and on salmon long line over great depths in the Norwegian Sea, in the Barents Sea and in the Svalbard zone. They migrate to the Norwegian coast for spawning. The smallest mature females have a length of about 32 cm and the smallest males about 20 cm. The spawning takes place from March to June in the littoral zone down to -30 m depth, mainly in the outer parts of the coast. After spawning they leave the coastal waters and continue their pelagic life in the open sea. The larval and juvenile fish live in the littoral zone for 1 year. At a length of 50-60 mm they start a pelagic life off the coast. Nothing is known about the migration of adolescent lumpsuckers.

10.2. The Fishery and the State of the Stock

It is only the female C. lumpus which is commercially exploited in Division IIa. The fishery is carried out along the coast of Troms. The fishermen use small boats and gill nets with 12.6 cm bar length. The nets are "set" on the spawning grounds down to about 20 m depth. As the females are bigger than the males, very few males are caught. Only the roe is utilized. Yearly catches have fluctuated between 1 608 and 4 301 tons (Table 31).

Table 1. Nominal catch (metric tons, whole weight) of cod in Sub-area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium	-	-	-	-	-	-	-	-	171	-	-
Faroe Island	-	-	-	-	-	-	-	-	3 582	5 010	4 931
France	2 222	-	-	-	44 245	34 755	8 915	17 128	10 674	19 482	19 040
GDR	2	17	3	1 429	3 662	437	474	98	2 446	2 121	262
FRG	7	823	-	-	3 257	2 452	2 166	12 847	43 581	12 106	16 031
Netherlands	-	-	-	-	-	-	-	-	-	-	-
Norway	100 618	118 315	119 223	120 787	199 286	131 282	78 175	88 548	146 841	158 971	142 046
Poland	-	-	-	7 856	42	12	668	764	2 917	2 860	1 029
Potugal	-	-	-	-	-	-	-	-	25 995	10 554	4 000
Spain	-	-	-	-	-	-	-	33	8 302	4 630	4 509
UK	50 764	48 218	94 689	130 377	119 115	46 101	33 437	55 066	73 452	85 644	58 652
USSR	138 640	155 425	428 537	418 929	229 315	97 466	73 180	318 332	405 528	260 323	288 624
Total	292 253	322 798	642 452	679 373	595 260	312 505	197 015	492 816	723 489	561 701	539 124

Table 2. Nominal catch (metric tons, whole weight) of cod in Division IIb.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium	-	-	-	-	-	-	-	-	-	614	-
Faroe Island	-	-	-	5 026	-	-	543	-	635	4 705	4 706
France	-	-	-	-	-	-	-	-	29 150	5 672	5 600
GDR	85	10	252	3 926	8 634	275	63	1 220	1 381	6 280	4 271
FRG	-	-	-	3 607	2 828	2 958	87	2 286	32 995	15 616	5 416
Norway	6 822	3 534	4 462	24 333	6 931	4 631	6 324	4 096	36 408	17 951	4 650
Poland	-	-	-	-	2 895	526	67	65	6 771	4 097	5 207
Potugal	-	-	-	-	-	-	-	-	-	-	2 000
Spain	-	-	-	-	-	-	-	-	407	2 340	2 335
UK	19 086	10 601	16 225	32 076	25 452	3 948	4 754	11 785	9 449	6 868	17 663
USSR	30 660	106 915	248 221	193 286	47 317	44 580	21 144	68 512	135 272	83 257	51 802
Total	56 653	121 060	269 160	262 254	94 057	56 920	32 982	88 207	254 730	147 400	103 650

Table 3. Nominal catch (metric tons, whole weight) of cod in Division IIa.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium	-	-	-	-	-	-	-	-	-	-	7
Faroe Island	-	-	-	24 348	26 265	5 877	850	1 916	1 500	1 594	1 569
France	745	664	-	--	-	17	-	-	6 204	3 580	3 360
GDR	141	18	112	552	3 662	4 286	693	3 366	1 033	1 580	4 413
FRG	4 284	2 809	1 073	1 827	3 366	4 316	1 189	1 618	1 931	2 315	3 333
Netherlands	121	6	133	-	--	-	-	-	-	-	218
Norway	96 352	97 061	131 926	160 126	171 389	271 131	309 682	192 540	104 027	100 177	187 132
Poland	-	-	-	-	2 216	974	157	14	210	478	750
Portugal	-	-	-	-	-	-	-	-	-	-	1 000
Spain	-	-	-	-	-	213	166	243	1 101	1 230	1 207
UK	33 162	28 189	29 473	68 613	36 914	30 053	20 191	11 957	7 993	9 322	11 712
USSR	-	-	-	-	-	2 756	2 329	351	1	-	1 678
Total	134 805	128 747	162 584	255 599	243 812	319 623	335 257	211 762	124 215	120 276	216 379

Table 4. Nominal catch (metric tons, whole weight) of cod in Sub areas I and II.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium			-						171	614	7
Faroe Island	-	-	-	29 374	26 265	5 877	1 393	1 916	5 717	11 309	11 206
France	2 967	664	-	-	44 245	34 772	8 915	17 028	46 028	28 734	28 000
GDR	228	45	255	5 907	12 413	4 998	1 300	4 684	4 860	9 981	8 946
FRG	4 284	3 632	1 073	5 343	9 451	9 726	3 405	16 751	78 507	30 037	24 780
Netherlands	121	6		133						-	218
Norway	203 792	218 910	255 611	305 241	377 606	407 044	394 181	285 184	287 276	277 099	333 828
Poland	-	-	-	7 856	5 153	1 512	892	843	9 898	7 435	6 986
Portugal									25 995	10 554	7 000
Spain						215	166	276	9 810	8 200	8 051
UK	103 012	87 008	140 387	231 066	181 481	80 102	58 382	78 808	90 894	101 834	88 027
USSR	169 300	262 340	676 758	612 215	276 632	144 802	96 653	387 196	540 801	343 580	342 104
Total	483 704	572 605	1 074 084	1 197 226	933 246	689 048	565 287	792 686	1 102 434	829 377	859 153

Table 5. Nominal catch (metric tons, whole weight) of haddock in Sub-area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium									20	-	
Faroe Island	-	-	-	-	-	-	-	1 015	626	38	40
France	-	-	-	-	-	-	-	3 214	1 166	2 697	325
GDR	-	11	-	-	-	-	785	-	62	3	43
FGR	-	144	-	-	-	17	436	8 116	11 150	7 480	13 041
Netherlands										-	
Norway	64 190	40 461	51 661	53 988	26 040	35 183	35 152	67 889	42 121	31 818	27 984
Poland	-	-	-	-	-	-	1 397	304	2 787	669	183
Portugal										-	450
Spain									6 209	1 538	1 499
UK	11 215	10 115	13 655	11 537	6 595	6 969	10 523	23 349	18 353	14 981	6 940
USSR	48 710	57 346	75 654	24 211	26 802	14 822	173 675	179 841	76 543	62 462	49 062
Total	124 115	108 077	140 970	89 736	59 437	56 991	221 968	283 728	159 037	121 686	99 567

Table 6. Nominal catch (metric tons, whole weight) of haddock in Division IIb.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium										47	
Faroe Island	-	-	-	-	-	-	-	117	78	4	3
France									1 242	1 713	206
GDR	-	-	-	-	159	-	41	1	16	24	37
FRG	-	-	-	-	-	-	44	597	6 953	2 765	841
Netherlands										-	
Norway	967	169	57	113	56	10	385	1 519	2 297	1 011	250
Poland	-	-	-	-	-	6	4	2	258	263	710
Portugal										-	100
Spain									307	902	887
UK	647	271	668	452	497	477	1 722	4 060	1 269	444	662
USSR	-	-	-	-	-	-	-	6 693	1 928	2 553	7 277
Total	1 614	440	725	565	712	463	2 196	12 989	15 068	9 726	10 973

Table 7. Nominal catch (metric tons, whole weight) of haddock in Division IIa.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium											5
Faroe Island				2	541	81	137	80	221	257	261
France	1 072	1 208							1 193	781	94
GDR	11	3	204	309	497	16	3	21	376	410	268
FRG	2 098	1 561	1 867	1 490	2 119	879	953	870	5 306	5 685	2 446
Netherlands	74	23		25		3	2 223				246
Norway	16 933	11 324	12 358	13 448	10 620	10 522	11 163	17 359	21 746	23 137	19 228
Poland						43	32	19		148	93
Portugal											450
Spain									809	676	673
UK	15 861	13 772	25 806	25 245	13 331	8 957	4 921	4 999	16 671	13 236	9 065
USSR						956	22 550		77		215
Total	36 049	27 891	40 235	40 519	27 108	21 457	41 982	23 348	47 033	44 330	33 044

Table 8. Nominal catch (metric tons, whole weight) of haddock in Sub-areas I and II.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium									20	47	5
Faroe Island				2	541	81	137	1 212	925	299	304
France	1 072	1 208						3 214	3 601	5 191	625
GDR	1	14	204	309	656	16	829	22	454	437	348
FRG	2 098	1 705	1 867	1 490	2 119	896	1 433	9 583	23 409	15 930	16 328
Netherlands	74	23		25		3	2 223				246
Norway	82 090	51 954	64 076	67 549	36 716	45 715	46 700	86 767	66 164	55 966	47 462
Poland						49	1 433	325	3 045	1 080	986
Portugal											1 000
Spain									7 325	3 116	3 059
UK	27 723	24 158	40 129	37 234	20 423	16 373	17 166	32 408	36 293	28 661	16 667
USSR	48 710	57 346	75 654	24 211	26 802	15 778	196 225	186 534	78 548	65 015	56 554
Total	161 778	136 408	181 930	130 820	87 257	78 911	266 146	320 065	221 138	175 742	143 584

Table 9. Nominal catch (metric tons, whole weight) of polar cod in Sub-area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Norway	-	-	-	17 761	8 947	16 484	388	2 831	77	38	
USSR	838	3 484	2 195	116 547	234 409	331 576	166 377	79 403	123 611	63 124	
Total	838	3 484	2 195	134 308	243 356	348 060	166 765	82 234	123 688	63 162	

Table 10. Annual catches (metric tons) of halibut (Bulletin Statistique).

Year	Total ICES Area	IIIa, IV, VI	
		total	%
1960	20 334	1 293	6.4
1961	17 460	1 087	6.2
1962	13 569	876	6.5
1963	13 322	852	6.4
1964	35 833 ^{a)}	967	2.7
1965	27 496	1 147	4.2
1966	17 336	921	5.3
1967	7 657	880	11.5
1968	6 835	1 082	15.8
1969	6 357	819	12.9
1970	6 957	620	8.9
1971	6 346	606	9.5
1972	5 177	617	11.9
1973	5 176	535	10.3
1974	4 662	643	13.8
1975	4 578	649	14.2

^{a)} The USSR catch of 26 191 tons includes an unknown proportion of Greenland halibut.

Table 11. Nominal catch (metric tons, whole weight) of halibut in Sub-area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium									6		
FRG		10					3	1	6	4	
Norway	160	133	207	44	36	62	49	55	27	24	
Poland							1	6			
UK (England & Wales)	195	92	50	40	46	37	34	25	15	9	
UK (Scotland)										1	
USSR	991				3						
Total	1 346	235	257	84	85	99	87	87	54	38	

Table 12. Nominal catch (metric tons, whole weight) of halibut in Division IIb.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium										8	
FRG							1		16	7	
Norway		1				1			+		
Sweden						3					
Poland					4				2	2	
UK (England & Wales)	26	11	2	2	5		2	6	2	+	
UK (Scotland)					1	1	1	1	+		
USSR	3 279				51						
Total	3 305	12	2	2	61	5	4	7	20	17	

Table 13. Nominal catch (metric tons, whole weight) of halibut in Division IIa.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Faroe Island						3					
FRG	41	41	16	14	15	8	15	19	39	49	
Netherlands	Ø?										
Norway	1 979	1 959	1 796	1 961	1 716	1 446	1 295	1 503	1 305	1 120	
Sweden										+	
Poland							3		4		
UK (England & Wales)	214	145	98	128	93	75	42	30	18	15	
UK (Scotland)					1	2	1	+	1	1	
USSR	5 498										
Total	7 732	2 145	1 910	2 103	1 825	1 534	1 356	1 552	1 367	1 185	

Table 14. Nominal catch (metric tons, whole weight) of halibut in Sub-areas I and II.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium									6	8	
Faroe Island						3					
FRG	41	51	16	14	15	8	19	20	61	60	
Netherlands	Ø										
Norway	2 139	2 093	2 003	2 005	1 752	1 509	1 344	1 558	1 332	1 144	
Sweden						3					
Poland					4		4	6	6	2	
UK (England & Wales)	435	248	150	170	144	112	78	61	35	24	
UK (Scotland)					2	3	2	1	1	2	
USSR	9 768				54						
Total	12 383	2 392	2 169	2 189	1 971	1 638	1 447	1 646	1 441	1 240	

Table 15. Nominal catch (metric tons, whole weight) of plaice in Sub-area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976*
German, Fed. Rep.									112	26	512
Norway	150	71	110	183	198	117	120	131	31	67	.. a)
U. K. (Eng. & Wal.)	1 692	274	1 226	2 070	2 650	4 307	2 539	985	304	2 809	
U. K. (Scotland)										29	
USSR								10 074	11 869		4 352
Total	1 842	345	1 336	2 253	2 848	4 424	2 659	11 190	12 316	2 931	

* Preliminary.

a) I included with IIa.

Table 16. Nominal catch (metric tons, whole weight) of plaice in Division IIb.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 [*]
German, Dem. Rep.	-	-	-	-	-	-	-	12	-	22	-
Germany, Fed. Rep.	-	-	-	-	-	-	-	-	10	2	-
Norway	-	-	-	-	-	-	-	21	-	-	... ^{a)}
U. K. (Eng. & Wal.)	-	5	22	19	5	-	13	24	1	42	-
U. K. (Scotland)	-	-	-	-	20	1	11	1	-	-	-
USSR	-	-	-	-	-	-	-	4 256	5 187	-	829
Total	-	5	22	19	25	1	24	4 314	5 198	66	

* Preliminary.

a) IIb included with IIa.

Table 17. Nominal catch (metric tons, whole weight) of plaice in Division IIa.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 [*]
France	19	31	-	-	-	-	-	-	-	-	-
German, Dem. Rep.	-	-	-	-	-	-	-	2	-	-	4
Germany, Fed. Rep.	-	-	-	-	-	-	2	+	12	1	10
Netherlands	-	1	-	--	-	-	-	-	-	-	-
Norway	1 087	755	563	643	603	395	440	555	461	371	700 ^{b)}
Sweden	-	-	-	-	-	-	-	-	-	+ ^{a)}	-
U.K. (Eng. & Wal.)	33	62	18	99	44	108	26	11	11	7	-
U.K. (Scotland)	-	-	-	-	+	1	+	-	-	-	-
USSR	-	-	-	-	-	-	-	28	9	-	124
Total	1 139	849	581	742	647	504	468	596	493	379	

* Preliminary.

a) IIa includes smaller quantities taken in other areas than IIa, IV and III a,b,c.

b) IIa includes I and IIb.

Table 18. Nominal catch (metric tons, whole weight) of plaice in Sub-areas I and II.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
France	19	31									
GDR								14		22	4
FRG							2	+	134	29	522
Netherlands		1									
Norway	1 237	826	673	826	801	512	560	707	492	438	700
Sweden										+	
U.K. (Eng& Wal.)	1 725	341	1 244	2 188	2 699	4 415	2 578	1 020	316	2 858	
U.K. (Scotland)					20	2	11	1		29	
USSR								14 358	17 065		5 305
Total	2 981	1 199	1 939	3 014	3 520	4 929	3 151	16 100	18 007	3 376	

Table 19. Nominal catch (metric tons, whole weight) of common dab in Sub-area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 ^x
FRG	-	-	-	-	-	-	-	39	63	120	
UK (England & Wales)	45	14	17	7	19	21	15	14	36	39	
UK (Scotland)	-	-	-	-	-	-	-	-	-	7	
Total	45	14	17	7	19	21	15	53	99	166	

^xPreliminary

Table 20. Nominal catch (metric tons, whole weight) of common dab in Division IIb.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
GDR	-	-	-	-	-	-	-	-	-	67	
FRG	-	-	-	-	-	-	-	18	72	121	
UK (England & Wales)	-	1	-	1	-	-	2	5	1	-	
UK (Scotland)	-	-	-	-	9	17	23	25	9	-	
Total	-	1	-	1	9	17	25	48	82	188	

Table 21. Nominal catch (metric tons, whole weight) of common dab in Division IIb.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
France	..a)	-	-	-	-	-	-	-	-	-	-
FRG	-	-	-	-	-	-	-	4	9	16	
Sweden	-	-	-	-	-	-	-	-	-	+b)	
UK (Engl.& Wales)	-	-	1	1	1	2	+	4	4	3	
UK (Scotland)	-	-	-	-	+	+	4	1	+	-	
Total	..	-	1	1	1	2	4	9	13	19	

a) Included in Lemon sole

b) IIa includes smaller quantities taken in other areas than IIa, IV, IIIa, b, c, d.

Table 22. Nominal catch (metric tons, whole weight) of common dab in Sub-areas I and II.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
GDR										67	
FRG								61	144	257	
Sweden										+	
U.K. (Eng. & Wal.)	45	15	18	9	20	23	17	23	41	42	
U.K. (Scotland)					9	17	27	26	9	7	
TOTAL	45	15	18	9	29	40	44	110	194	373	

Table 23. Nominal catch (metric tons, whole weight) of long rough dab in Sub- area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976*
Poland							1				10
U.K. (England & Wales)	1	2			1	1		10	7		
TOTAL	1	2			1	1	1	10	7		

* Preliminary

Table 24. Nominal catch (metric tons, whole weight) of long rough dab in Division II. b.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976*
German Dem. Rep.	-	-	-	-	-	-	-	119	-	377	
Poland	-	-	-	-	-	-	-	-	-	-	186
U. K. (England&Wales)	-	-	-	-	1	-	-	4	-	-	
TOTAL	-	-	-	-	1	-	-	123	-	377	

Table 25. Nominal catch (metric tons, whole weight) of long rough dab in Division II a.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976*
German Dem. Rep.	-	-	-	-	-	-	-	10	-	-	
Poland	-	-	-	-	-	-	-	-	-	-	14
U. K. (Engl. &Wal.)	-	-	-	-	-	-	-	1	1	-	
TOTAL	-	-	-	-	-	-	-	11	1	-	

* Preliminary

Table 26. Nominal catch (metric tons, whole weight) of long rough dab in Sub-areas I and II.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 ^x
GDR								129		377	
Poland							1				210
UK (Eng.& Wales)	1	2			2	1		15	8		
Total	1	2			2	1	1	144	8	377	

^xPreliminary

Table 27. Nominal catch (metric tons, whole weight) of catfish in Sub-area I.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 ^x
Belgium	-	-	-	-	-	-	-	-	2	-	
Faroe Islands	-	-	-	-	-	-	-	-	3	-	
GDR	-	-	-	-	78	-	-	-	-	11	
FRG	-	-	-	-	-	-	4	3	37	90	
Norway	270	213	757	296	305	328	659	605	300	424	
Poland	-	-	-	-	-	-	-	-	-	8	
Portugal	-	-	-	-	-	-	-	-	-	67	
UK (Eng.& Wales)	496	275	320	376	381	421	504	1 060	686	878	
UK (Scotland)	-	-	-	-	-	-	-	-	-	20	
USSR	12 003	5 905	8 815	8 696	9 048	4 403	7 682	16 389	19 346	8 166	
Total	12 769	6 424	9 892	9 368	9 812	5 152	8 849	18 057	20 374	9 664	

^xPreliminary

Table 28. Nominal catch (metric tons, whole weight) of Catfish in Division IIb.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976*
Belgium	-	-	-	-	-	-	-	-	-	5	
German, Dem. Rep.	-	-	-	-	-	-	-	27	9	189	
Germany, Fed. Rep.	-	-	-	-	-	18	4	15	156	343	
Norway	1	9	10	16	4	-	5	124	200	123	
Poland	-	-	-	-	-	-	-	-	-	19	
U. K. (Eng. & Wal.)	332	109	49	70	128	59	154	391	190	135	
U. K. (Scotland)	-	-	1	-	15	13	15	54	25	4	
USSR	969	2 875	3 667	3 534	3 410	7 261	4 431	5 416	10 729	15 203	
Total	1 302	2 993	3 727	3 620	3 557	7 351	4 609	6 027	11 309	16 021	

* Preliminary.

Table 29. Nominal catch (metric tons, whole weight) of catfish in Division IIa.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
German, Dem. Rep.	-	2	-	-	8	-	7	-	-	2	
Germany, Fed. Rep.	69	77	6	7	14	3	62	126	179	225	
Netherlands	+	+	-	-	-	-	-	-	-	-	
Norway	1 761	1 293	765	1 355	990	1 321	1 735	3 462	1 202	1 334	
Sweden	-	-	-	-	-	-	-	-	-	+ ^{a)}	
U. K. (Eng. & Wal.)	131	153	116	138	77	130	138	132	68	80	
U. K. (Scotland)	-	-	+	-	3	1	5	2	1	+	
USSR	567	297	189	1	12	2	6	33	-	30	
Total	2 528	1 822	1 076	1 501	1 104	1 457	1 953	3 755	1 450	1 671	

a) IIa includes smaller quantities taken in other areas than IIa, IV and IIIa, b, c.

Table 30. Nominal catch (metric tons, whole weight) of catfish in Sub-areas I and II.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Belgium									2	5	
Faaoe Island									3		
GDR		2			86		7	27	11	189	
FRG	69	108	6	7	14	21	70	144	370	658	
Netherlands	+	+									
Norway	2 032	1 515	1 532	1 667	1 299	1 649	2 399	4 191	1 702	1 881	
Sweden										+	
Poland										27	
U. K. (Eng.&Wal.)	959	537	485	584	586	610	796	1 583	944	1 093	
U. K. (Scotland)			1		18	14	20	56	26	24	
USSR	13 539	9 077	12 671	12 231	12 470	11 666	12 119	21 838	30 075	23 399	
Portugal										67	
Total	16 599	11 239	14 695	14 489	14 473	13 960	15 411	27 839	33 133	27 356	

Table 31. Nominal catch (metric tons, whole weight) of lumpsucker in Division II a.

Country	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Norway	-	-	-	-	2 352	1 675	1 608	4 301	3 122	2 137	
Sweden	-	-	-	-	-	-	-	-	-	+ a)	
Total	-	-	-	-	2 352	1 675	1 608	4 301	3 122	2 137	

a) IIa includes smaller quantities taken in other areas than IIa, IV and IIIa, b, c, d.

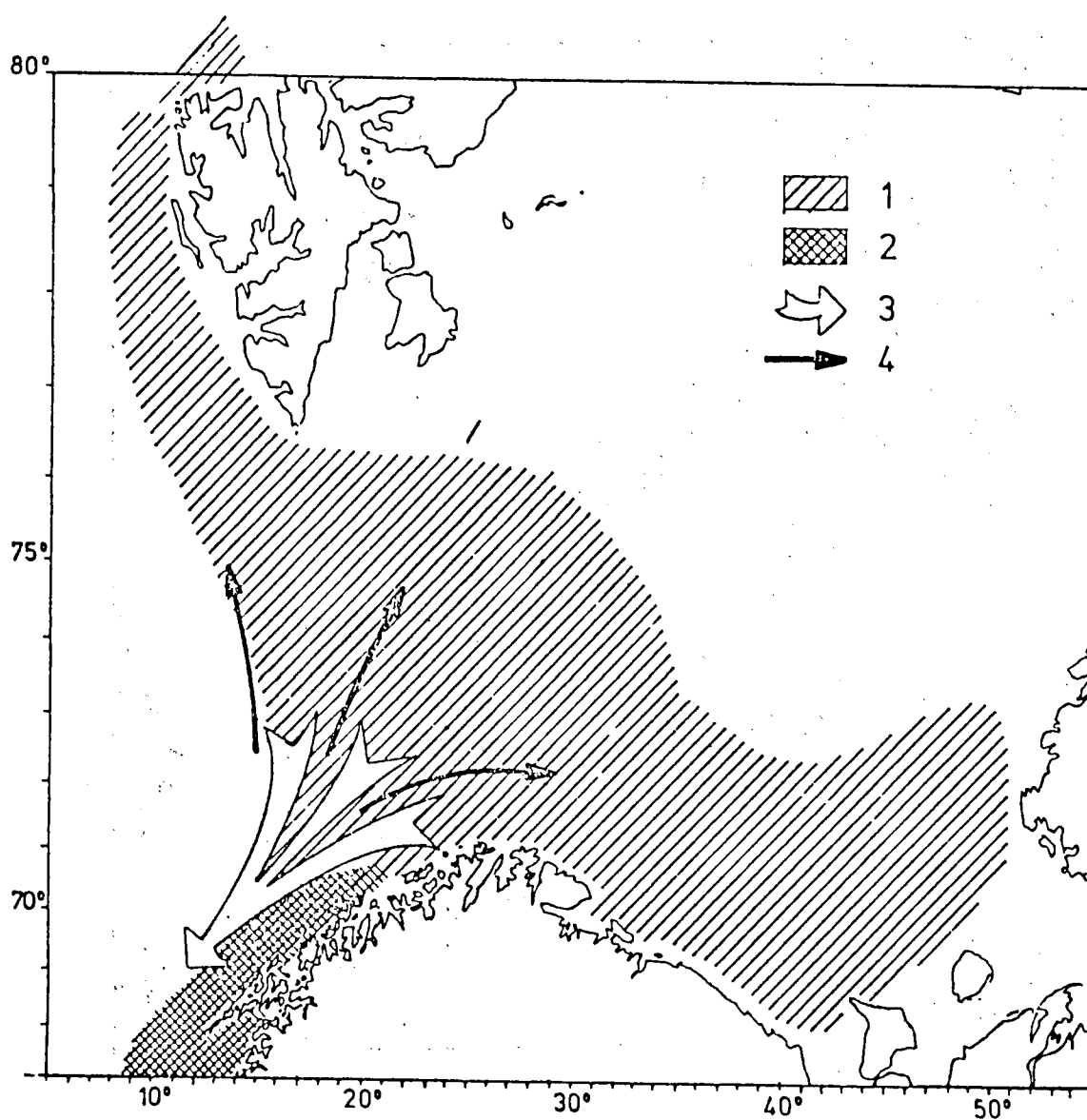


Fig. 1. Cod. The general distribution and migration of mature fish.

- 1) Feeding area,
- 2) Spawning area,
- 3) Spawning migration,
- 4) Migration of spent fish,

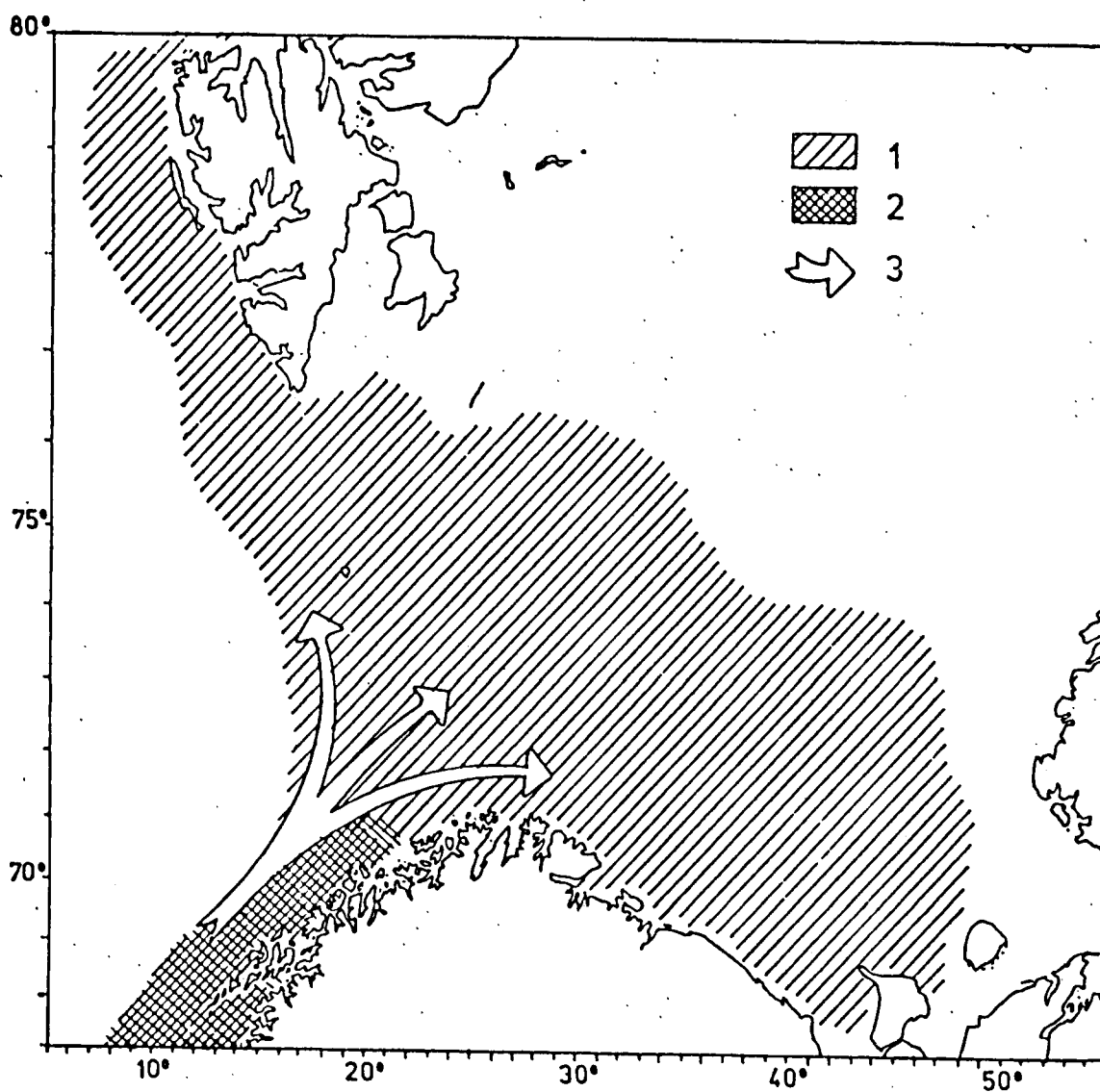


Fig. 2. Cod. The general larval drift.

- 1) Distribution of 0-group,
- 2) Distribution of eggs,
- 3) Larval drift.

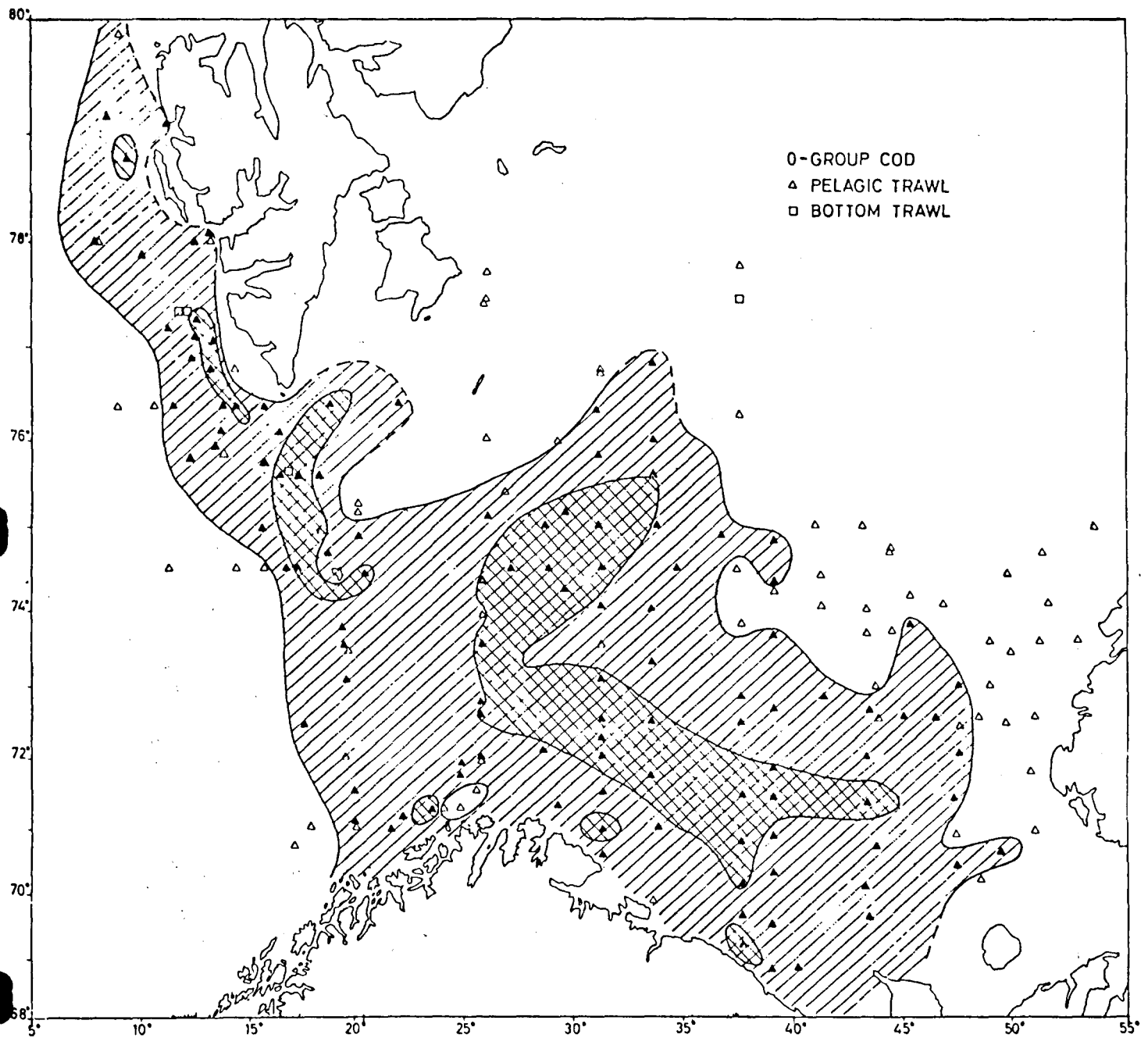


Fig. 3. Distribution of 0-group cod 1970.

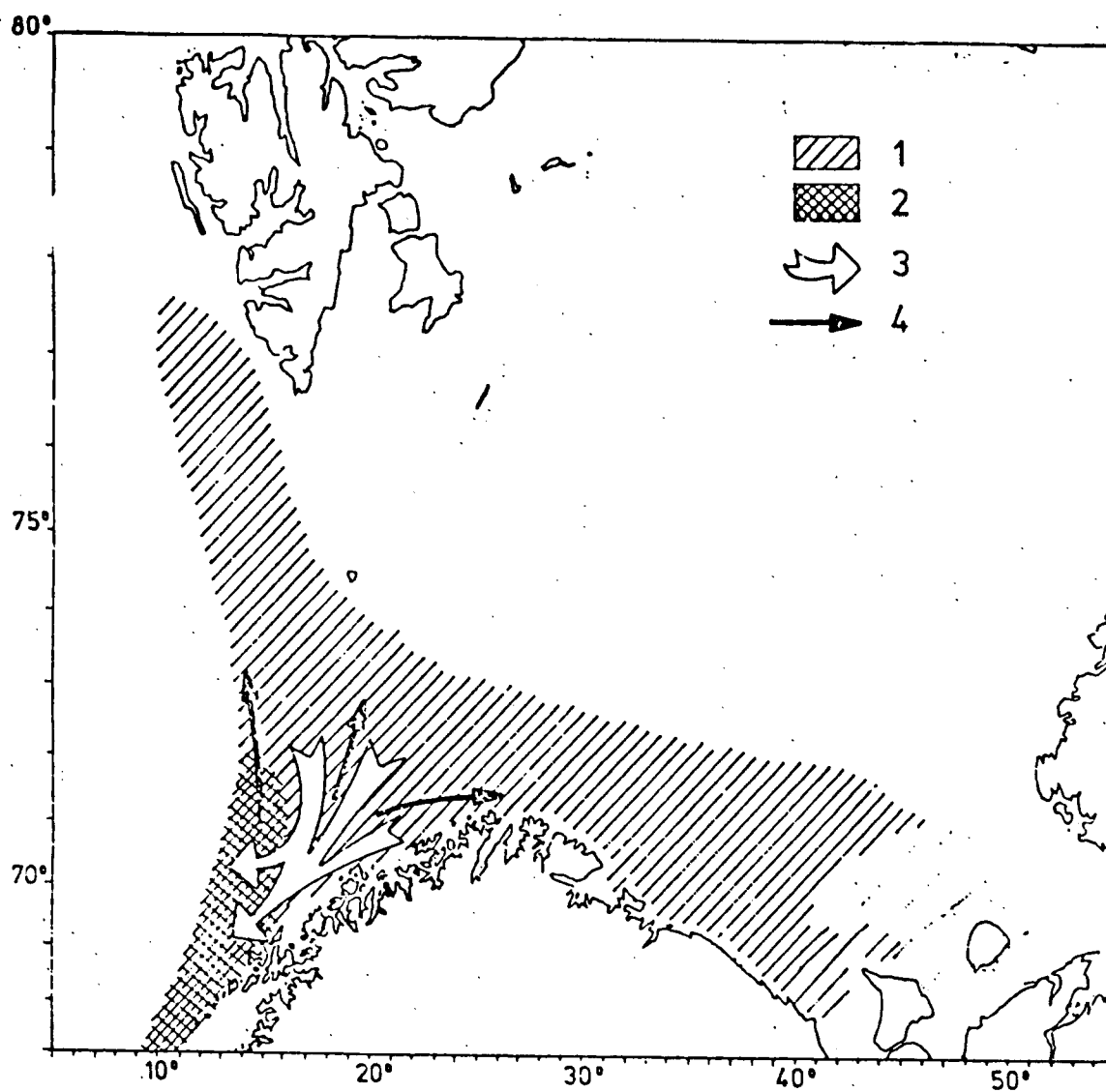


Fig. 4. Haddock. The general distribution and migration of mature fish.

- 1) Feeding area,
- 2) Spawning area,
- 3) Spawning migration,
- 4) Migration of spent fish.

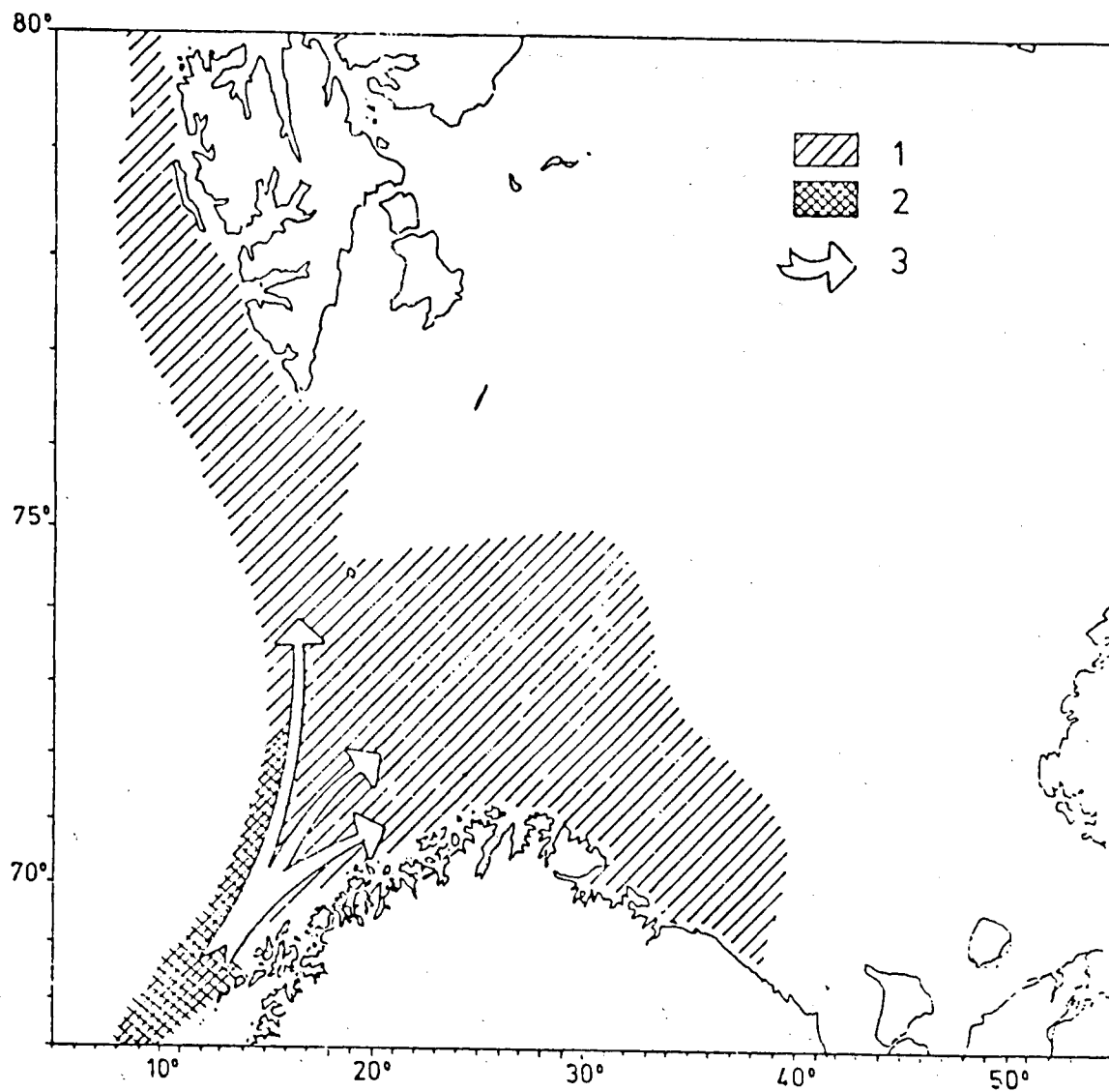


Fig. 5. Haddock. The general larval drift.

- 1) Distribution of 0-group,
- 2) Distribution of eggs,
- 3) Larval drift.

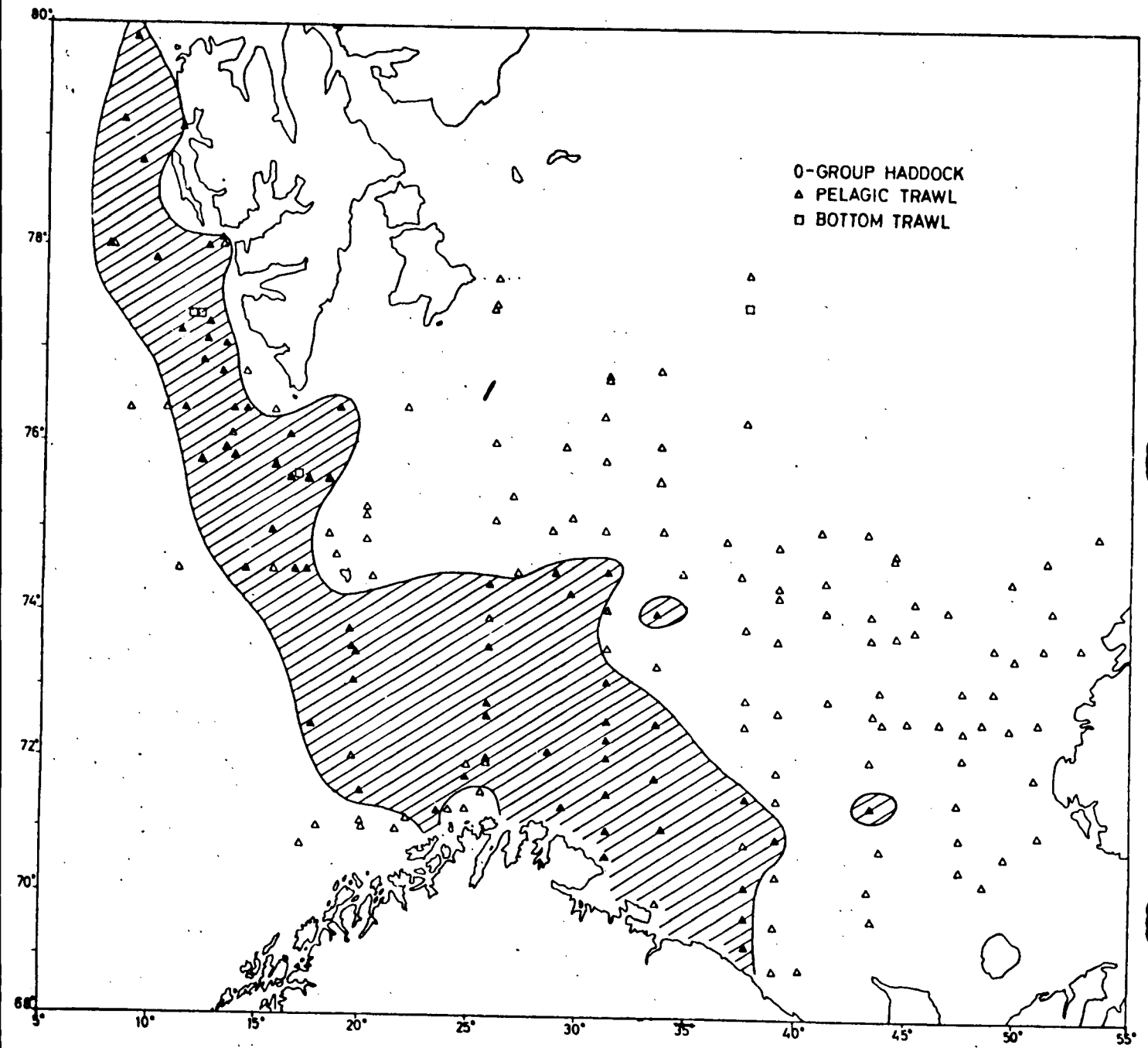


Fig. 6. Distribution of 0-group haddock 1970.

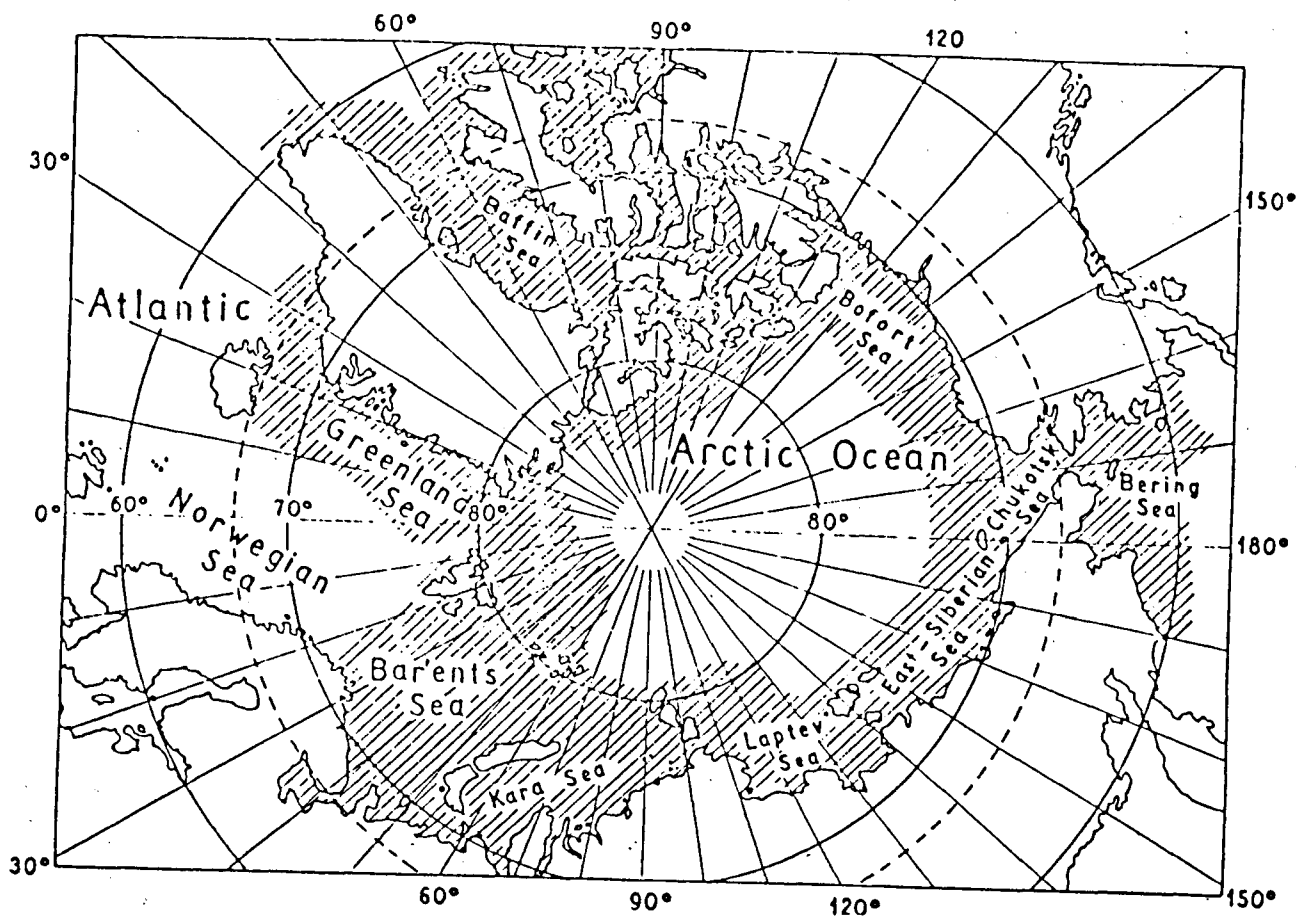


Fig. 7. Distribution of Polar cod in the Arctic Seas.

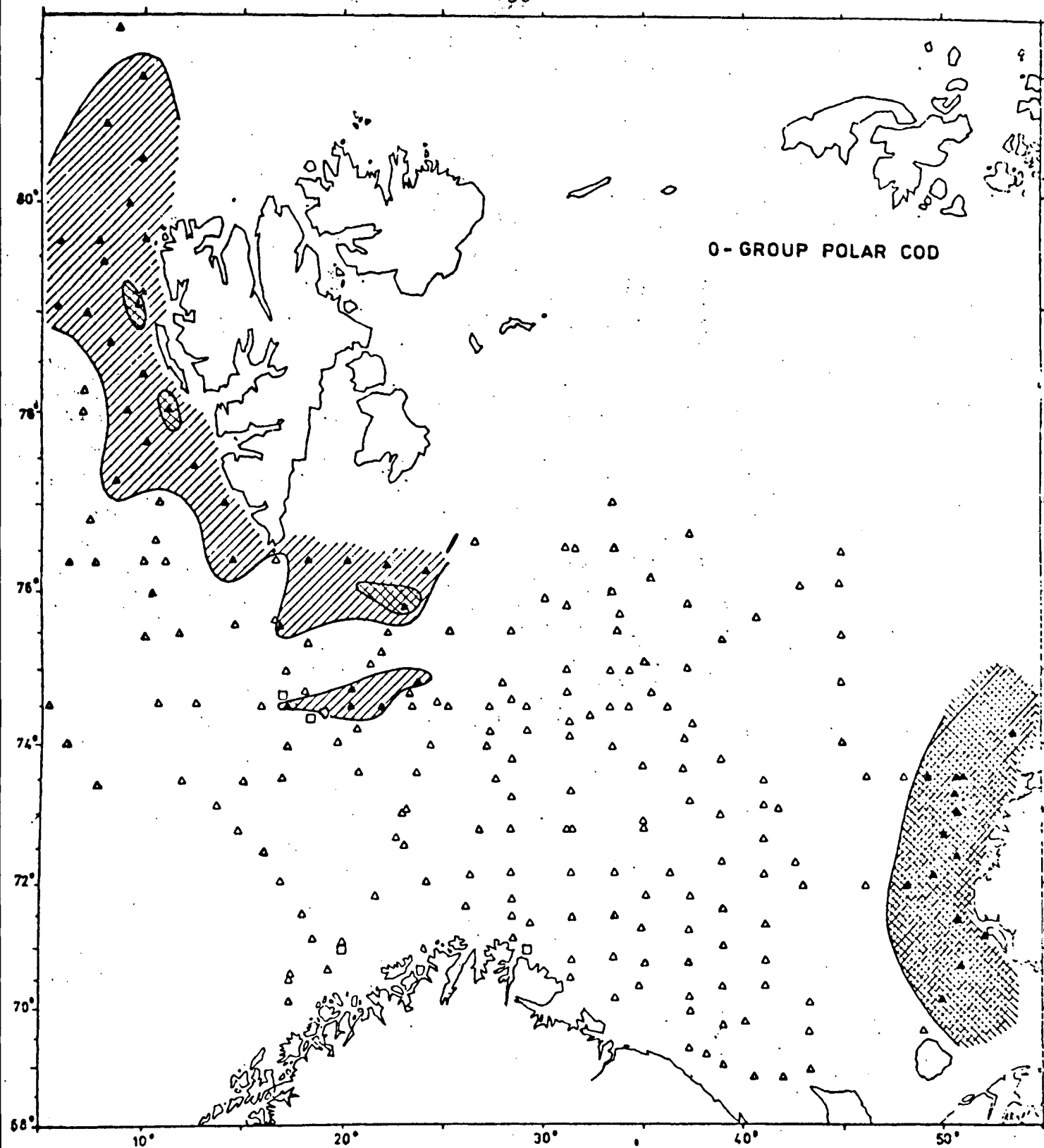


Fig. 8. Distribution of 0-group polar cod 1974.

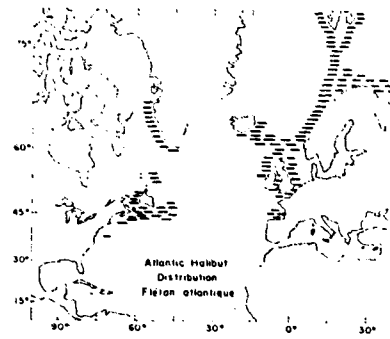


Fig. 9. Atlantic distribution of the halibut (Leim and Scott, 1966).

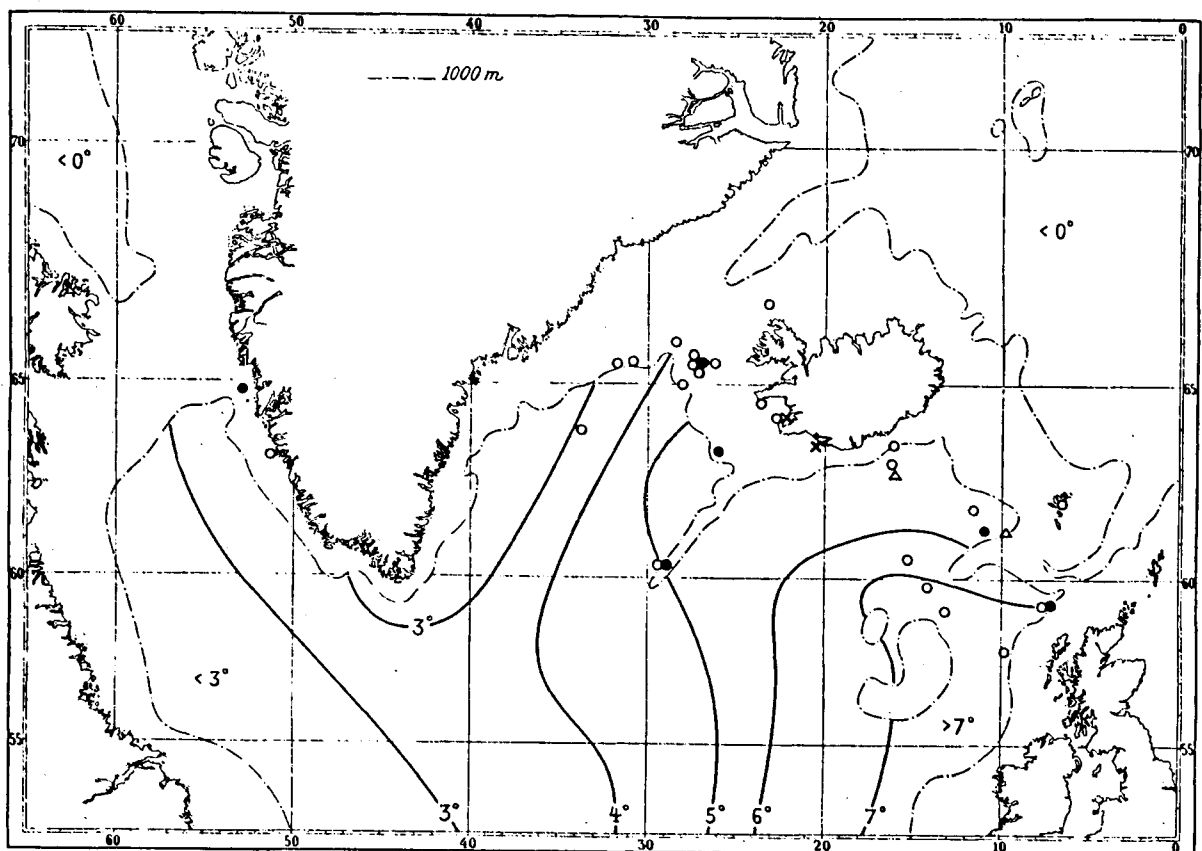


Fig. 10. Distribution of eggs, pelagic postlarval stages, and bottom stages of the 0-group of the Halibut. Δ eggs, \bullet postlarval stages 13.5-19 mm., \circ postlarval stages 20-34 mm., \times bottom stages of the 0-group 47-64 mm. 1000 metres isotherms from SCHOTT 1926. (After Tåning, 1936.)

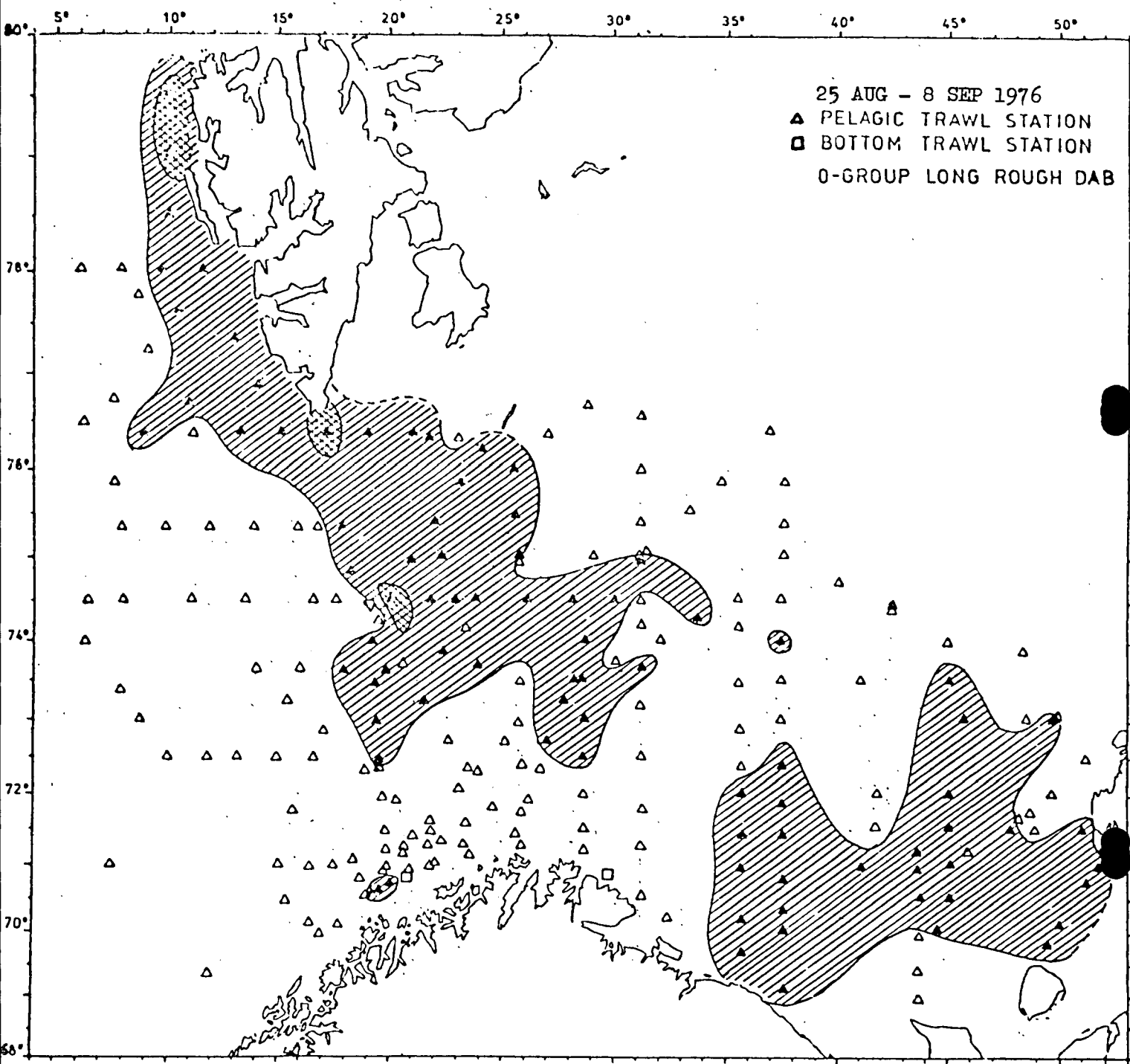


Fig. 11. Distribution of 0-group long rough dab 1976.