

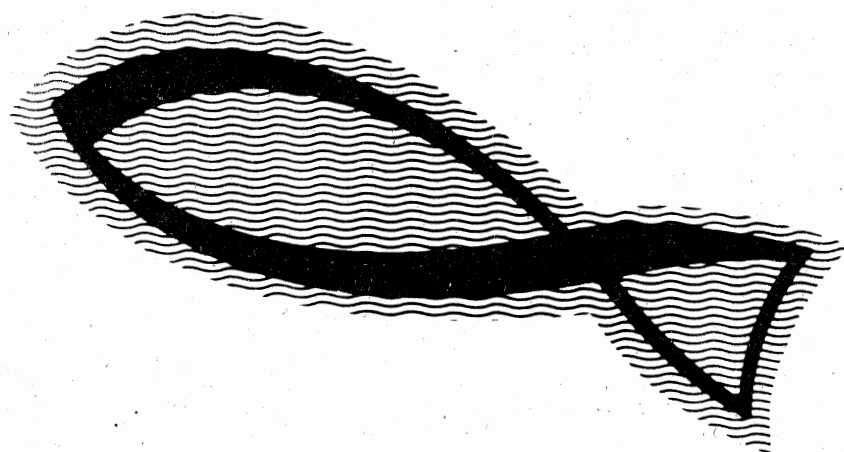


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**The Summer herring fishery  
in the Irish Sea in 1974.**



**by  
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# The Summer Herring fishery in the Irish Sea 1974

by

John Molloy

## Abstract

In 1974 the landings of herrings taken by the Irish fleet from the Summer herring fishery in the north western part of the Irish sea increased considerably and were valued at over £277,000. The fishery is based on two different races of herring each having different spawning areas. At present, both stocks are rather small and catches are dependant to a large extent on the influx of young fish each Summer. In this situation controls are necessary to prevent the over-exploitation of the adult stock and certain conservation measures are suggested.

The operating expenses of boats in this fishery could be reduced considerably by co-operation in the transport of catches from the fishing grounds to the home ports.

Introduction. Although there is a long tradition of herring fishing along the east coast of Ireland, landings during the early sixties decreased to the point where the fishery had, for practical purposes, ceased to exist. This decline was probably due to a decrease in the abundance of herring, a lack of fishing effort, and a poor marketing system. However in 1971 and 1972 two boats based at Howth, using bottom trawls, pursued a successful fishing for a few weeks in October in the Dundalk Bay area. Encouraged by their success a number of other boats using paired midwater trawls took part in the fishery in 1973, and the area fished was expanded further to the south and east. In 1974, a total of thirty three boats fished herrings at various times from early July until mid October and again the area covered was expanded still further to embrace part of the traditional Isle of Man fishery. While landings were made at Clogherhead, Mornington, Skerries and Howth, the catches auctioned at Howth accounted for over 90% of the total catch.

Catches. The landings and value of herrings taken from what is now called the Irish Sea Summer herring fishery are shown in Table 1. These figures do not include the quantities of young and immature herrings landed at Mornington for reduction to fishmeal, which are shown separately in Table 1. As can be seen the landed quantities of young herring have, according to the figures, which are submitted by the management of the factory, shown a considerable decrease since 1971. This decrease can be contributed to one of three factors:- either there has been, in the last few years, a substantial decline in the abundance of young herring in the area, or there has been a deliberate policy by boats to avoid fishing in those areas known to contain young herrings or there has been some change in the system used in estimating the amount of young herrings present in the catches. However, it is considered very important to determine whether this decline is real or only apparent because overexploitation of young herrings at this stage will cause considerable damage to the adult fisheries.

Table 1. Annual landings (tons) and value of Herrings from summer fishery.

Summer fishery			Fishmeal		Summer fishery			Fishmeal	
Year	Tons	Value £	Tons	Year	Tons	Value £	Tons		
1969	18	239	3,620	1972	178	7,529	1,758		
1970	37	1,315	4,407	1973	1,601	110,417	745		
1971	316	8,767	3,255	1974	3,555	270,674	-		

In 1974 the landed value of the adult herring from the summer fishery amounted to over £277,000. This resulted in an average price of £13.05 per cran or £7.29 per 100 kg unit. In view of the average price of over £22.00 for the previous winter fishery off the south coast, the price of £13.05 was considered by the fishermen to be disappointing, particularly taking into consideration the steep increases in the price of fuel, nets and other expenses. Moreover market difficulties, caused by severe restrictions in the amount of cold storage facilities available to buyers,

meant that on occasion boats were fishing under a quota system. Lack of quay space also restricted the amount of rough packing that could be done. Most of the catch was frozen prior to export while small amounts were processed, rough packed, or sent fresh to Britain or the Continent. About 450 cran of unmarketable herrings were reduced to fishmeal.

Location of fishing. In 1974 fishing commenced in mid July when shoals were located over a large area which extended from west of the Isle of Man to about half way to Howth. (Areas and places mentioned in text are shown in Fig. 1.) Towards the end of the month shoals were located off the Isle of Man, northwest of Peel and off the Chickens Rock. Fishing continued in this general area throughout most of August although small quantities of rather small herring were taken from closer to the Irish coast. Towards the end of August herrings were reported from the Douglas Bank to the east of the Isle of Man, and in mid September the main shoals moved on to this bank for spawning.

The Irish fleet then switched their main effort to the "Channel" area and towards the Co. Down coast as they are not permitted to fish within the 12 mile limits off the eastern coast of the Isle of Man. In late September fishing was confined to Kilkeel Bay and off Annalong, Co. Down. However herring fishing was prohibited along that section of the Northern Irish coast that is between Haulbowline Rock and Roaring Rock (see Fig 1) from October 2 to October 17. This prohibition was a conservation measure designed to protect the spawning stock. Consequently the main fishing activity during this period took place in Dundalk Bay and Carlingford Lough. Towards the end of October light catches were made from over a wide area.

Catches per effort and effort. Because this fishery has only recently been revived by Irish boats there is no long series of catch per effort data available for this fleet. This means that it is not possible to study long term fluctuations in stock abundance using this data, although similar data is available for fleets operating out of Isle of Man ports. Furthermore differences in the manner of fishing practised by the east coast fishermen make comparison between this fishery and other Irish fisheries difficult to make, e.g. while it is an established

pattern for boats engaged in the south coast and northwest coast winter herring fisheries to remain together in pairs for the duration of the season, the boats fishing from the east coast tended to fish in groups of three, four or even five. Because of this it was impossible to calculate the average catch per pair per fishing night which is the accepted unit of stock abundance for the other Irish fisheries. The catch per unit effort therefore has been expressed as the number of crans per boat landing, and the weekly figures are shown below in Table 2.

Table 2. Catches, effort and catches per effort per week.

Week ending	Crans	Landings	Catch/landings (Crans)
13 July	415	7	59
20 "	1,085	22	49
27 "	943	32	29
3 August	917	19	48
10 "	1,577	44	35
17 "	937	48	19
24 "	1,400	65	21
31 "	2,042	70	29
7 September	1,055	37	28
14 "	1,338	57	23
21 "	2,038	58	35
28 "	3,146	67	46
5 October	922	33	27
12 "	1,426	54	26
19 "	1,310	32	40
26 "	117	5	23

An examination of these weekly catch per effort figures show that considerable variation occurred over the sixteen weeks of fishing. Highest catches were made at

the beginning of the season but the catching rate decreased in August and September. Increased catches were again made in October as the shoals gathered together for spawning. It could be suggested from these figures that the lower catching rates coincided with increased effort, a fact which would indicate a low overall abundance in herring - especially in view of the fact that the decreased catching rate was experienced so soon after the relatively high initial catches. However, detailed analyses of this type of data must await additional information to be collected from future seasons.

One important fact, not connected with stock densities, that emerges from these figures is that it seems completely unrealistic for boats, whose average capacity exceeds 300 crans, to return each morning to port with catches of 30 to 40 cran. Considerable saving could be made, both in time and fuel, if fishing operations could be so organized so that particular boats would be responsible for transporting fish while others would be responsible for catching fish. In this way large numbers of boats would not have to return with small catches to port each morning and could then remain in ports more adjacent to the fishing grounds.

Scientific investigations. Samples of herrings have been obtained from the Irish catches and the adult herring fishery in the Irish Sea since 1971. Preliminary results have been described by Molloy (1974). In 1974, these samples were obtained weekly from the beginning of the fishery until the end of October. A total of 1,398 herrings were examined for age and meristic characteristics, and total length recorded for a further 2,585, which were subsequently converted to age using an age/length key. Samples of young herrings landed at the fish meal plant at Mornington have been examined since 1969. In addition, the herrings landed at the Isle of Man have been subjected to detailed study every year since 1930 and in recent years samples of herrings landed at N. Ireland ports have also been examined at the Ministry of Agriculture Fisheries and Food at Lowestoft. Results from these



investigations have been published by the relevant authorities.

Racial investigation. For some time it has been known that two main spawning areas exist in the Northern Irish Sea - one on the Douglas Bank to the east of the Isle of Man and the other along the coast of Co. Down and in Carlingford Lough. The herrings that spawn on these beds have, although both are Autumn spawners, sufficient differences in ~~their~~ meristic and biological characters to enable them to be classified as different races. This has been shown by Molloy (1974) and Anon (1974). The pattern and location of the fishing activity of the Irish fleet is also indicative of the presence of two different types of herring. During July, August and early September the boats fished to the west of the Isle of Man and the resulting catches could be said to belong to that component that spawns on the Douglas Bank. Following this period, fishing was carried out for a short time in the mid Channel area, because at this time the main Isle of Man stock had migrated around to the spawning areas on the east coast of the Island, where Irish vessels are not permitted to fish, and the Mourne stock had not yet fully arrived on its spawning ground. From the third week of September, the Irish catches were all composed of Mourne stock. However, there would appear to be a relatively clear division of the catches into two components i.e. those which were taken before the week ending 6th September, belonged to Isle of Man stock and those which were caught after the 6th September belonged to Mourne stock.

Age distribution. After an examination of the weekly age distribution, the age distribution of each stock (separated on the basis of the fishing pattern already described) was found to be as follows in Table 3.

Table 3. Age distribution of Manx and Mourne stocks.

Age	Year Class	Manx(July-Aug)		Mourne	(Sept-Oct)
(Years)		Nos	%	Nos	%
2	1972	46	5.4	227	40.5
3	1971	483	56.7	170	30.4
4	1970	155	18.2	65	11.6
5	1969	75	8.8	74	13.2
6	1968	43	5.0	4	0.7
7	1967	20	2.3	9	1.6
8	1966	17	2.0	1	0.2
9	1965	10	1.2	8	1.4
10	1964	3	0.4	-	-
10 +		-		2	0.4
Total		852	100.0	560	100.0

As can be seen there is a considerable difference in the relative abundance of two and three year old fish in both distributions. The Mourne stock contain considerably more 2 year old fish than the Manx stock and since these fish were full, "mazy" or spent fish it must be assumed that the main recruitment to the Mourne stock takes place when fish are only 2 years old as compared with three years old in the Isle of Man stock. A comparison is also shown below in Table 4 between the age distribution of the Mourne stock for the years 1971 to 1974.

Table 4. Annual percentage age composition of Mourne Stock.

Year	2	3	Age in Years			7	8	9	10	10 +
			4	5	6					
1971	66.7	10.3	14.7	4.1	1.5	2.1	0.6	0.9	-	0.1
1972	32.0	51.1	2.3	7.2	2.4	1.2	2.6	0.2	0.4	0.6
1973	36.3	35.1	20.9	1.1	2.0	2.5	0.4	1.6	-	0.1
1974	40.5	30.4	11.6	13.2	0.7	1.6	0.2	1.4	-	0.4



A scarcity of fish older than 4 years is evident in all years. As has been suggested by Molloy (1974) the recent revival in the Mourne stock has been largely due to an extraordinary successful spawning in 1969. The recruits produced by this spawning entered the fishery in 1971 as two year olds and are still present as five year olds in 1974. The scarcity of fish older than three years of age would indicate that the original parent stock before 1969 must have been extremely small. However, the numbers surviving from the succeeding year classes of 1970, 71 and 72 would suggest that they, while not as strong as the '69 year class, were all much more abundant than those of the years immediately preceding 1969.

Length and age. Monthly mean lengths per age class are shown in Table 5. As those fish caught during July and August belong to the Manx component, it is interesting to note that they are consistently smaller per age class than the fish caught during September and October which belong to the Mourne stock. The average difference in length per age class is nearly 1 cm and becomes increasingly apparent in the older age groups. These differences are too large and consistent to be explained by natural growth increases during the period and therefore the different growth rates can be considered as separate biological characteristics of each race.

Table 5. Monthly mean length per age class.

Years	July	Aug.	Sept.	Oct.
2	22.71	23.75	24.41	25.10
3	25.89	26.22	26.70	27.21
4	27.30	27.39	28.29	28.25
5	28.19	28.71	29.28	29.43
6	28.99	28.68	30.91	30.25
7	29.45	29.30	30.10	31.03
8	29.08	29.86	29.47	-
9	29.75	29.71	30.88	31.25
10	30.50	30.75	32.25	-
10 +	-	-	31.75	31.25

Maturities and vertebral counts. As these herrings are all trawl-caught and consequently lack scales, the only character that is available which will help to separate races is the average number of vertebrae. The number of vertebrae are dependant on the temperature of the water when the herrings are spawned; winter spawned herrings have a high average vertebral count (56.80 - 57.10) while Autumn spawned herrings have a lower average count (56.20 - 56.60). The average vertebral count obtained from an examination of all the samples during the fishery was 56.714. This is an intermediate count and would usually suggest a mixture of both autumn and winter spawning herrings. However, a closer examination of the average counts per maturity stage (see Table 6) shows that herrings with typical winter spawning counts are present among the stages VI and VII fish taken from the Mourne stock in late September and early October.

Table 6. Average vertebral counts per maturity stage per month.

Maturity Stages

Month	I	II	III	IV	V	VI	VII	VIII	Total Average
July (no.s)	56.563 (16)	56.697 (20)	56.576 (186)	56.538 (197)	56.817 (24)	-	-	57.000 (5)	56.589 (446)
August (no.s)	-	56.667 (6)	56.631 (38)	56.550 (115)	56.550 (157)	-	-	-	56.559 (306)
Sept. (no.s)	56.528 (70)	56.786 (14)	56.778 (9)	56.566 (76)	56.617 (100)	56.833 (66)	56.700 (3)	56.000 (2)	56.648 (349)
Oct. (no.s)	-	-	-	-	56.508 (64)	56.708 (227)	57.025 (13)	-	56.678 (298)

Conservation measures. In 1974 conservation measures designed to decrease the fishing rate were in operation for both the Mourne and Isle of Man fisheries. Off the Isle of Man all herring fishing was prohibited within the 3 - 12 miles zone of the fishery limits around the Island from October 1 to November 17, 1974. The Mourne fishery was restricted in 1974 by measures imposed by both the Northern Irish and Irish authorities. The former prohibited fishing for herring from October 2 to October 13 in the area extending from Haulbowline Rock to Roaring Rock (54° 10')

while the latter prohibited the fishing of herrings from 12 noon on any Friday to 12 noon on the following Monday in that Section of the Irish Sea within the exclusive fishery limits of the State bounded to the north by a line running in a south easterly direction from Haulbowline Rocks (approx.  $54^{\circ}00'N$  lat) and bounded to the south by a line running in an easterly direction from the most northerly point of Red Island at Skerries. The measures taken were intended to protect the stock during the actual process of spawning, because at this time, herrings are sluggish of movement and therefore particularly vulnerable and liable to be caught in great quantities. However, the actual time at which herrings spawn depends on environmental conditions and because of this, peak spawning time may vary every year. Consequently a short closed season may in fact fall in a period either before or after spawning has taken place and its effectiveness as a conservation measure is therefore limited. A further limitation is the fact that there is a tendency for boats to fish harder immediately prior to and after the closing season so that the overall effort may only be slightly reduced. Better results would be obtained if the number of days fishing were restricted over the entire fishing season, with a possible severe curtailment of fishing during a longer period around the approximate spawning time.

Fat content and number of fish per kilogramme. The percentage fat content (estimated from fillets) and the number of herrings per kilogramme were estimated throughout the season. The results are shown in Table 7. Herring from the summer fishery in the Irish Sea are renowned for having high fat contents and the figures obtained during 1974 were very typical. From mid July until Mid August the fat content was well above 20%, but there was a progressive decrease as the onset of spawning approached and the figures for mid October were 12% - 15%. Considerable variation occurred in the size of herring, throughout the season. Generally speaking the Manx herring ranged from 6.9 - 5.2 per kilogramme while the Mourne herring were slightly larger and ranged from 5.4 - 4.8 per kilogramme. Some samples obtained from the Channel area were approximately 7.3 per kilogramme, which may not be representative.

Table 7. Fat content (%) and numbers of fish/kilogramme

Date	Fat Content	No./kg.	Date	Fat Content	No./kg.
9 July	21	6.9	11 Sept	16 (small)	} 7.5
17 July	23	6.5	11 Sept	23	
23 July	25	6.2	20 Sept	10 (small)	} 7.2
30 July	-	5.5	20 Sept	19	
31 July	-	5.6	25 Sept	15	5.4
6 Aug	23	5.6	1 Oct	12	5.4
21 Aug	18	5.3	9 Oct	16	4.8
27 Aug	15	5.4	15 Oct	12	5.2
4 Sept	-	5.2	18 Oct	15	-

# REFERENCES

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ICES C.M. 1974/H:7.
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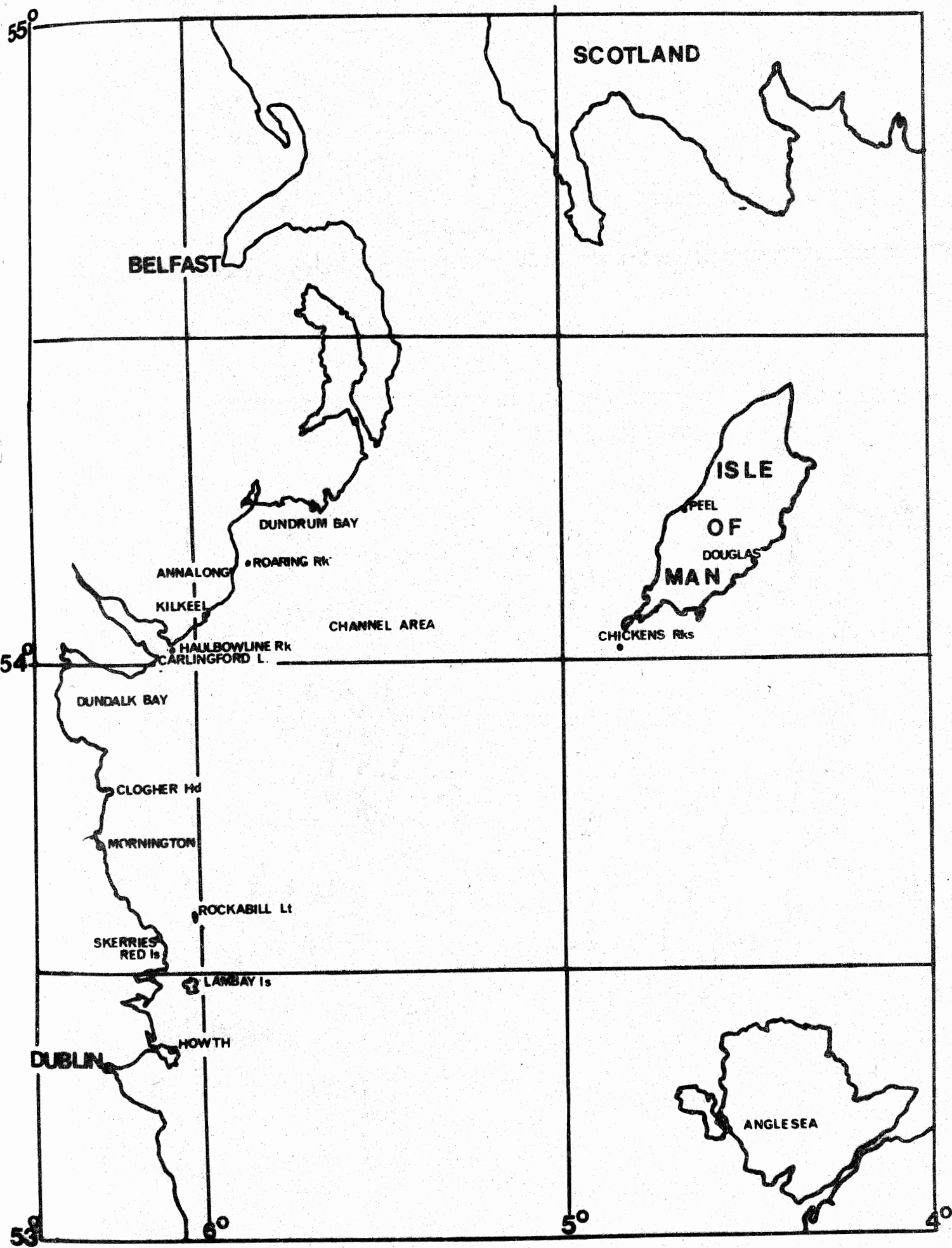


Fig1 AREAS AND PLACES MENTIONED IN TEXT