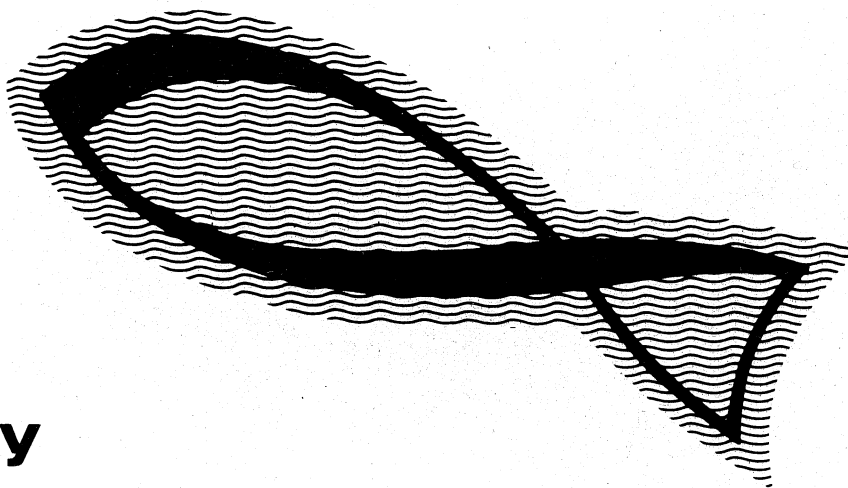




**Fishery Leaflet  
Number 86  
1977**

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**The herring fisheries on the  
South and South-West coasts  
1976-77**



**by  
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A B S T R A C T

The quantities and values of herring landed during the 1976/77 herring season off the south coast and during the July to November period off the south west coast are reviewed. In both areas there was a further serious decline in the catches - mainly due to a continuing very poor rate of recruitment of young herring to the adult stock. In the Celtic Sea the total international catch during 1976/77 was only 7,000 tonnes compared with 48,000 tonnes in 1969, while the total Irish catch of approximately 3,000 tonnes was the lowest since the mid-fifties. The immediate aim of any management policy for the Celtic Sea herring stock must be to rebuild it to a level of at least 40,000 tonnes. It is, at present, estimated to be below 10,000 tonnes. This can only be done by having a complete ban on all herring fishing in the Celtic Sea until 1980 at least.

1. SOUTH COAST (CELTIC SEA)

Introduction: The 1976/77 winter herring fishery began during September 1976 and continued until the middle of January 1977. The total landings during the season amounted to 2,981 tonnes which was over 3,600 tonnes (55%) lower than in 1975/76 and was in fact the lowest landing since the 1955/56 season. The value of the landed catch decreased to £807,000 from £1,100,000 in the 1975/76 season. Because of the poor catches in the early part of the season a number of boats did not participate in the fishery with the result that the total number of boats involved decreased from 78 to 40. The early start to the season and the continual good weather meant that until the middle of January there were a possible 89 fishing days and landings were made on 65 of these days. Some small boats using drift nets also took part in the fishery during the season, but like the trawlers, their catches were very disappointing. The following table shows the monthly landings per port for 1976/77 and corresponding figures for 1975/76 and 1974/75.

Table 1: Monthly Landings (Tonnes) in 1976/77 by port and for 1975/76 and 1974/75 (all ports)

Month	Dunmore East	Cobh	Total 1976/77	Total 1975/76	Total 1974/75
August	-	-	-	11	-
September	442	-	442	584	-
October	424	268	692	1,494	601
November	67	554	601	1,795	4,880
December	507	101	608	1,417	3,079
January	482	3	485	1,282	3,001
February	-	-	-	-	257
Totals 1975/76	1,922	926	2,828	6,583	11,818

Landings made by small boats using drift nets off that part of the Wexford coast that is in the Celtic Sea and also off Helvick amounted to approximately 150 tonnes.

The average price per tonne increased from £167.16 (i.e. £28.75 per cran) in 1975/76 to £270.86 (£48.59 per cran) in 1976/77. (Table 2). Because of the scarcity of herring, prices continued to rise throughout the season, and the prices paid after Christmas ranged from £60-£70 per cran. The total landings, the total value and the average price per tonne since 1968/69 are shown in Table 2.

Table 2: Total landings (tonnes), total value (£) and the average price per tonne, 1968/69 - 1976/77

Season	Tonnes	Value (£)	Average Price (£)
1968/69	12,174	353,905	29.07
1969/70	16,673	544,670	32.66
1970/71	19,060	770,703	40.43
1971/72	13,724	718,128	52.32
1972/73	18,800	1,060,351	56.40
1973/74	10,697	1,423,683	133.09
1974/75	11,818	1,301,913	110.16
1975/76	6,582	1,100,218	167.15
1976/77	2,981	807,426	270.85

	Dunmore East		Cobh	
Month	Tonnes	£	Tonnes	£
September	442	170.46	—	—
October	424	197.48	268	—
November	67	240.19	534	196.96
December	507	351.56	101	288.70
January	482	389.44	3	176.87
Season	1922	282.77	906	244.25

International catch: For the third successive season the total catch taken from the Celtic Sea was regulated by the North East Atlantic Fisheries Commission (N.E.A.F.C.). The total allowable catch (T.A.C.) for 1976/77, originally fixed at 16,500 tonnes, was later reduced to 10,850 tonnes. This was divided as follows:-

Ireland 6,500 tonnes, France 1,300 tonnes, Netherlands 2,000 tonnes, U.K. 350 tonnes and others 1,700 tonnes. Again, as in the previous two seasons, Ireland's catch of 2,900 tonnes fell far short of its allotted quota. In Table 4 the catches per season for each country participating in this fishery since 1965/66 are shown. These are the figures supplied to the ICES\* Working Group on the assessment of herring stocks, and are considered the best estimates of catches taken from the Celtic Sea stock.

Table 4: Celtic Sea herring catches tonnes (1 April - 31 March)  
(1976/77 figures are provisional)

Season	Bul- garia	France	Ger- many (DR)	Ger- many (FR)	Ireland	Nether- lands	Pol- and	U.K.	U.S.S.R.	Total
1965/66	-	1,742	-	353	3,482	13,071	-	1,054	-	19,702
1966/67	-	5,506	-	1,143	8,861	11,459	112	197	-	27,278
1967/68	-	3,825	-	910	10,736	10,204	425	398	-	26,498
1968/69	-	2,637	-	1,662	11,996	12,191	130	598	-	29,214
1969/70	-	7,038	-	5,906	16,712	13,111	261	400	-	43,428
1970/71	-	3,627	-	1,481	19,106	4,667	778	220	-	29,879
								...../..		

Table 4 (Contd.)

- 4 -

Season	Bul-garia	France	Ger-many (DR)	Ger-many (FR)	Ireland	Nether-lands	Pol-and	U.K.	U.S.S.R.	Total
1971/72	-	3,383	-	974	13,757	10,600	880	65	-	29,659
1972/73	-	7,327	-	393	18,846	6,852	751	-	618	34,787
1973/74	123	4,143	7	294	11,317	5,834	1,139	-	334	23,191
1974/75	-	2,150	-	435	11,683	2,462	954	-	-	17,684
1975/76	-	2,451	-	399	6,524	2,441	579	24	1,054	13,472
1976/77	-	1,578	147	36	2,970	1,264	157	-	826	7,078

\* International Council for the Exploration of the Sea

Table 5 shows how the total allowable catch has been allocated per country since quotas were first implemented by N.E.A.F.C. in 1974/75 for the Celtic Sea. The actual catch recorded by each country each season is also shown.

Table 5: Quotas and recorded catches in the Celtic Sea (tonnes)

Season	1974/75		1975/76		1976/77	
Country	Quota	Catch	Quota	Catch	Quota	Catch +
Ireland	18,000	11,683	14,000	6,524	6,500	2,981
Netherlands	7,000	2,462	5,000	2,441	2,000	1,264
France	5,000	2,150	3,600	2,451	300	1,578
Germany (FR)	2,000	435 )	1,600	399 )	700	1,266
Poland		954 )		579 )		
U.S.S.R.		0 )		1,054 )		
U.K.		0	800	24	350	0
Total	32,000	17,684	25,000	13,472	10,850	7,089

(+) Provisional figures for 1976/77.

Disposal of the catch: No difficulty was experienced in 1976/77 in disposing of the catch. The major part of it was exported fresh to France while smaller quantities were cured, mainly for the Netherlands, and the U.K. Small quantities were also exported fresh to the U.K.

Locations of fishery: The catches in the early part of the season were taken from Baginbun Bay. During the remainder of the season small shoals were located over a wide area extending from the Daunt Rock to Hook Head. The main feature of the location of the fishery was the absence of any worthwhile shoals on the traditional spawning beds off the Daunt Rock, in Ballycotton and Youghal Bays and in Baginbun Bay.

Landings per type of gear: Apart from 150 tonnes taken by drift nets, the remainder of the catch was taken by paired midwater trawls. No boats tried using bottom trawls throughout the season.

Catch per effort: The average catch per fishing night per pair of midwater trawlers for each season is used to make comparisons of the abundance of the total stock of herrings. Although this method has obvious limitations (the chief one being that no allowance is made for increased efficiency due to increased horse power etc.) it does allow one to describe the fluctuations that occur in stock sizes each year, and thus to make estimates of the relative abundance of the stock at any given time. Table 6 gives the average catches per effort (i.e. tonnes per night fishing) that have been recorded since 1963/64 from the midwater trawlers and from bottom trawlers.

Table 6: Average tonnes per night fishing, 1963/64 - 1976/77

Season	Total	Midwater Trawls		Bottom Trawls
		Dunmore East	Cobh	Dunmore East
1963/64	7.5	7.5	-	4.7
1964/65	9.4	9.4	-	5.8
1965/66	9.1	9.1	-	7.4
1966/67	15.9	15.9	-	6.0
1967/68	17.0	14.8	21.0	8.5
1968/69	18.9	14.7	22.0	9.4
1969/70	19.2	16.2	23.8	6.1
1970/71	19.7	20.3	17.8	6.4
1971/72	11.6	10.2	14.4	5.2
1972/73	16.1	15.0	19.8	6.1
1973/74	11.1	11.8	9.8	2.4
1974/75	11.1	10.5	13.0	1.8
1975/76	6.2	5.7	6.8	1.9
1976/77	6.1	5.6	7.5	1.0

Effort: The effort to which the stock is subjected is the total number of nights fished by midwater pairs. This is estimated from the catches of each pair and is shown in Table 7. As in 1975/76 there were many occasions on which boats returned to port with no catches and consequently their night's fishing may have gone unrecorded. Therefore the 1975/76 and 1976/77 effort figures will undoubtedly be underestimated. However, the total effort figure for the 1976/77 season was the lowest recorded since 1965/66.

This was undoubtedly due to the poor catches during the September/October period which resulted in fewer boats than usual taking part in the fishery. In spite of the reduced effort the catches per night fishing remained very low throughout the season - an indication of the very low level of stock size throughout the season.

Table 7: Catch and fishing effort, 1963/64 - 1976/77

Season	Total Catch (tonnes)	Catch per effort (tonnes per night's fishing)	Effort (night's fishing)
1963/64	3,786	7.53	502
1964/65	2,999	9.4	318
1965/66	3,533	9.1	389
1966/67	8,180	15.9	515
1967/68	10,947	17.0	643
1968/69	12,174	18.9	646
1969/70	16,673	19.2	867
1970/71	19,060	19.7	970
1971/72	13,724	11.6	1179
1972/73	18,800	16.1	1159
1973/74	10,697	11.1	960
1974/75	11,818	11.1	1062
1975/76	6,582	6.2	1062
1976/77	2,981	6.1	489

Scientific Investigations: Scientific examinations of herring landed at Dunmore East and Cobh were continued throughout the season. A total of 982 were examined for age, length and weight and racial characters, while a further 400 were measured and subsequently converted to age using an age/length key. The number of herring per kilogramme and the percentage fat content were also noted for each sample.

Age and distribution and recruitment: The age distribution of the stock, based on the catches by boats operating from Dunmore East and Cobh are shown in Table 8. They are given for the 1963/64 season onwards and are expressed as the numbers of fish of each age group present in the average landing of paired midwater trawlers. The total number is an indication of the size of the stock and it shows the serious decline that has taken place in recent years. The number of three-year old herring caught (on which the fishery so much depends) has also fallen drastically. During 1975/76 and 1976/77 the numbers of this age group recruiting to the fishery i.e. those herring which were spawned in the

1972/73 and 1973/74 seasons were very low compared to the high levels which recruited in the late sixties. The relationship between the size of the adult stock and the resulting recruitment is shown in Fig. 1. It clearly shows the enormous decline that has taken place in the stock size in the "sixties". While the decline in recruitment has not been so dramatic the state has now been reached where the adult stock size is very nearly equal to the size of the recruiting year class.

Table 8: Age Distribution (Years) in thousands of fish per landing

	2	3	4	5	6	7	8	9	10	10+	Total
1963-64	0.8	28.2	4.2	2.1	6.0	0.9	0.4	0.8	0.5	0.5	44.4
1964-65	7.9	13.3	16.1	3.2	1.7	6.5	1.2	0.5	0.8	1.0	52.2
1965-66	0.5	27.6	6.0	6.3	1.7	1.9	4.0	0.7	0.3	0.9	49.9
1966-67	6.5	18.9	30.5	5.4	8.0	3.2	2.2	5.1	0.8	1.6	82.2
1967-68	8.4	38.6	11.3	18.4	4.2	3.9	1.9	2.9	1.0	1.1	91.7
1968-69	5.4	34.1	22.5	7.0	17.5	2.5	1.9	0.7	1.1	2.0	94.7
1969-70	5.1	47.7	20.6	12.1	6.6	6.1	1.8	0.6	0.5	0.6	101.7
1970-71	0.7	35.9	34.6	11.6	7.6	4.0	2.3	0.8	0.5	0.6	98.6
1971-72	5.1	9.3	11.3	14.3	6.0	3.3	1.9	1.4	0.2	0.5	53.3
1972-73	3.2	58.1	8.0	6.2	5.1	1.6	1.0	0.4	0.3	0.3	84.2
1973-74	5.3	19.2	21.8	2.0	3.3	2.4	1.5	0.6	0.1	0.5	56.7
1974-75	3.4	27.6	10.7	11.8	2.4	2.8	1.4	0.4	0.2	0.2	60.9
1975-76	8.1	6.7	7.3	2.7	2.8	1.3	0.7	0.4	0.4	0.2	30.6
1976-77	6.8	12.3	6.4	2.4	0.9	0.8	0.5	0.2	0.1	0.1	30.5

Mortality calculations: Estimates of total instantaneous mortality (Z) based on the figures in table 8 show that the value of Z obtained during 1976/77 was 0.68. This was considerably lower than the very high figure of 1.29 obtained in 1975/76. The reduction is probably due to an overestimate of the catch per effort figure for 1976/77, but it is still considerably in excess of the level of 0.45 recommended for any stock that is in a normal healthy state. It is therefore, dangerously high for a stock such as the Celtic Sea one, which is now in danger of extinction.

Prospects for future years: The prospects for this fishery remain very poor. The immediate aim of any conservation measures must be to rebuild the adult stock as quickly as possible to a level of at least 40,000 tonnes. To achieve this it will be necessary to prohibit all fishing on the stock. The length of time that this will take will depend completely on the level of recruitment, (i.e. the success of the spawning of 1974/75, 1975/76 and 1976/77 and the subsequent survival of the herring). If recruitment returns to the normal rate recovery to the required level will not take place before

1980 at the earliest. On the other hand the process of rebuilding to the required level would be accelerated if the 1974-76 year-classes were stronger than the ones that have recruited in recent seasons.

The adult stock at 1 April 1977 is estimated to be less than 10,000 tonnes. Fishing at the present level on such a small stock is highly dangerous because the adult stock is now so much reduced that it may not be able to generate any recruitment whatsoever. In such a situation the stock would quickly become extinct.

Racial composition of the Celtic Sea stock: During the last few seasons an earlier start to the season has led to speculation that a new autumn spawning component had entered the Celtic Sea fishery. These early spawning fish were again present during the 1976/77 season and herring that spawned before November contributed to over 35% of the catches. However, it appears, from an examination of racial characters, that these earlier spawning herring are the result of a change in the time of the main spawning, which previously took place in December and January.

## 2. SOUTH-WEST COAST

Introduction: The south-west coast herring fishery, which is now mainly exploited by boats fishing from Castletownbere, started in August 1976 and continued until November, 1976. The total landings were slightly lower than in the previous season but the value, because of considerably higher prices, was over £30,000 higher than in 1974. (Table 9). The landings, values and average prices per port are shown below.

Table 9: Total landings (tonnes) and value (£ in brackets) at principal ports, (July-November)

Port	1971	1972	1973	1974	1975	1976
Castletownbere	635	1376 (65263)	1193 (123020)	791 (86113)	921 (119246)	262 (37536)
Baltimore	14	110 (6469)	317 ((3132)	-	-	-
Dingle	145	407 (21309)	747 (63742)	490 (37656)	227 (38730)	721 (186101)
Reynard Pt.Valentia Ballinskelligs	-	29 (1490)	87 (7425)	130 (9656)	92 (11745)	33 (2141)
Total	794	1922	2064	1411	1240	1016
Value	34,490	94,531	197,319	133,425	169,721	225,778
Average	43.44	49.18	95.60	94.56	136.87	222.20

In addition to the above figures a further 217 tonnes valued at £43,900 were landed at Bantry and Glengarriff by small boats using drift nets during the period October to December, 1976. It was not possible to obtain any samples from this area during the main fishery of 1976, and this together with an inadequate collection of catch per effort statistics meant that comparison of stock size cannot be made.

#### ACKNOWLEDGEMENTS

The continued co-operation of skippers, buyers and fishermen, and particularly the staff of the South and East Coast Fishermen's Association for supplying information and statistics used in compiling this report is gratefully appreciated.

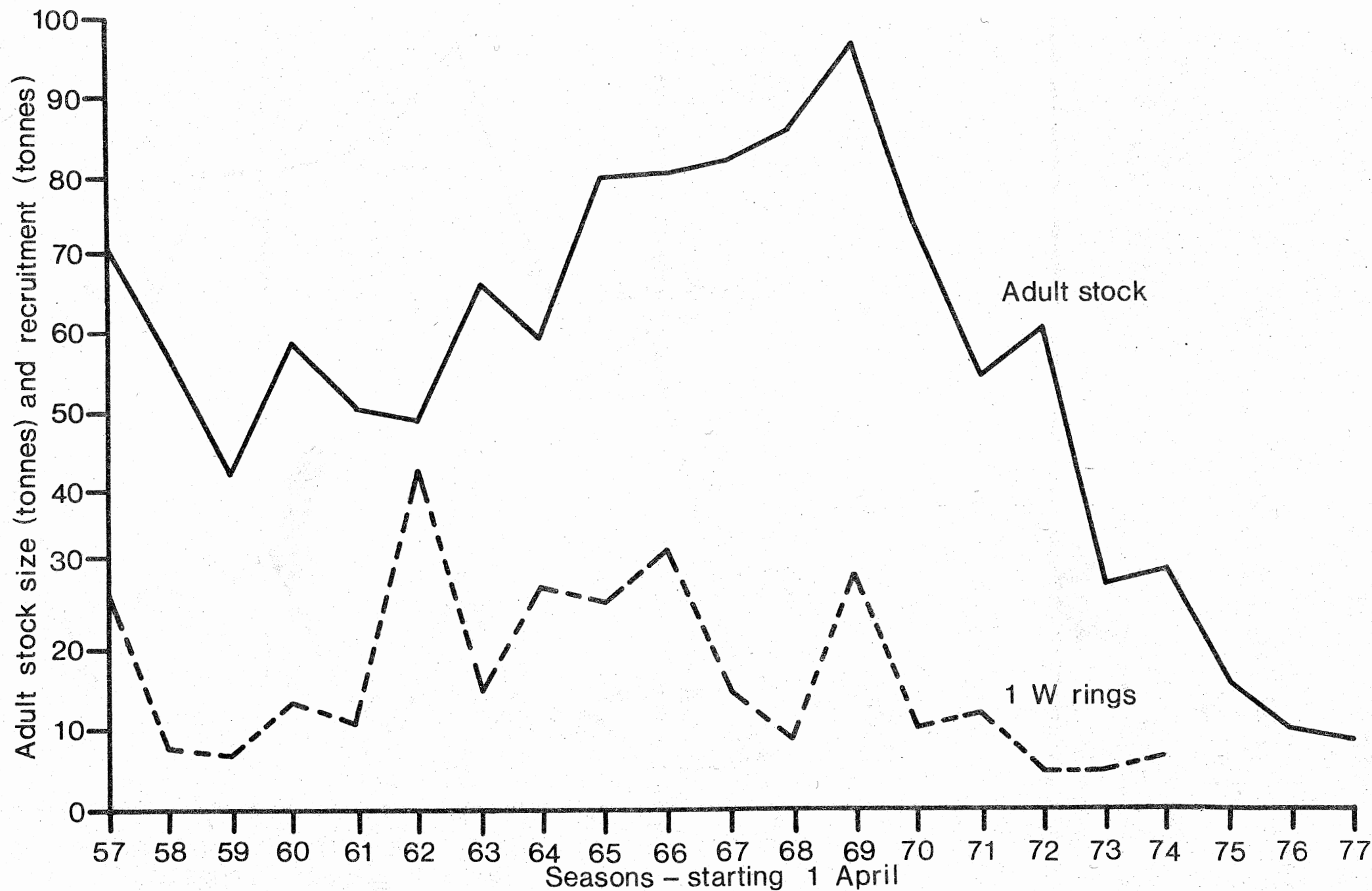


Fig. 1. Celtic Sea: Adult stock biomass and biomass 1 w.ring. fish two years later.