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by

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One of the most difficult problems facing fishery managers is to decide on the allocation of the salmon catch as between different classes of netmen and anglers. Few decisions are more controversial or generate so much heat, yet a decision has to be made on this matter and any information which aids in making such a decision is to be welcomed. An evaluation of the economics of angling compared with those of net fishing is one such input but, of course, there are many other issues to be considered also. The purpose of this paper is to show how the Irish salmon catch has been divided in recent years and to make some evaluation in economic terms of the benefits accruing to different sectors.

The distribution of the salmon catch as between netmen and anglers for selected years between 1952 and 1982 is shown in Table 1 and for all the years over this period in Figure 1. This diagram indicates that over the years in question the total catch has shown a distinct cyclical pattern. The level was over 1,000 tonnes in the early 1950s but declined to around 600 tonnes by 1961. It rose to 1,570 tonnes in 1963, declined to 1,160 tonnes in 1966 and then rose dramatically to almost 2,200 tonnes in 1975. After that it declined steadily to 650 tonnes in 1981 but rose to 900 tonnes in 1982 and the indications are that it will be much higher than this in 1983.

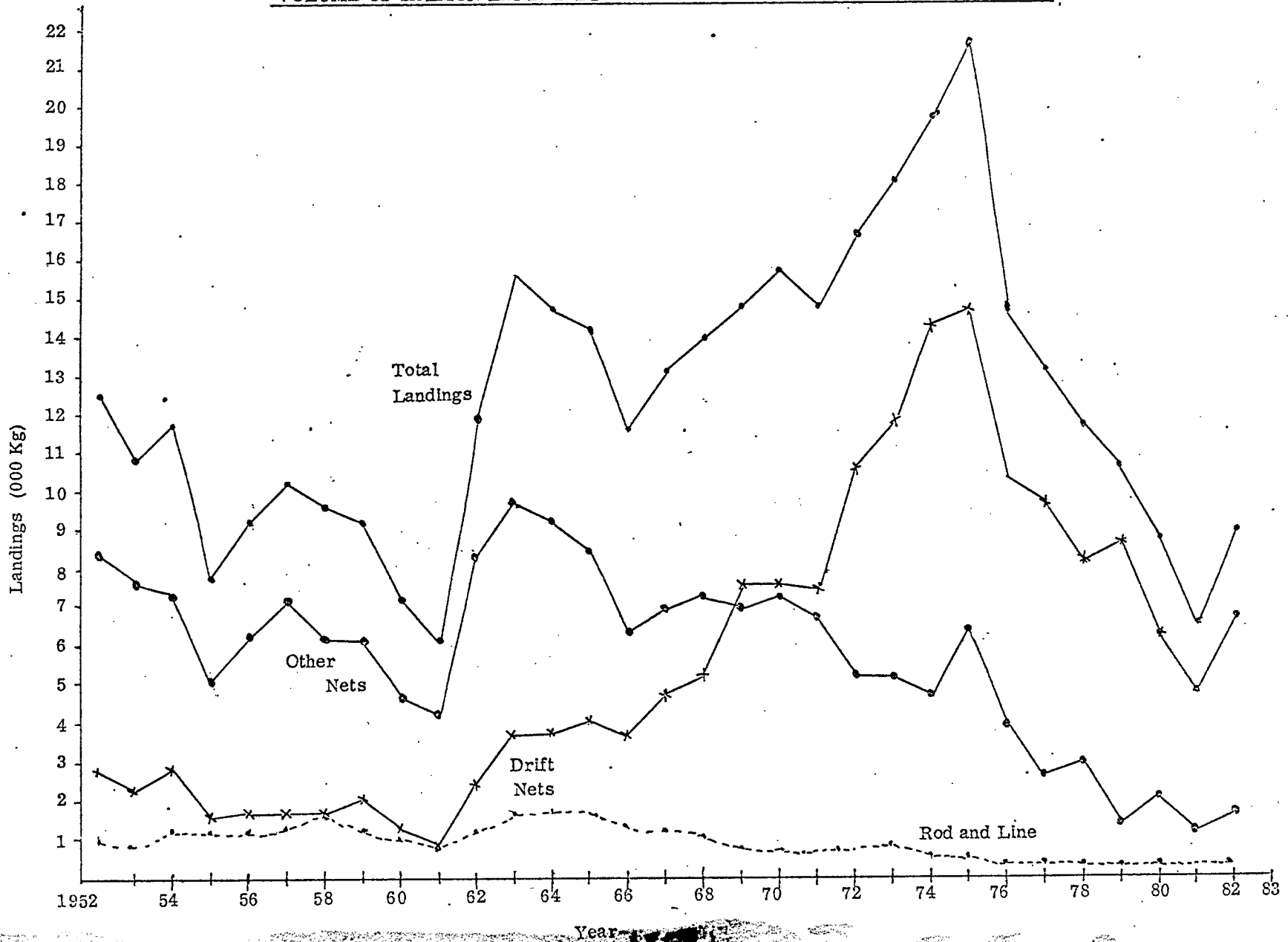
The size of the total catch is, however, a function of the effort and gear employed in chasing the fish, and it is obvious from an examination of the data that the large catches in the 1970s were due very much to the effort exerted by the drift net fishermen who between 1972 and 1976 took over 1,000 tonnes annually. During this period the catch taken by other nets was much less than it had been in the mid 1960s and particularly in

Table 1: Salmon Landings in Ireland in Selected Years, 1956-1982*

Year	Commercial			Total	Rod and Line	Total all Methods
	Drift Nets	Draft Nets	Other Nets			
	Tonnes					
1952	299.8	591.6	256.5	1148.0	102.4	1250.4
1954	290.7	564.4	176.3	1031.4	133.2	1164.6
1956	169.6	487.0	140.2	796.7	120.1	916.8
1957	176.7	594.3	111.5	882.5	140.7	1023.2
1958	175.4	473.3	134.8	783.5	170.7	954.2
1960	140.6	374.1	90.3	604.9	104.7	709.6
1961	99.5	337.9	87.8	525.2	87.9	613.1
1962	252.1	674.1	156.5	1082.8	117.3	1200.1
1964	381.0	748.4	182.6	1312.0	177.3	1489.3
1966	376.2	486.1	161.5	1023.7	137.1	1160.8
1968	546.2	556.1	184.4	1286.8	114.3	1401.1
1970	786.8	573.2	173.5	1533.5	62.2	1595.7
1971	750.5	535.8	149.7	1436.0	60.7	1496.7
1972	1064.6	408.2	115.8	1588.7	85.2	1673.8
1973	1191.0	414.1	113.5	1718.6	93.6	1812.2
1974	1440.3	390.7	102.8	1933.8	58.5	1992.3
1975	1482.3	530.3	123.6	2136.2	52.2	2188.4
1976	1046.1	304.4	98.4	1448.9	43.0	1491.9
1977	981.0	226.3	59.5	1266.8	38.5	1305.3
1978	843.2	255.6	49.0	1147.8	31.4	1179.2
1979	882.9	129.6	20.8	1033.3	39.7	1073.0
1980	641.9	171.8	41.0	854.7	39.8	894.5
1981	492.4	80.7	41.2	614.3	40.9	655.2
1982	690.0	135.4	37.5	862.9	40.4	903.2

* The commercial catch figures prior to 1970 are taken from ESRI Paper No. 68. They are somewhat higher than those in the Sea and Inland Fisheries Report because in some years the latter were less than salmon exports. After 1970 the recording methods appear to have been improved.

VOLUME OF SALMON LANDED BY DIFFERENT METHODS OF CAPTURE 1952-1982



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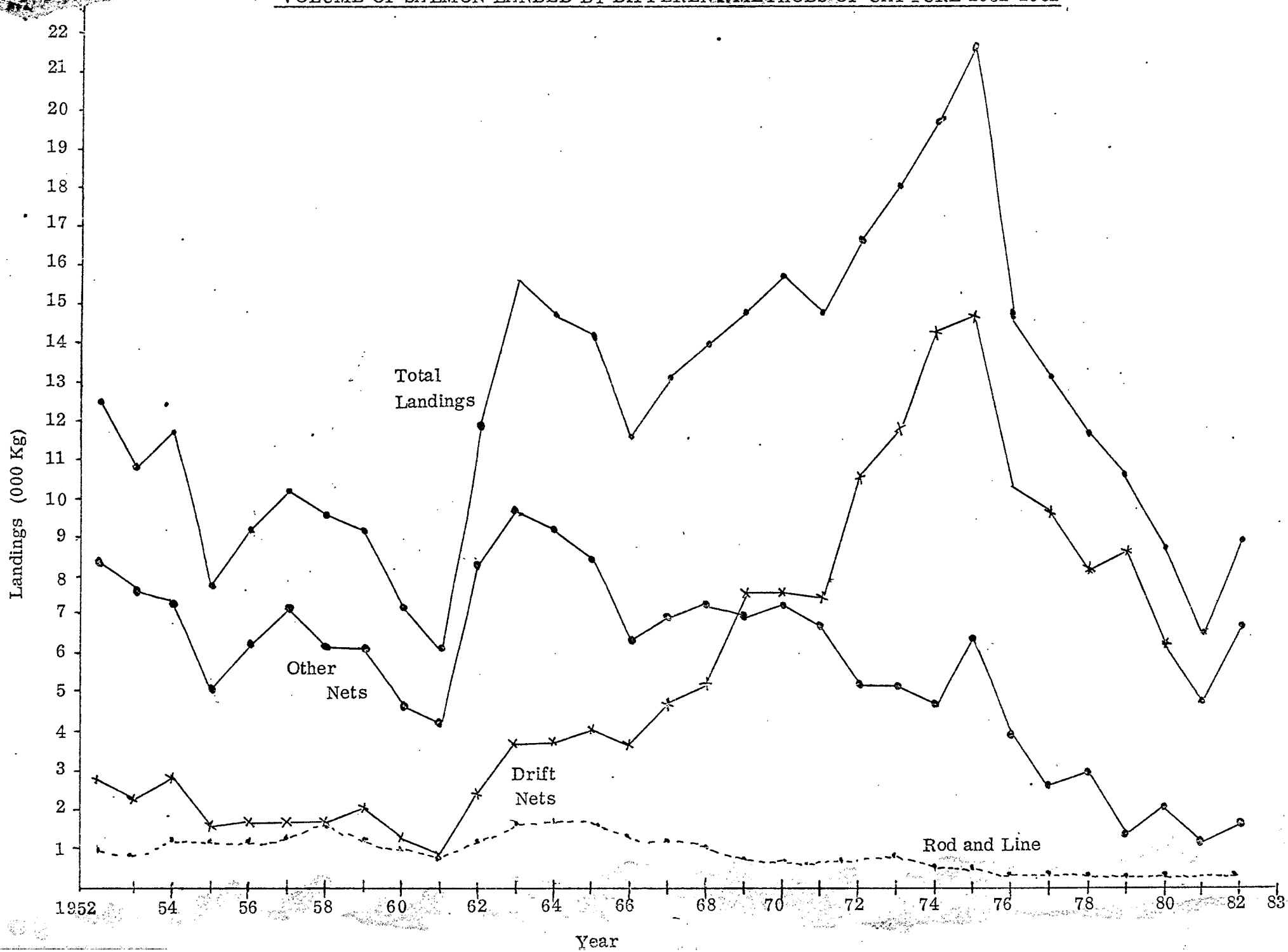


Table 2: Number of different classes of licence issued
and catch per licence, 1960-1982

Year	No. of Licences *				Catch per Licence			
	Drift Net	Draft Net	Other Nets	Rod & Line	Drift Net	Draft Net	Other Nets	Rod & Line
	No.				Kg			
1960	318	633	242	8,742	377	503	318	13.7
1961	319	589	201	8,578	311	572	436	10.2
1962	363	589	228	9,009	760	1252	751	13.0
1964	476	792	255	11,628	727	859	651	15.2
1967	531	732	268	10,705	869	665	621	11.4
1969	669	665	274	10,746	1141	825	558	10.6
1970	817	667	285	11,446	963	859	609	5.4
1971	916	697	264	10,769	819	769	567	5.6
1972	1156	678	243	9,727	921	602	477	8.7
1973	1112	713	271	11,788	1071	581	419	7.9
1974	1048	681	259	12,951	1374	574	397	4.5
1975	1046	672	266	13,285	1417	789	465	3.9
1976	1047	677	277	14,412	999	450	556	3.0
1977	997	650	267	11,879	984	348	368	3.2
1978	1007	608	266	13,481	837	420	184	2.3
1979	924	587	279	12,900	956	221	74	3.1
1980	959	601	233	16,079	669	286	176	2.5
1981	878	601	231	16,888	574	134	178	2.4
1982	830	560	247	15,714	831	242	152	2.6

* Source: Department of Fisheries, Sea and Island Fisheries Reports, various issues.

1974 when the other nets took only 493 tonnes, while the drift nets took 1,440.

The anglers also did badly during this period of high total catches. The rod and line catch in the years between 1952 and 1968 (except for 1953 and 1961) was over 100 tonnes per annum and indeed was over 170 tonnes in some years. Since 1968, however, the catch has declined steadily and is now only about 40 tonnes per annum.

What has really been happening is that the drift net fishermen have been taking more and more salmon off-shore leaving much less for the in-shore netsmen and for the anglers. Actually the catch per rod and line licence has declined from around 15 kg per annum in 1964 to 2.6 kg in 1982, while that for draft net licences has dropped from around 800 kg and sometimes more between 1962 and 1970 to a mere 134 kg in 1981. The catch per drift net licence, on the other hand, rose from about 400 kg, in 1960 to over 1,400 kg in 1975 but has declined since then to 570 kg in 1981. Figures for the number of licences issued and catch per licence are given in Table 2 for the years 1960 to 1982.

It is very often argued that the heavy exploitation by the driftnetmen if continued will ultimately lead to a permanent decline in stocks. This is probably true though the evidence to date is not conclusive. The cyclical nature of the salmon runs makes it very difficult to determine what is really happening. Even though the drift net catch, at 492 tonnes in 1981, was only one third of its 1975 level, it recovered to 690 tonnes in 1982 and will probably continue rising over the coming years. This, if it happens, will not be of great benefit either to the in-shore netsmen or the anglers. The heavy exploitation at sea will continue to reduce in-shore and river catches, though it may not necessarily reduce stocks on a permanent basis.*

A relatively small number of fish going upstream will maintain stocks at a fairly reasonable level but this small number will give very poor angling. For good angling it is necessary to have a fairly "full river". This, to an extent, is wasteful of fish because

* It may however affect the gene-pool giving rise to less variability and so more danger from disease. It may also reduce some river stocks very severely.

angling is a very inefficient method of catching fish but from an economic point of view a "full river" (with poaching controlled) should attract anglers from other areas, home and abroad, and bring cash into the river catchment area through the tourist spending. This aspect of the topic is discussed below.

Economic Evaluation of Salmon Fishing

In theory it is not difficult to estimate the value of a commercial fishery though in practice it is not easy to obtain the necessary data. The problem of making an economic evaluation of a recreational resource such as angling, on the other hand, is an extremely difficult one because the use of such a resource does not usually involve the conventional market mechanisms.* To put the matter briefly the value of angling can be looked at in two ways, though each of these is not completely independent of the other.

1. It can be considered from the point of view of its economic importance to the region or state in which it is located and its importance measured in terms of the income and employment arising in the area. This might be termed the "value added" or GNP approach.
 2. Alternatively we can consider the value of a recreation site as a measure of the satisfaction or utility it affords as an amenity to its users. In some cases the users may spend very little money in connection with the amenity but nevertheless it may provide them with great mental and physical relaxation for which many of them would pay highly if they had to, and would object strenuously if its existence were threatened. It thus has some intangible value which cannot be measured directly in monetary terms but has to be evaluated by some indirect means. This might be termed the amenity value approach.
- A considerable amount of work on the evaluation of salmon angling was carried out in the ESRI in the early 1970s using both these approaches. In this paper I

* For the difficulties involved see O'Connor et al (1974) ESRI Paper No. 75. P. 74.

adopt somewhat the same type of evaluation for 1982 and then go on to discuss the results.

The Value of Irish Salmon Fishing in 1970 and 1982

In estimating the value of salmon fishing in 1970 (see ESRI Paper No. 78) we began by calculating what we termed the gross output of the industry and from this we deducted certain expenses to obtain the net output or value added. Gross output was defined as the total value of all sales by the industry. These sales related to three basic components;

- (a) sales of angling services to foreign visitors;
- (b) sales of angling services to Irish anglers, and
- (c) sales of salmon by commercial fishermen.

The results showed that for the State as a whole expenditure on salmon angling by out-of-State visitors in 1970 amounted to £533,000, expenditure by Irish anglers on salmon fishing came to £326,000 and sales of salmon by commercial fishermen were valued at £1.2 million, giving a total gross output for the salmon fishing industry of £2,059,000 in that year. When these figures are converted to 1982 prices, by the use of suitable price indices, this total comes to £11.18 million made up of £2.73 million for visiting anglers, £1.67 million for the home anglers and £6.78 million for the commercial fishermen. This breaks down into about 40 per cent from angling and 60 per cent from commercial sales, showing that the value of the angling is quite substantial.

We carried out a number of surveys in connection with the 1970 study which showed the numbers involved in different types of operation in different districts, the amounts spent by different classes of anglers and the expenditure incurred by the commercial fishermen. Unfortunately, similar surveys have not been carried out in the intervening years and for that reason it is difficult to produce comparably accurate figures for the present time. However, on the basis of catch data, number of licences sold and certain data from Bord Failte, I have derived some figures for 1982 which I hope are not too far out.

Visiting Anglers

On the basis of licences sold in 1982 and 1970 it is estimated that about 6,000 out-of-State anglers visited Ireland in 1982. The corresponding figure for 1970 was 3,751. In view of the relatively small number of salmon taken by anglers in recent years (see Table 1) it would seem at first that this figure is too high. However, Bord Failte estimates a somewhat higher figure than this for 1982 and so we consider that our figure of 6,000 is reasonable.

With regard to the expenditure of the visiting anglers we first applied the 1970 figure per angler in the different districts to the estimated 1982 numbers in these districts and then grossed up the resulting data using a suitable index. Bord Failte estimated that average expenditure per ordinary visitor in 1982 was 4.27 times higher than that in 1970 and we applied this ratio to the 1982 expenditure at 1970 prices to obtain a total expenditure of £3.62 million for the visiting anglers in 1982. Had we grossed up by the change in the consumer price index between the two periods, which was 5.118 we would have obtained a higher figure.

Home Anglers

When the estimated number of angling licences issued to visiting anglers in 1982 was deducted from the total we estimate that there were about 8,200 Irish anglers in that year, and if we assume that their average expenditure in the different districts increased in the same proportion as the Consumer Price Index between 1970 and 1982, then the total gross expenditure on salmon angling by Irish anglers in the latter year was £2.10 million in current money values.

Total Gross Output

The commercial catch in 1982 was 862.8 tonnes valued at £3.81 million and if we add this value to the anglers' expenditure the gross output of the industry is £9.53 million (3.62 + 2.10 + 3.81). This compares with a gross output of £11.18 million in 1970 (at 1982 prices), a drop of about £1.7 million.

Net Output

As stated above, the calculation of net output involves the subtraction from gross output of all the costs incurred in producing the goods or services in question. From the point of view of an individual firm such costs are simply its expenditure on non-labour inputs such as raw materials, transport, etc. From the point of view of the economy as a whole, however, it is only the import content of these costs that should be deducted since the domestic content represents net output (or value added) by the Irish economy.

In order to estimate the net output of salmon fishing in 1982, it was assumed, based on an ESRI Input/Output table, (Henry 1983)

- (i) that the average import content of both Irish and visiting anglers' expenditure in 1982 was the same as that of other tourists (26.6 per cent) and
- (ii) that the average import content of the commercial salmon output was equal on average to the import content of all exports from the fishing industry in 1982 (25 per cent).

The import contents were calculated on this basis and deducted from gross outputs to give a net output of £2.66 million for sales to visiting anglers, £1.54 million for sales to Irish anglers and £2.86 million for sales of salmon by commercial fisherman. Thus the total net output or value added by salmon fishing in 1982 was estimated at £7.06 million. The corresponding figure for 1970 at 1982 prices was £9.13 million made up of

£2.06 for the visiting anglers, £1.22 for the home anglers and £5.85 million for the commercial fishermen. Gross and net output figures at 1982 prices for 1970 and 1982 classified by source are given in Table 3.

Table 3: Gross output and net output (value added) arising from the salmon fishing industry in 1970 and 1982 at 1982 prices

Source	1970			1982		
	Gross Output	Import Content	Net Output	Gross Output	Import Content	Net Output
	£ million (1982 prices)					
Visiting Anglers	2.73	0.67	2.06	3.62	0.96	2.66
Irish Anglers	1.67	0.45	1.22	2.10	0.56	1.54
Commercial fishermen	6.78	0.93	5.85	3.81	0.95	2.86
Total Industry	11.18	2.05	9.13	9.53	2.47	7.06

In a previous ESRI publication (Paper No. 78) we applied a multiplier of 1.6 to some of the 1970 net output figures to allow for second and further round spending effects. Research carried out since that time indicates that this multiplier is probably too high and that a figure of 1.3 would be nearer the mark. If, therefore, we apply the latter multiplier to the net value added by the visiting anglers and the commercial fishermen* we obtain the following estimates of value added for salmon fishing in Ireland in 1970 and 1982.

	<u>1970</u>	£m	<u>1982</u>
Visiting Anglers	2.68		3.46
Irish Anglers	1.22		1.54
Commercial fishermen	7.61		3.72
Total	<u>11.51</u>		<u>8.72</u>

These figures which are for the State as a whole compare with a value of £43.8 million for sea fish other than salmon taken in 1982. Data for the net output of salmon in the different districts are given in Table 4 and show that in 1982 the bulk of the value added

* In one of our earlier reports it was explained that a multiplier should not be applied to the expenditure of the Irish anglers.

Table 4: Value added at 1982 prices by the salmon fishing industry in 1970 and 1982 classified by fishing district.

Fishing District	1970				1982			
	Visiting Anglers	Home Anglers	Commercial Fishermen	Total	Visiting Anglers	Home Anglers	Commercial Fishermen	Total
	£000				£000			
East	170.4	174.8	241.5	586.7	260.3	239.5	67.8	567.6
South	174.5	142.2	1604.6	1921.3	305.7	223.2	229.2	758.1
South West	593.2	204.4	812.5	1610.1	499.1	154.5	518.9	1172.5
Shannon	54.8	186.4	645.7	886.9	72.8	217.6	76.3	366.7
West	450.4	179.3	153.3	783.0	412.6	147.6	119.6	679.8
North West	314.3	208.5	1102.6	1625.4	633.5	376.8	467.0	1477.3
North	299.9	127.9	1294.1	1721.9	470.9	180.6	1383.5	2035.0
Total	2057.5	1223.5	5854.2	9135.2	2654.9	1539.8	2862.3	7057.0

was generated in the North, North West and South West regions. There was a considerable decline in both the Shannon and the South regions between 1970 and 1982.

Discussion of the results

The above figures show that salmon fishing is an important national asset. At present price levels it generates around £8 million per annum in relatively depressed areas. This income comes from the sale of fish and from the spending of the home and visiting anglers. Angling, therefore, is far from being a mere hobby: it is a valuable source of income, employment and export earnings. However, the angling case must not be overstated. Over zealous advocates sometimes do this by quoting the value of a salmon to a commercial fisherman as being perhaps £12 while to a foreign angler the same fish is worth over £500 in the sense that the total expenditure of all foreign anglers divided by their catch gives an average of over £500. The fallacy of this argument is in its implications rather than its facts, for it implies that if one more salmon is allowed up the river an extra £500 will be generated by anglers. This, of course, is not so, but it does raise the question of the responsiveness or elasticity of the number of anglers to changes in the stocks of salmon.

In the ESRI we have been unable to obtain a significant relationship over time between these two variables because there are other factors involved such as higher living standards in recent years, more discretionary income etc. Commonsense, however, would indicate that in the long run good angling will attract more foreign anglers and for that reason, as well as for the satisfaction of our own anglers, reasonable river stocks should be maintained. A British national angling survey in the early 1970s showed that there were half a million game fishermen in Britain of whom only about one in ten usually catch a salmon, but nearly half of whom would like to catch salmon more than any other fish. This is evidence of a large and unsatisfied demand for salmon angling and suggests

that increases in salmon stocks in our rivers would be matched by increases in the numbers of visiting anglers.

The choice as to the proportions of fish allowed for angling and for commercial exploitation is, however, far from clearcut and is complicated by the fact that in some places whole communities are dependent on commercial salmon fishing as an important part of their livelihood. Excessively stringent restrictions on netting would, therefore, hit these communities hard. On the other hand, so would a decline in salmon stocks. In the ultimate analysis, of course, stock maintenance is what matters and I feel that extra effort must be made by the government in this direction. Essentially what is required is a (very rough) assessment of the spawning capacity of Irish rivers combined with adequate monitoring of runs of fish. Such steps are an essential prerequisite for rational management of our salmon stocks since they provide an estimate of the maximum sustainable yield (MSY). Valuable information on these topics is being obtained by the Salmon Research Trust on an individual river system but this monitoring should be extended to other rivers so as to obtain an adequate volume of information on salmon runs in all areas at all times. Armed with such information the Department could adjust the netting effort in accordance with the level of runs and thus safeguard stocks.

In the meantime, however, it seems that some specific action needs to be taken. The above figures show that in real terms the incomes of commercial fishermen have been halved since 1970 and by much more than that since 1975 when the total commercial catch was 2,136 tonnes. It would appear, therefore, that the drift netting effort at the present time is far too intensive and would need to be relaxed over the coming years in order to give the stocks a chance of recovering. It is my opinion, however that if present regulations regarding fishery times, length and depth of nets, location of drift netting and inland poaching were enforced, the stocks would very soon recover and everybody would be better off. In the national interest, therefore, the government should treat enforcement as a matter of priority and see to it that existing laws are obeyed.

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