AN ROINN TALMHAIOCHTA AGUS IASCAIGH
(Department of Agriculture and Fisheries)

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EEL RESEARCH 1972.

By

CHRISTOPHER MORIARTY.

Fisheries Division
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EEL RESEARCH IN 1972

The national survey of eel stocks was continued in 1972. For the first time the eel population of a river, the Munster Blackwater, was studied. It proved to be the most densely stocked freshwater area sampled to date. It was calculated that between five and ten tons of eels must leave the river each year on migration. Unfortunately the eels were slow-growing and of rather low quality.

The eel stocks of Lough Gill and Lough Conn were found to be poor, heavily overfished and the eels were slow-growing. Two restricted areas, which had been subjected to intense commercial fishing for several years, the South Sloblands Channel in County Wexford and the Broadmeadow Estuary, showed poor stocks and will take several years to recover. Unfortunately, eels grow so very slowly (rarely taking less than ten years to reach market size) that their stocks are highly susceptible to damage from overfishing.

Using the fyke-netting method, described in Fisheries Leaflet 43 (Moriarty, 1972) sampling took place in several lakes of the Erne system near Belturbet, the Shannon Estuary at Kilrush and the estuary and Cloonee lakes at Kenmare, besides the waters mentioned above. In connection with pollution studies on the Claregalway river, a sample of eels was collected by electrical fishing. Field work was done by zoology students, Miss Maria Cramp and Miss Una Nic Fhionnlaoidh and Messrs B. Doolin and P. Johnston of the staff of the Fisheries Division of the Department of Agriculture and Fisheries. The Principals of vocational schools in Ballina, Belturbet and Sligo very kindly made facilities for laboratory work available.

Comparative trials of fyke nets of two different sizes were made. The first, in use in the investigations since 1968, was mounted on stainless steel hoops and had three valves. The second was mounted on plastic hoops and had two valves. The traps of both nets measured six feet in length, the leader of the steel-hooped net was 16 feet in length, that of the plastic-hooped 11 feet. No significant difference between the catches made by either net was observed. In the Blackwater there appeared to be a tendency for more eels to be caught in the traps whose openings faced upstream.

An interesting observation in the Lough Erne study was that fishing in the first week was almost a total failure. For the first two nights the average catch per train of eight nets was two eels, for the next two - five eels, while the next week the catch rose to eleven. The brown nets had been used in salt water some months before and the white nets had never been used. Apparently in both cases the smell of the nets repelled the eels to some extent. After the nets had been used in freshwater in Lough Erne they worked satisfactorily in the other lakes from the first day in each case.

A summary of the results is given in Appendix 1 and 2, where they are compared with the figures for other surveys. The Broadmeadow Estuary, at Malahide, Co. Dublin, was sampled in May. Commercial fyke fishing had taken place there since 1967 but had been abandoned towards the end of 1970 when overfishing reduced the stocks so that fishing became unprofitable. The sampling revealed a shortage of eels of all sizes. The Broadmeadow eels were unusually well fed (the principal food being crabs and marine worms) and showed a high rate of growth. It is expected that if no fishing takes place for four or five years the stocks will return to a satisfactory level. The situation will be kept under review.

Field work on the Erne system was based at Belturbet. Loughs Quivvy and Drumard and Upper Lough Erne and portions of the River Erne were sampled. Eels in Lough Drumard were fewer and smaller than in the other waters. Lough Drumard is a small lake, lying off the main river and without any major inflowing streams. Such a lake would be unlikely to attract many ascending eels and has probably been overfished. The eel populations in the other lakes and the river were similar to each other and showed the high growth rate characteristic of the river system. As before, a shortage of small eels was recorded.

In Lough Gill thirteen standard trains of eight nets were set in water of ten feet deep or less. Very poor catches (a total of two eels), made by setting five trains in water from 10 feet down to 75 feet, suggested that the eels were mostly concentrated in the shallows. The catch per net per day figures for Appendix 1 were calculated from the shallow-water nets. They showed that the density of the eel population was very low, comparable with the figures for Loughs Mask and Key. A lake so close to the sea as Lough Gill should, however, have an eel population at least three times as large as this. The percentage of small eels in the catches was much higher than in any of the lakes studied previously (with the unimportant exception of Lough George) and large eels were very scarce. The rate of growth was similar to that observed in the Corrib and Shannon systems. Only 21% of the sample were older than 12 years, as opposed to figures of the order of 50% for Lough Key and the northern part of Lough Corrib. The figures show clearly that Lough Gill is very much understocked with eels and that the small stocks are heavily overfished. Understocking might result from the existence of some barrier to the ascent of elvers in the Garvogue River. It is also possible that other rivers, such as the Moy, could be more attractive to the elvers.

In Lough Conn the unit catch was slightly higher than in Lough Gill but the length distribution was much the same. The percentage of young eels was rather higher, but the growth rate was similar. This suggests that, although the stocks are distinctly low there is a much better supply of elvers to Lough Conn than to Lough Gill. However, there is equally clear evidence of over-fishing.

In the Blackwater fishing took place at three positions from August 14 to 18. Eels were very plentiful but of rather poor quality, most of them having very broad heads. Nets were set and fished daily. Besides the 620 eels in the sample 22 roach, 12 flounder, 8 dace, 4 gudgeon, 2 perch, 2 salmon parr and 14 small trout were caught. Table 1 gives figures for catches and length distribution of the eels, moving upstream from the Island.

Table 1. Catch and effort.

Position	Date	Number of effective nets	Total catch	Catch per net	Lengths, in cm.			(%)
					30-40	40-50	over 50	Mean
Island	15	13	99	7.6	28	21	51	49.9
"	16	18	75	4.2	72	8	20	39.9
"	17	24	68	2.8	76	7	17	39.0
"	18	24	71	2.9	65	14	21	41.0
Careys-ville	18	18	141	7.8	44	15	41	48.0
Castle-hyde	17	18	171	9.5	44	22	34	46.1

The catches made after one night's fishing at each position were similar to each other, both in length distribution and in numbers. Subsequent catches at the Island were less numerous, as expected, but also consisted of smaller eels. This suggests that for some reason large eels tended to be caught first. The most important finding here was that the eel stocks were more or less uniform from Castlehyde down to the Island, a fact which gives reason to believe that eels continue to be as plentiful over most of the length of the river.

Data on age distribution are given in Table 2. The most frequent age group is 13-14 years, 38% of the sample being older than this and 37% younger. This indicates that migration begins at about 14 years old but a substantial proportion of the eels stay much longer than this, 26% were aged 15-18 years and the older individuals made up 12%.

Table 2. Age and weight calculations for sample of 89 females.

Age	7-8	9-10	11-12	13-14	15-16	17-18	19-22	23-28
%	1	20	16	25	18	8	8	4
Proportions of over 15's					48	21	21	10
Mean weights					409	488	661	919
Weight per 100 over 15's					19,632	10,248	13,884	9,190

Total weight of 100 migrating eels 52,951 kg.

An estimate of the annual numbers and weight of migrating eels has been made from these figures. There are seven two-year age groups from which large proportions of the eels are migrating (those from 15 to 28 years). If no eels from these groups were to migrate there would be seven times as many eels of these ages as there were in the 13-14 group, that is to say 7 x 25 175. There were only 38 and therefore 137 must have migrated in the 14-year period. The number migrating each year represents 137/175 or 78% of the number of 13-14 year eels in the sample. On the assumption that the numbers migrating in each age group are proportional to the numbers remaining the weight of 100 migrating eels can be calculated from the mean weight for each age group. As shown in Table 2 the total is 52,951 grams.

The sample of eels on which these calculations are based was taken from 13 nets of overall length 115 yards. In this sample there were 22 eels in the 13-14 age group, approximately 20 per 100 yards or 100 in 500 yards of river. For each 100 in this group there are 78 older eels to migrate and these have a total weight of 78 x 530 g = 41 kg. In the 34 miles of broad river upstream of the Island there should therefore be:

$$\frac{41 \times 34 \times 1{,}760}{500} = 4{,}906 \text{ kg.}$$

or approximately 5 tons.

This is a conservative estimate, based on the assumption that all of the large eels in a given stretch of river were caught in the first night's sampling. This is quite clearly not the case but it is not possible to tell precisely how many avoid the net, especially in view of the fact that the proportions of large eels caught fell after the first night in the only position where sampling took place on several successive nights. It would probably be safe to reckon on double the figure calculated, that is to say, ten tons. However, the numbers of eels which migrate in any year are subject to extremely wide fluctuations and there could never be any certainty of catching the average run each year. It seems, however, that there is a reasonable chance of five tons being the smallest annual run.

In the Kenmare region bad weather seriously reduced the intensity of sampling and very small catches were made. Eels were scarce in the estuary close to the harbour but it proved impossible to take samples over shallow water to the west which might have yielded better results. In September netting took place in the Cloonee lakes and revealed poor stocks of slow-growing eels. Sampling in the Shannon Estuary to the south of Kilrush showed that freshwater eels were very scarce but congers were more plentiful, outnumbering the others by fourteen to one. In the South Sloblands Channel, following two years of successful commercial fishing, stocks were found to be very low and the owners were advised to abandon fishing for five years to permit recovery.

REFERENCE

Moriarty, C. (1972). Eel Research 1965-1971. Fishery Leaflet 43.

Appendix 1. Catch, length and weight figures.

	Number measured	Catch per net per day	Weight per net per day g	Weight per net per day lb	% less than 40 cm (16 in)	% 40–50 cm	% over 50 cm (20 in)
CORRIB SYSTEM							
Corrib South	349	4.4	485	1.07	45	38	17
Corrib Mid	797	1.9	–	–	45	39	16
Corrib North	378	1.3	61	0.13	37	42	21
Mask	127	1.2	223	0.49	21	56	23
Carra	71	0.5	152	0.34	17	47	36
FERGUS SYSTEM							
Inchiquin	276	0.8	154	0.34	47	35	16
George	76	0.3	17	0.04	64	28	8
ERNE SYSTEM							
Upper Lough Erne	73	1.5	352	0.78	14	40	46
Drumard	21	0.9	137	0.30	24	62	14
Quivvy	27	1.1	281	0.62	22	26	52
Eonish	128	1.4	301	0.67	21	41	38
Dromore	136	1.2	352	0.78	3	57	40
SHANNON SYSTEM							
Parteen	57	1.1	180	0.40	20	64	16
Derg	271	1.6	324	0.72	13	54	33
Key	287	1.4	298	0.66	6	54	40
LOUGH GILL	114	1.2	140	0.31	62	27	11
LOUGH CONN	84	1.8	205	0.45	63	29	8
BLACKWATER River	620	7.6	2,359	5.22	27	21	52
Estuary	1,900	4.3	662	1.46	42	37	21
SHANNON ESTUARY							
Battle Island	244	7.5	1,770	3.91	19	31	50
Ballinacuragh	129	9.3	–	–	38	30	32
BROADMEADOW ESTUARY	29	1.2	203	0.45	39	34	27
SOUTH SLOBLANDS							
1970	408	15.6	2,252	4.98	32	54	14
1972	15	0.3	–	–	40	53	7

Appendix 2 Age distributions and calculated growth rates.

	Calculated length at IO years (cm)	I5	Percentage of sample in age groups 4-8	9-IO	II-I2	I3-I4	I5+
CORRIB SYSTEM							
Corrib South	44	59	I5	32	25	I6	I2
Corrib Mid	4I	54	3	23	22	I9	33
Corrib North	40	58	9	2I	25	20	25
Mask	42	53	I5	32	25	I6	I2
Carra	44	58	7	27	32	25	9
FERGUS SYSTEM							
Inchiquin	47	63	I3	29	27	22	9
George	36	46	IO	37	2I	I3	I9
ERNE SYSTEM							
Belturbet Lakes	52	70	33	37	23	5	2
Eonish	60	90	5I	30	I7	2	
Dromore	54	68	23	5I	24	2	
SHANNON SYSTEM							
Parteen	45	54	30	33	22	II	4
Derg	43	58	9	22	32	22	I5
Key	45	59	3	I2	30	26	29
LOUGH GILL	4I	53	6	38	35	I3	8
LOUGH CONN	40	55	I9	37	27	I4	3
BLACKWATER River	43	55	3	25	I6	22	34
Estuary	44	6I	57	23	IO	4	6
BROADMEADOW Estuary	54	75	62	34	4		
SOUTH SLOBLANDS	47	59	40	22	20	9	9