Central Fisheries Board

A fish stock survey of L. Carra (2009) and a review of the current ecological status of this fishery

Central Fisheries Board
An Priomh-Bhord Iascaigh

About the Central Fisheries Board

The Central Fisheries Board is a statutory body with responsibility for inland fisheries and sea angling operating under the aegis of the Department of Communications, Energy and Natural Resources and was established under the Fisheries Act 1980.

The principal functions of the CFB are to advise the Minister for Communications, Energy and Natural Resources on policy relating to the conservation, protection, management, development and improvement of inland fisheries and sea angling, to support, coordinate and provide specialist support services to the Regional Fisheries Boards and to advise the Minister on the performance by the Regional Fisheries Boards of their functions.

The Boards mission is "to ensure that the valuable natural resources of inland fisheries and sea angling are conserved, managed, developed and promoted in their own right and to support sustainable economic activity, job creation and recreational amenity."

Project Personnel

The survey was carried out by and the report subsequently written by Dr M. O'Grady and C. Wogerbauer B. Sc.

Acknowledgements

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1. Introduction

Lough Carra is a shallow, productive, limestone lake that provides first-rate habitat to a wild trout population. It covers an area of 1,560 hectares and lies north of the larger Lough Mask. It is an important trout fishery in its own right. Reports from local anglers that fishing was poor in recent years prompted this survey. The previous survey was in April 2001. This is the eighth fish stock survey of L. Carra since 1978. Other surveys were completed annually in 1978, 1979, 1981, 1986, 1996 and 2001.

2. Methods

Thirty sets of 192.5m gill-nets were set across the lake at random locations overnight. Each gang of nets contain seven panels of equal length, every half inch mesh size, from 2" to 5" inclusively. Net locations are illustrated in Fig. 1. Research has shown that this method of gill-netting can catch a random cross-section of the trout population of all trout ≥ 19.8cm (O'Grady 1981a, O'Grady 1981b). The survey nets will also retain all perch ≥14cms, roach ≥16cm and pike ≥35cms. All fish caught were retained. They were subsequently measured, weighed, scaled for ageing, assessed for sexual maturity, and dissected to identify diet. Although this method of gill-netting is fatal for all fish, it is estimated that the entire sample of fish is likely to be less than 0.001% of the fish population of a lake (O'Grady 1981a).

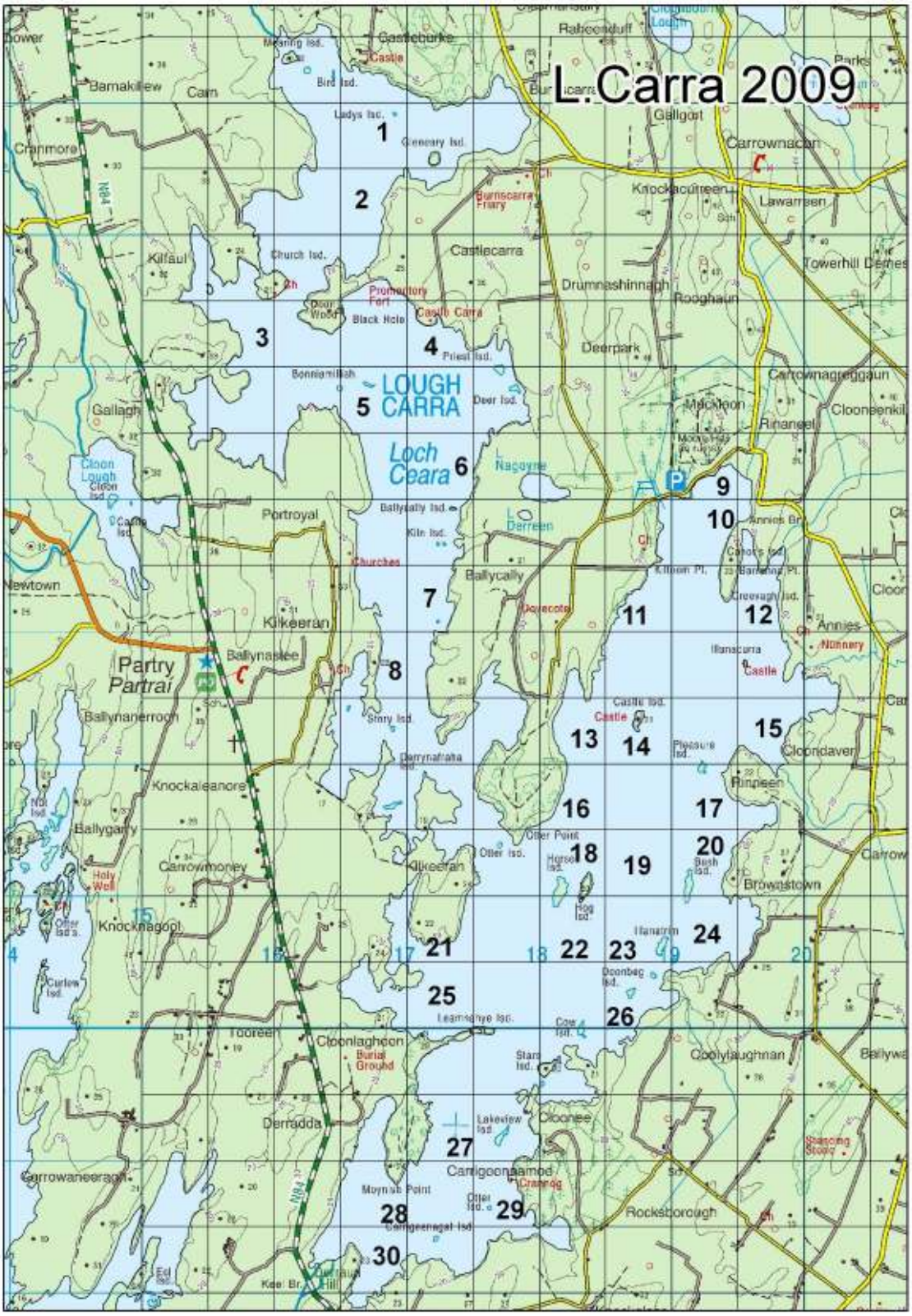


Fig. 1 Site locations for each gang of gill-nets.

3. Results

Three species of fish were captured in this survey. In total 131 trout, 25 pike and 51 perch were encountered (Table 1). The average trout weighed 0.66kg the average pike weighed 1.6kg. Data on catches are presented as Catch Per Unit Effort values (CPUE). This allows one to compare the relative density of different species in this survey, and more importantly, to look at the change in the relative densities of a particular species over many years.

Table 1: Catch Per Unit Effort (CPUE) of the L. Carra survey 2009

	Trout		Pike		Perch	
	CPUE	Number	CPUE	Number	CPUE	Number
2009	4.367	131	0.833	25	1.833	55

3.1 Trout

The trout data indicate the presence of a large and very balanced trout stock at the time of this survey. All age groups, from 2+ to 5+ years of age are well represented (Fig. 2). The survey gill nets are only capable of catching trout ≥19.8cm (O'Grady 1981a). Age analysis of adult L. Carra trout indicates that circa 50% of 2+ year old trout in the lake are <19.8cm and, therefore, will not be captured by the survey nets. Consequently the number of 2+ year old trout captured in the 2009 survey reflects the presence of a very strong year class of this age in the lake at the time of the survey. Approximately half of all trout caught were sexually mature (52%). This is consistent with the authors observations that many adult trout in Irish lakes only spawn on alternate years (O'Grady 1981a).

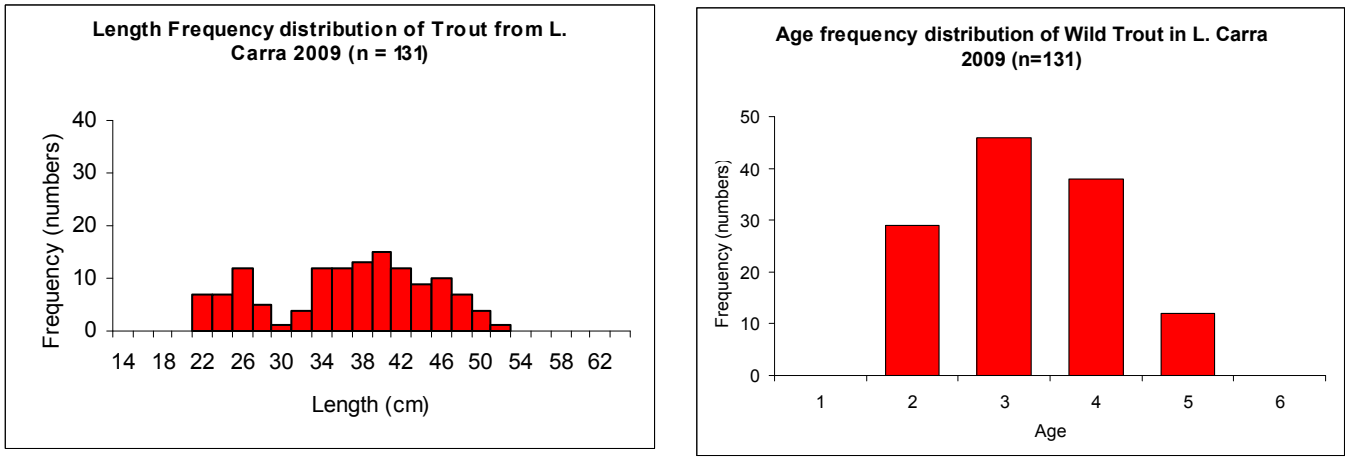


Fig. 2 Trout length frequency and age data from the 2009 L. Carra survey

Growth rates of L. Carra trout are very good, reflective of a productive lake (Fig. 3). Rates of growth have remained stable since 1978, indicating a high level of ecological stability in this water for decades (Table 2).

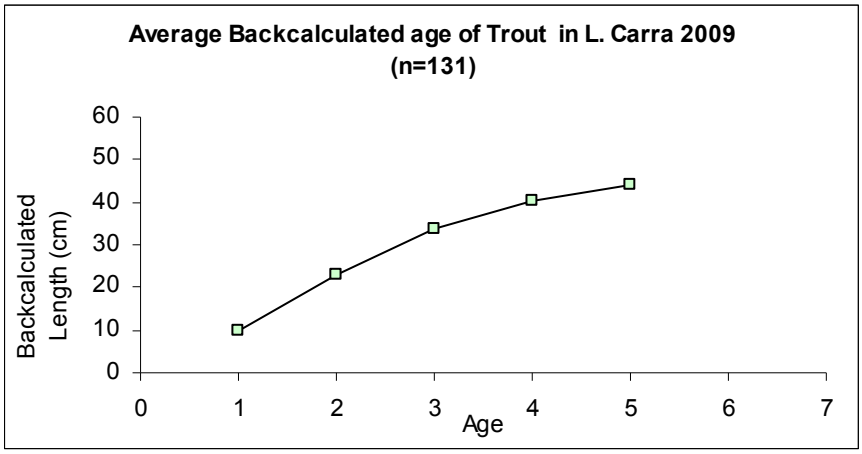


Fig. 3 Average back calculation of growth rate of Wild Trout in L. Carra, 2009

Table 2: Back-calculation of growth rates of Trout in Lough Carra from 1978-2009

		n	L1	L2	L3	L4	L5	L6
Wild	**1978**	44	7.03	19.04	30.03	36.19	39.89	40.37
Farmed	**1978**	109	11.74	22.81	35.51	40.99	44.00	
Wild	**1979**	102	8.64	18.81	28.86	37.82	43.95	45.69
Farmed	**1979**	34	11.02	22.61	32.57	37.46	44.93	49.30
Wild	**1980**	172	9.10	21.51	30.58	40.11	46.40	49.35
Farmed	**1980**	33	9.68	21.48	32.56	39.52	46.55	
Wild	**1981**	228	8.50	20.20	30.39	37.35		
Farmed	**1981**	43	10.45	20.67	31.54	37.94		
Wild	**1986**	127	8.09	20.84	32.60	41.06	46.27	48.79
Farmed	**1986**	21	10.92	23.94	33.47	40.85	45.63	47.00
Wild	**2001**	22	10.23	25.78	35.40	45.54		
Wild	**2009**	131	9.66	23.03	33.77	40.09	44.10	

The main food sources of trout were *Asellus*, *Gammarus* and cased caddis such as Limnephilidae. This is a very similar diet to that of the trout examined in nearly every survey since 1978 (Fig. 4). The 1996 and 2001 surveys did reveal proportionally more insects in the stomachs of trout at that time. Recent reports of poor angling in the lake may indicate that a change occurred in the insect populations in the 1990's, however the early spring dietary pattern appears to be stable over a long number of years – since surveys began in 1978.

Fig. 4 Trout length frequency and age data from the 1978 - 2009 L. Carra survey

3.2 Pike

The majority of pike caught were small and less than four years old, females were generally larger than males of the same age – a feature of all pike populations. The small numbers of pike netted combined with the youth of the pike population indicates that the pike control program is working very well. However, as males mature at a young age, even small pike can contribute to population growth. The stomach contents of pike indicated they predominately fed on fish; perch fry, sticklebacks and trout between 27 - 35cm (Fig. 5).

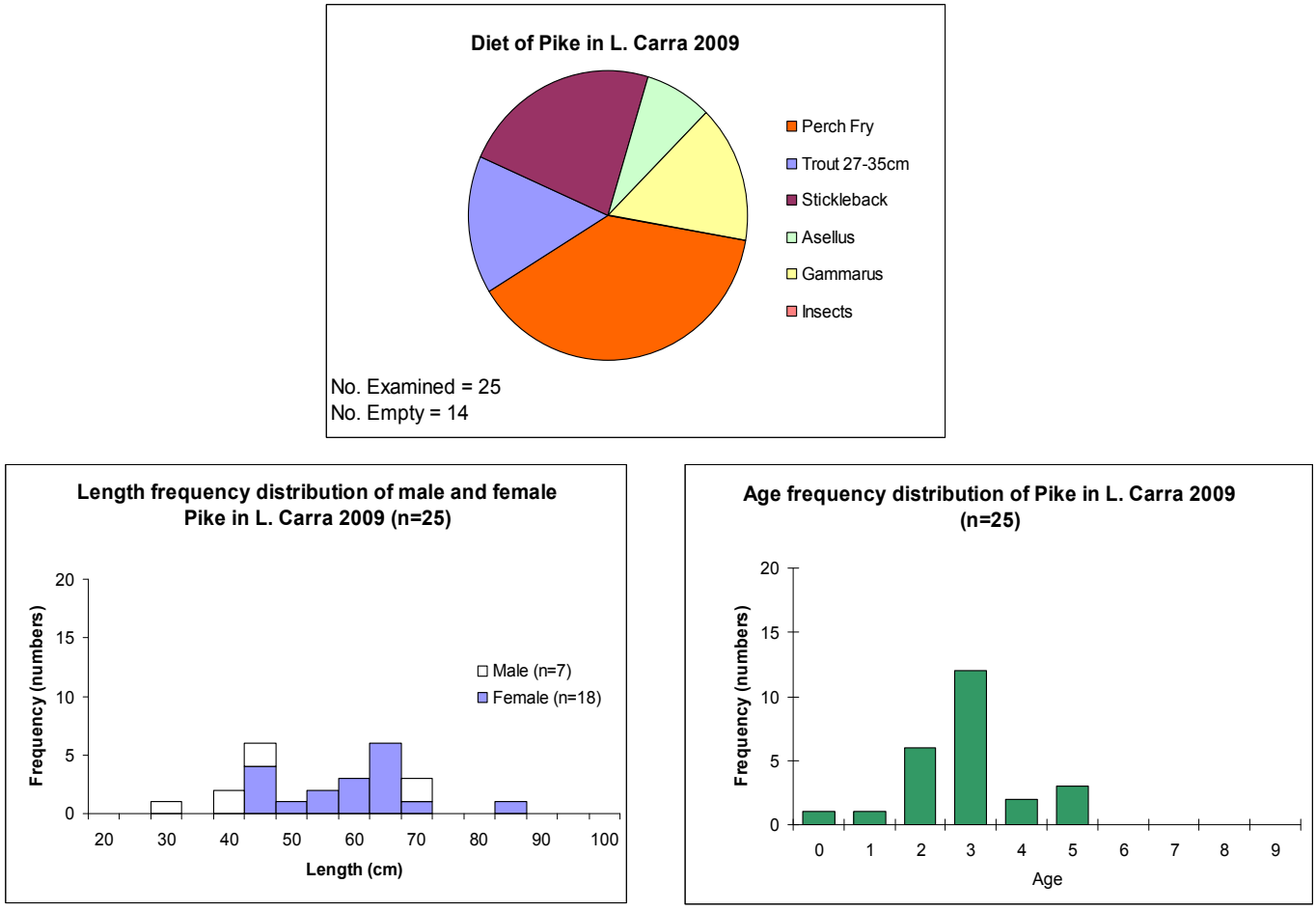
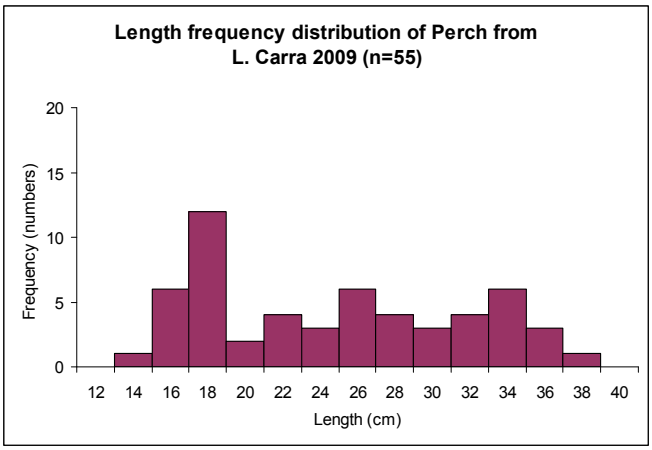


Fig. 5 Length frequency, age and diet data of Pike from the 2009 L. Carra survey

3.3 Perch

The structure of the perch stock in Lough Carra, since this survey series began, has always been different to that observed in other Irish lakes. The relative survival of perch in L. Carra to 2+ years of age has been consistently poor. However, the few perch which live beyond this age in L. Carra can reach a very large size (Fig. 6).



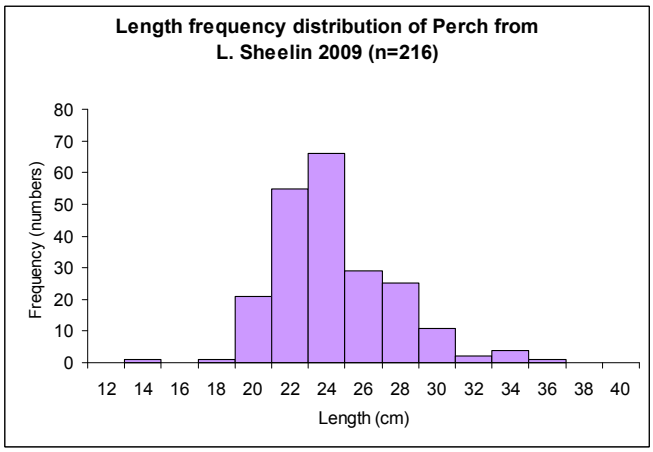


Fig. 6 Comparison of the length frequency of Perch from the 2009 L. Carra survey and the L. Sheelin 2009 survey

3.4 A summary of the survey database (1978-2002) and management implications

A summary of the CPUE values for all fish species over the entire survey period is provided overleaf in Fig. 7.

Lough Carra had been stocked annually with brown trout in the late 1970's. This practice ceased in 1981. It is of interest to note that the sum of CPUE values for wild trout and stocked trout in the 1978, 1979, 1980 and 1981 surveys were similar to the CPUE values of wild trout recorded in more recent years (1996, 2001 and 2009). This suggests that the stocked trout were filling a niche left vacant by the poor recruitment rate of the wild trout in the 1970's and 1980's.

Lough Carra's stream sub-catchments were subject to an arterial drainage scheme carried out over the period 1981- 1985. This probably accounts at least in part, for the decline in the standing crop of trout in the 1986 survey. The decline in numbers at this point in time (1986) may have also been due in part to a decline in controlling pike stocks – pike netting efforts were reduced by 50% from 1985 onwards and ceased completely in 1988. A pike control program was reintroduced in 1992 at a "pre-1985" intensity and has continued to date (O'Grady *et al.* 1996).

From 1998 to 2001 a major post-drainage stream enhancement program was carried out on all of the sub-catchments to the lake of the Western Regional Fisheries Board. The large trout stock and limited pike densities recorded in Lough Carra in both the 2001 and the 2009 surveys vindicates the Western Regional Fisheries Boards (WRFB) management strategy in relation to this resource. The successful maintenance of Lough Carra, into the future, as a quality wild brown trout fishery necessitates a continuation of the WRFB's current management strategy.

The authors see no necessity in repeating this survey exercise in the next 5 years unless there are obvious ecological changes in this fishery.

Currently L. Carra, in the context of large Irish trout loughs, is a unique fishery. It is now the only fishery of its kind which does not suffer from one or more of these "common ailments" – cultural eutrophication, roach and / or zebra mussel infestations.

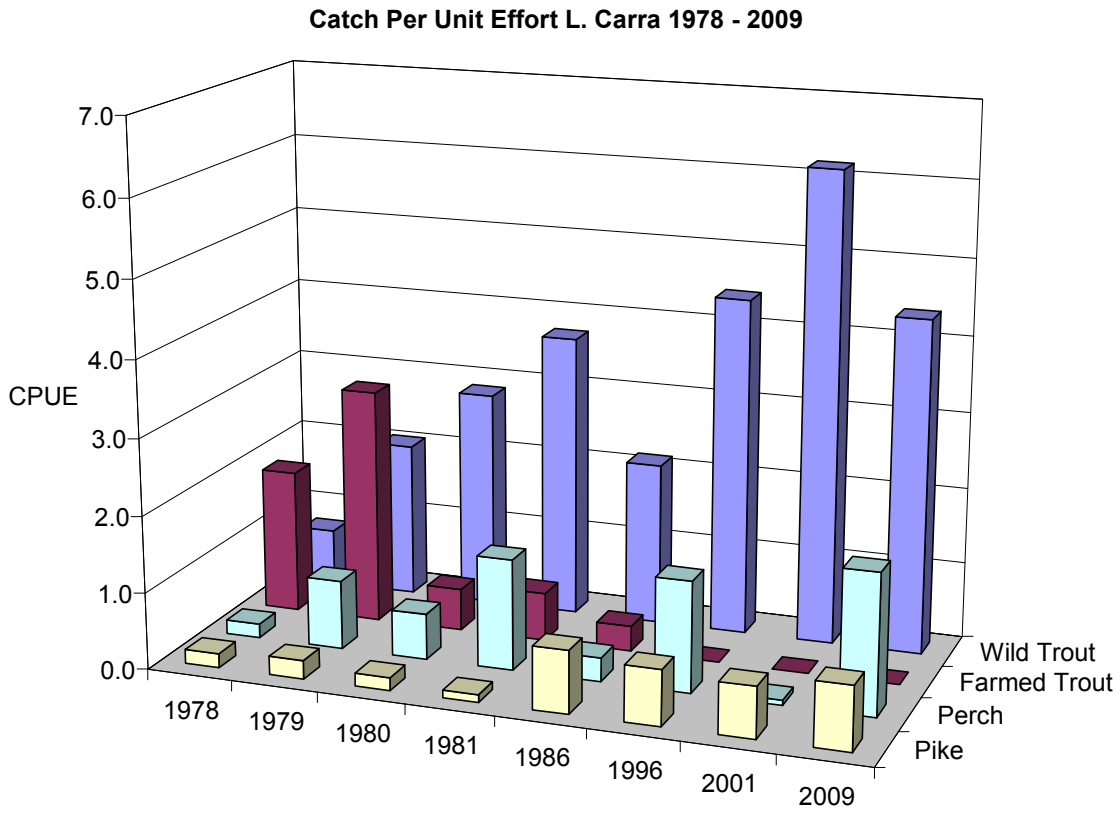


Fig. 7 Catch Per Unit Effort (CPUE) of fish stock surveys of L. Carra from 1978 – 2009

4. Conclusion

The trout population is extremely healthy. The feeding habits of the fish are unchanged when compared to previous surveys going back to the 1970's. This is a very good indication that the lake is ecologically stable, a rare thing in these times of change for Irish waters.

Although some anglers have reported sightings of shoals of roach in L. Carra, no roach were recorded in this survey. A subsequent fish stock monitoring exercise was carried out in L. Carra in the summer of 2009 as part of the Water Framework Monitoring Programme. No roach were recorded during this exercise (F. Kelly, pers. comm.)

Local reports say that the mayfly hatch has not been good in the last decade and although the reason for this is unknown, it might help to explain why angling has not been as good as in previous years. The survey data indicates that trout in this L. Carra are feeding from the lake bed on crustaceans and for this reason are unlikely to be available to anglers. Reassuringly, this survey indicates that L. Carra still supports an excellent and healthy stock of trout, one of the best in the country.

5. References

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