



Sampling Fish for the Water Framework Directive

Lakes 2011

Lough Talt



Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Lough Talt, September 2011

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Cover photo: Lynda and Fiona gill netting © Inland Fisheries Ireland

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1.1 Introduction

Lough Talt is situated in Co. Mayo in the Ox Mountains, between Tobercurry and Ballina in the Moy catchment (Plate 1.1 and Fig. 1.1). The lake has a surface area of 97ha and a maximum depth of approximately 40m. The lake falls into typology class 8 (as designated by the EPA for the Water Framework Directive), i.e. deep (mean depth >4m), greater than 50ha and moderate alkalinity (20-100mg/l CaCO₃).

Lough Talt forms part of the Lough Hoe Bog Special Area of Conservation (NPWS, 1997). The shores of the lake are home to the rare semi aquatic snail *Vertigo geyeri*. This endangered species is found at very few sites around Ireland and is listed on Annex II of the EU Habitats Directive. This oligotrophic lake is also home to a population of white-clawed crayfish (*Austropotamobius pallipes*), a species also listed on Annex II of the EU Habitats Directive (NPWS, 1997). Lough Talt is historically recognized as a good brown trout fishery and also holds an Arctic char population, a rare and threatened species listed in the Irish Red Data Book for fish as vulnerable (NPWS, 1997; O' Reilly, 1998; King *et al.*, 2011).

Inland Fisheries Ireland (previously the North-Western Regional Fisheries Board) undertook a fish stock survey of Lough Talt during 1986. Good numbers of small trout (up to 540g in weight; average 226g), small numbers of perch (up to 880g in weight; average weight 510g) and two Arctic char (average weight = 255g) were recorded (IFI, unpublished data). A fish stock survey carried out in November 2003, by the Irish Char Conservation Group (ICCG), found Arctic char still to be present in the lake (Western People Press release, 2004). Even though this is a good sign for the lake, substantial algal growths were noted on the gravels used by char for spawning. In light of these findings the lake was resurveyed in 2004 and on that occasion not only were high levels of algae discovered but a substantial number of dead char eggs were found where the char had spawned. Despite this algal growth, char did spawn and a number of age classes were present in the lake (Western People Press release, 2004). Lough Talt contains the sole remaining population of char in the Moy catchment.

Lough Talt was also previously surveyed in 2008 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009). During this survey, brown trout and Arctic char were found to be the dominant species present in the lake. Perch, eels and three-spined stickleback were also captured during the survey.

This report summarises the results of the 2011 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.



Plate 1.1. Lough Talt

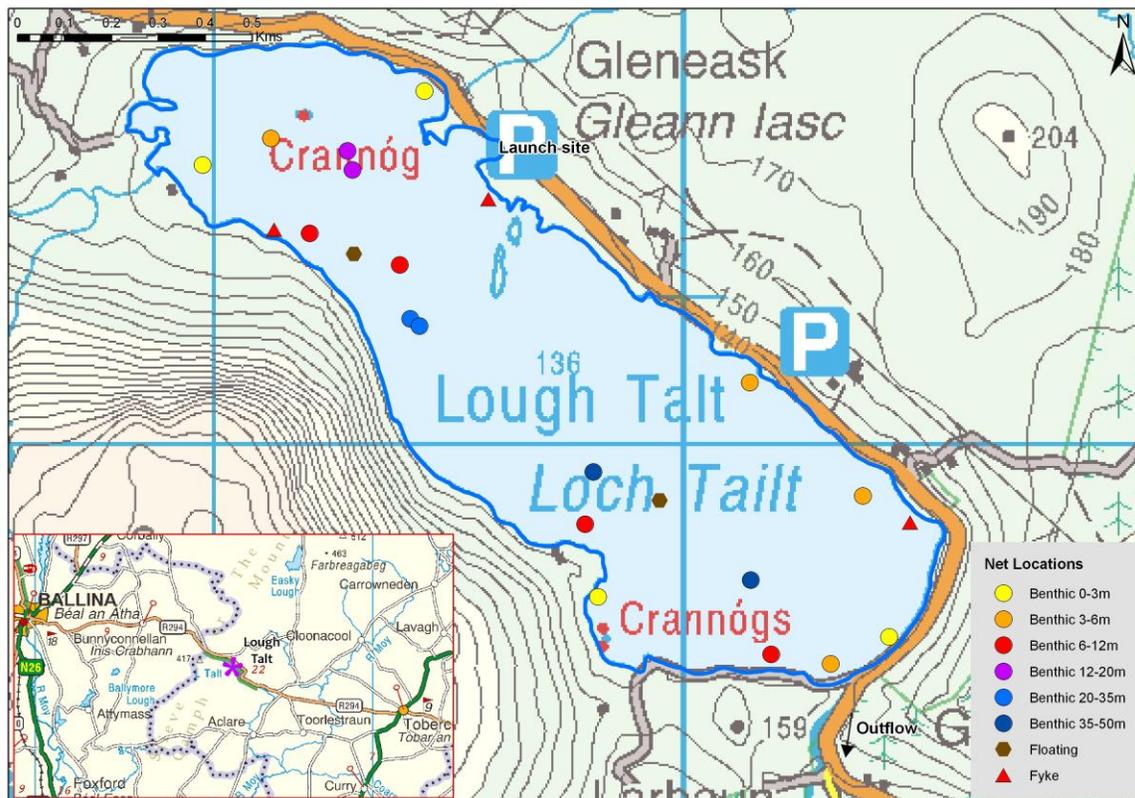


Fig. 1.1. Location map of Lough Talt showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Talt was surveyed over two nights between the 26th and the 28th of September 2011. A total of three sets of Dutch fyke nets, 18 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m, 4 @ 6-11.9m, 2 @ 12-19.9m, 2 @ 20-34.9m and 2 @ 35-49.9m) and two floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (23 sites). Nets were deployed in the same locations as were randomly selected in the previous survey in 2008. A handheld GPS was used to mark the precise location of each net. The angle of each gill net in relation to the shoreline was randomised.

All fish apart from perch were measured and weighed on site and scales were removed from all brown trout and Arctic char. Live fish were returned to the water whenever possible (i.e. when the likelihood of their survival was considered to be good). Samples of fish were retained for further analysis.

1.3 Results

1.3.1 Species Richness

A total of five fish species were recorded on Lough Talt in September 2011, with 102 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Brown trout was the most abundant fish species recorded, followed by Arctic char, perch, three-spined stickleback and eels. During the previous survey in 2008 the same species composition was recorded.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Talt, September 2011

Scientific name	Common name	Number of fish captured			Total
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	
<i>Salmo trutta</i>	Brown trout	54	0	0	54
<i>Salvelinus alpinus</i>	Arctic char	18	0	0	18
<i>Perca fluviatilis</i>	Perch	12	0	0	12
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	7	0	2	9
<i>Anguilla anguilla</i>	European eel	0	0	9	9

1.3.2 Fish abundance

Fish abundance (mean CPUE) and biomass (mean BPUE) were calculated as the mean number/weight of fish caught per metre of net. For all fish species except eel, CPUE/BPUE is based on all nets, whereas eel CPUE/BPUE is based on fyke nets only. Mean CPUE and BPUE for all fish species captured in 2008 and 2011 are summarised in Table 1.2. Mean CPUE and BPUE for all fish species is illustrated in Figures 1.2 and 1.3.

Although the mean brown trout CPUE and BPUE was lower in 2011 than in 2008, these differences were not statistically significant (Figs. 1.2 and 1.3). The differences in the mean brown trout CPUE between Lough Talt and two other similar lakes were also assessed and found to be statistically significant (Kruskal-Wallis, $P < 0.05$) (Fig. 1.4). Independent-Samples Mann-Whitney U tests between each lake showed that Lough Talt had a significantly lower mean brown trout CPUE than Lough Fern ($z = -2.286$, $P < 0.05$).

The differences in the mean brown trout BPUE between Lough Talt and two other similar lakes were also assessed and found to be statistically significant (Kruskal-Wallis, $P < 0.05$) (Fig. 1.5). Independent-

Samples Mann-Whitney U tests between each lake showed that Lough Talt had a significantly lower mean brown trout BPUE than Lough Fern ($z = -2.283$, $P < 0.05$).

Although the mean Arctic char CPUE and BPUE was higher in 2011 than in 2008, these differences were not statistically significant (Figs. 1.2 and 1.3). The differences in the mean Arctic char CPUE between Lough Talt and four other similar lakes were also assessed and found to be statistically significant (Kruskal-Wallis, $P < 0.05$) (Fig. 1.6). Independent-Samples Mann-Whitney U tests between each lake showed that Lough Talt had a significantly higher mean Arctic char CPUE than Lough Melvin ($z = -2.581$, $P < 0.05$) and significantly lower than Lough Acoose and Lough Beagh ($z = -3.386$ $P < 0.05$ and $z = -3.140$ $P < 0.05$).

The differences in the mean Arctic char BPUE between Lough Talt and four other similar lakes were also assessed and found to be statistically significant (Kruskal-Wallis, $P < 0.05$) (Fig. 1.7). Independent-Samples Mann-Whitney U tests between each lake showed that Lough Talt had a significantly higher mean Arctic char BPUE than Lough Beagh and Lough Melvin ($z = -2.647$ $P < 0.05$ and $z = -2.594$ $P < 0.05$) and significantly lower than Lough Acoose ($z = -3.213$, $P < 0.$).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Lough Talt, 2008 and 2011

Scientific name	Common name	2008	2011
Mean CPUE			
<i>Salmo trutta</i>	Brown trout	0.128 (0.031)	0.078 (0.019)
<i>Salvelinus alpinus</i>	Arctic char	0.017 (0.008)	0.026 (0.018)
<i>Perca fluviatilis</i>	Perch	0.041 (0.013)	0.017 (0.008)
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	0.001 (0.001)	0.011 (0.007)
<i>Anguilla anguilla</i>	European eel	0.016 (0.009)	0.05 (0.025)
Mean BPUE			
<i>Salmo trutta</i>	Brown trout	16.286 (3.895)	10.771 (2.774)
<i>Salvelinus alpinus</i>	Arctic char	1.301 (0.811)	2.010 (1.311)
<i>Perca fluviatilis</i>	Perch	7.685 (2.823)	1.665 (0.801)
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	0.005 (0.005)	0.014 (0.009)
<i>Anguilla anguilla</i>	European eel	11.066 (5.999)	26.661 (11.841)

* On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species.

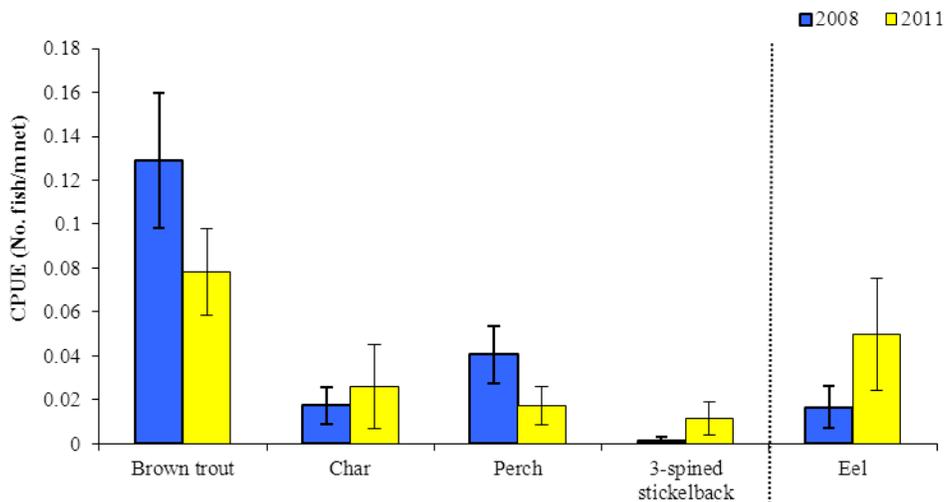


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Lough Talt (Eel CPUE based on fyke nets only), 2008 and 2011

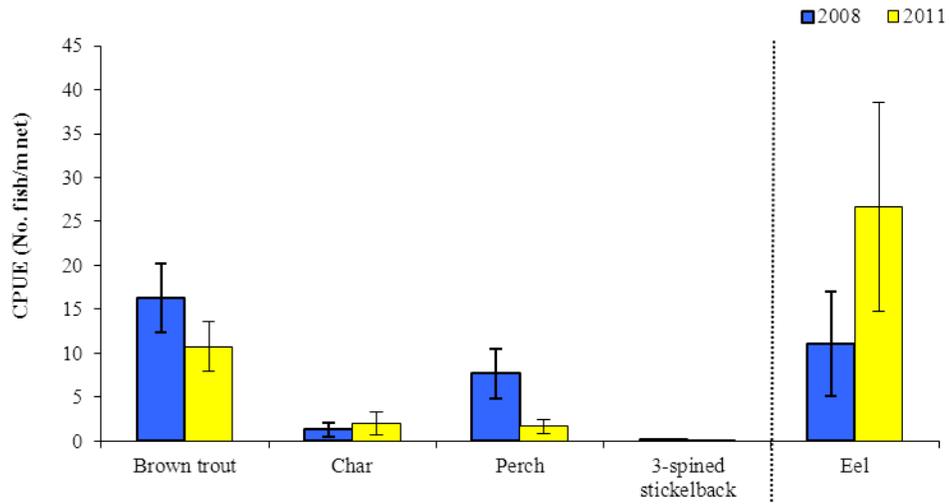


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Lough Talt (Eel CPUE based on fyke nets only), 2008 and 2011

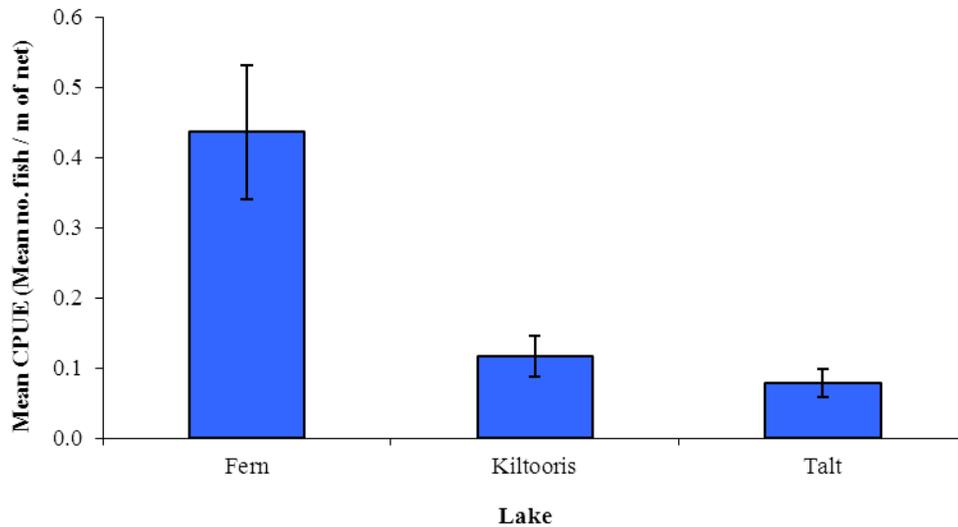


Fig. 1.4. Mean (\pm S.E.) brown trout CPUE in three lakes surveyed during 2011

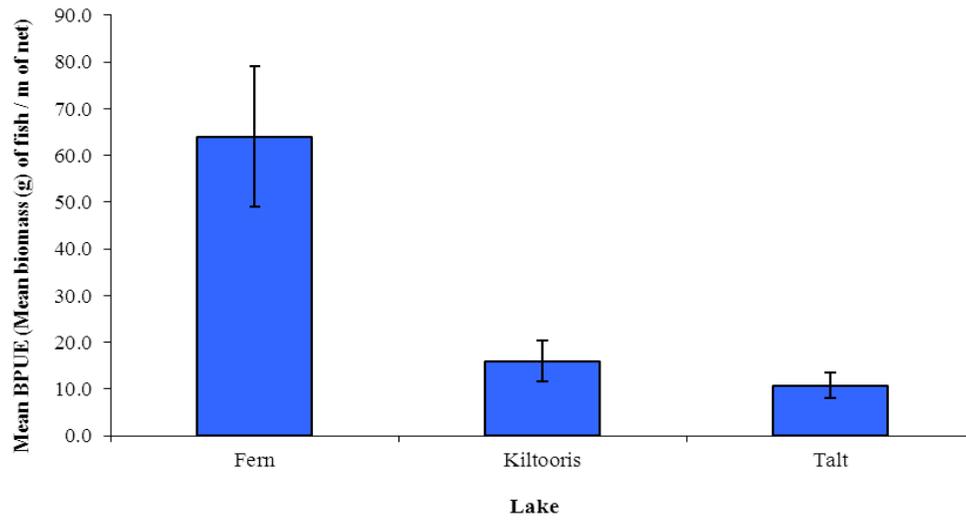


Fig. 1.5. Mean (\pm S.E.) brown trout BPUE in three lakes surveyed during 2011

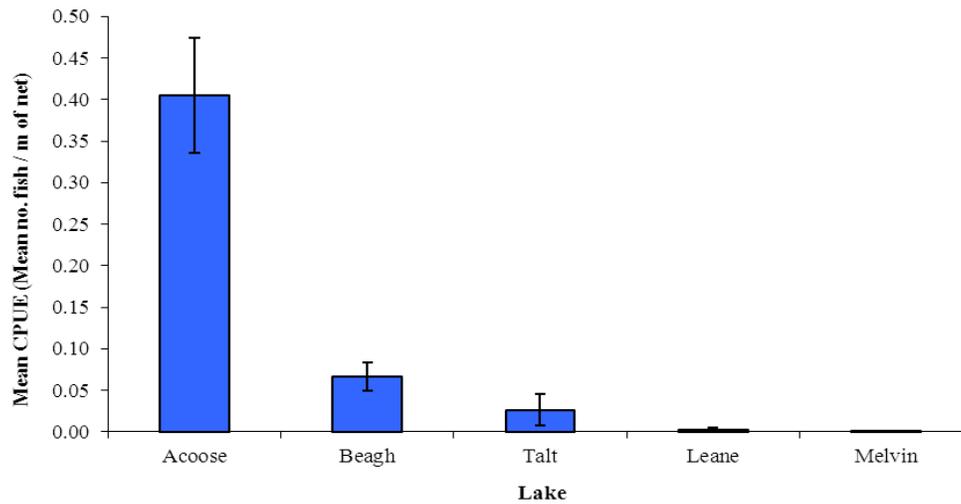


Fig. 1.6. Mean (\pm S.E.) Arctic char CPUE in three lakes surveyed during 2011

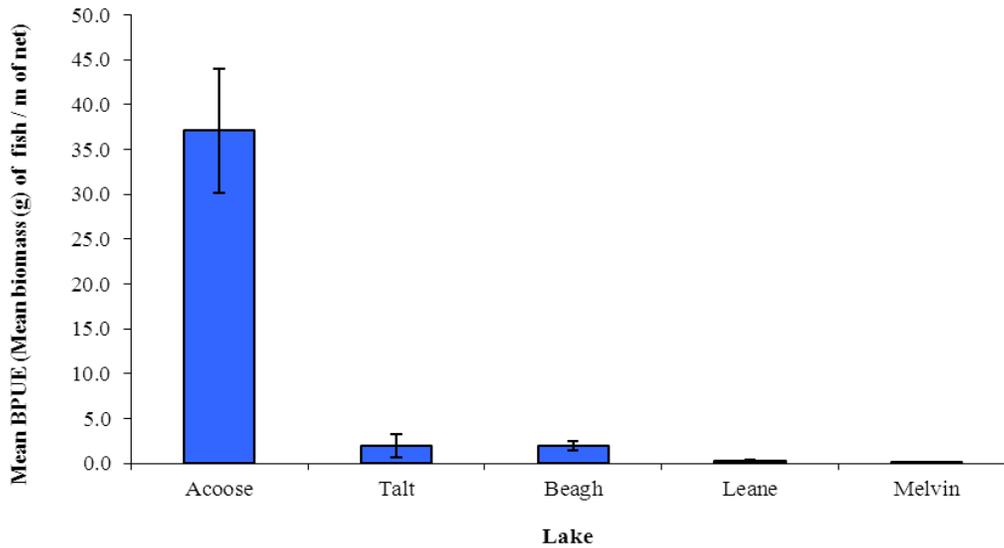


Fig. 1.7. Mean (\pm S.E.) Arctic char BPUE in three lakes surveyed during 2011

1.3.3 Length frequency distributions

Brown trout captured during the 2011 survey ranged in length from 9.2cm to 33.7cm (mean = 22.3cm) (Fig. 1.8). Brown trout captured during the 2008 survey ranged in length from 13.3cm to 34.0cm (Fig. 1.8).

Arctic char captured during the 2011 survey ranged in length from 7.2cm to 23.0cm (mean = 17.4cm) (Fig.1.9). Arctic char captured during the 2008 survey had similar lengths ranging from 7.5cm to 23.3cm (Fig.1.9).

Perch captured during the 2011 survey ranged in length from 10.3cm to 23.7cm, three-spined stickleback ranged in length from 4.0cm to 5.0cm and eels ranged in length from 40.2cm to 77.0cm.

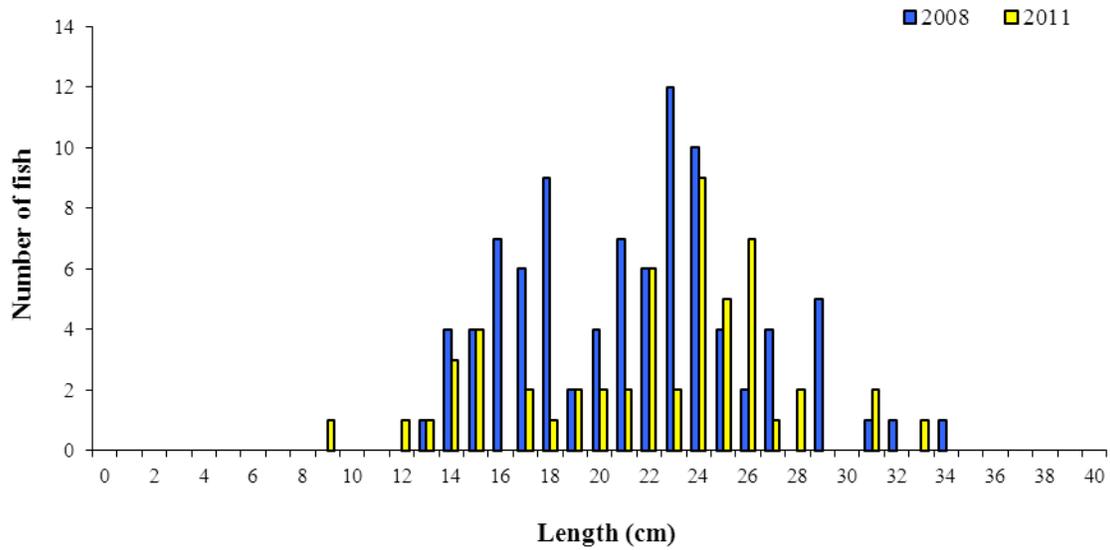


Fig. 1.8. Length frequency of brown trout captured on Lough Talt, 2008 and 2011

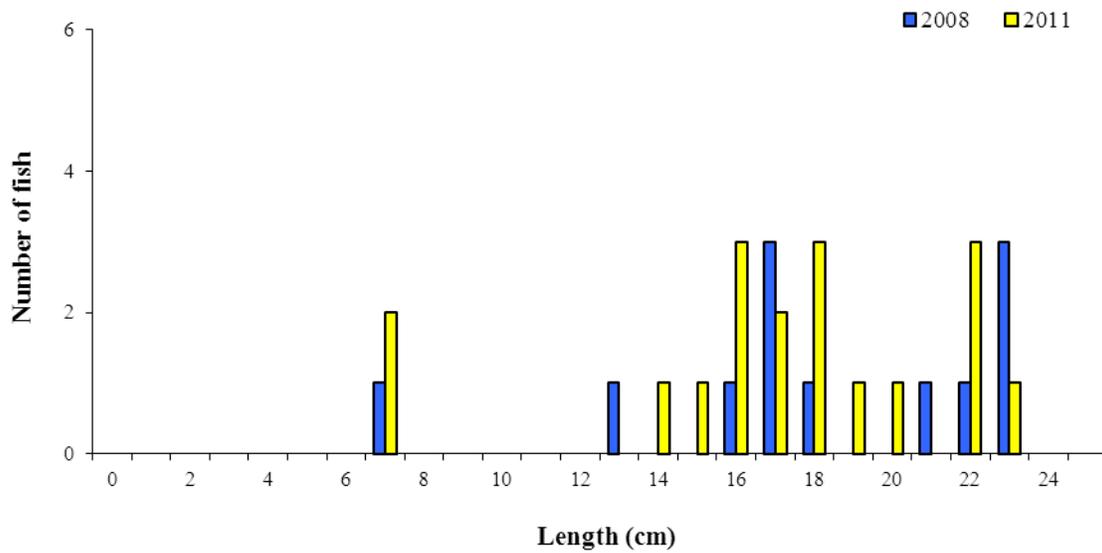


Fig. 1.9. Length frequency of Arctic char captured on Lough Talt, 2008 and 2011

1.3.4 Fish age and growth

Six age classes of brown trout were present, ranging from 0+ to 5+, with a mean L1 of 7.1cm (Table 1.3). The dominant age class of brown trout was 3+. In the 2008 survey, brown trout ranged from 1+ to 3+ with a mean L1 of 7.1cm. Mean brown trout L4 in 2011 was 27.1cm indicating a slow rate of growth for brown trout in this lake according to the classification scheme of Kennedy and Fitzmaurice (1971).

Four age classes of Arctic char were present, ranging from 0+ to 3+ and perch ranged in age from 1+ to 3+.

Table 1.3. Mean (\pm SE) brown trout length (cm) at age for Lough Talt, September 2011

	L ₁	L ₂	L ₃	L ₄	L ₅
Mean	7.1 (0.2)	16.1 (0.4)	22.3 (0.4)	27.1 (0.8)	30.7
N	46	37	23	8	1
Range	4.2-10.0	9.6-21.5	18.5-25.4	24.1-30.4	30.7-30.7

1.4 Summary

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets.

The mean brown trout CPUE and BPUE in Lough Talt was significantly lower than Lough Fern, Co. Donegal, another similar lake surveyed. Brown trout ranged in age from 0+ to 5+, indicating reproductive success in each of the previous six years. Length at age analyses revealed that brown trout in the lake exhibit a slow rate of growth according to the classification scheme of Kennedy and Fitzmaurice (1971).

The mean Arctic char CPUE in Lough Talt was significantly higher than Lough Melvin, Co. Leitrim and significantly lower than Lough Acoose, Co. Kerry and Lough Beagh, Co. Donegal. The mean Arctic char BPUE in Lough Talt was significantly higher than Lough Beagh and Lough Melvin and significantly lower than Lough Acoose. Arctic char ranged in age from 0+ to 3+, indicating reproductive success in recent years.

Classification and assigning lakes with an ecological status is a critical part of the WFD monitoring programme. It allows River Basin District managers to identify and prioritise lakes that currently fall short of the minimum “Good Ecological Status” that is required by 2015 if Ireland is not to incur penalties.

A multimetric fish ecological classification tool (Fish in Lakes – ‘FIL’) was developed for the island of Ireland (Ecoregion 17) using IFI and Agri-Food and Biosciences Institute Northern Ireland (AFBINI) data generated during the NSSHARE Fish in Lakes project (Kelly *et al.*, 2008). This tool was further developed during 2010 (FIL2) in order to make it fully WFD compliant, including producing EQR values for each lake and associated confidence in classification (Kelly *et al.*, 2012). Using the FIL2 classification tool, Lough Talt has been assigned an ecological status of High based on the fish populations present. The ecological status assigned to the lake based on the 2008 survey data was also High.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lough Talt an overall ecological status of Good, based on all monitored physico-chemical and biological elements, including fish. This status classification will be revised at the end of 2012.

1.5 References

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