Sampling Fish for the Water Framework Directive

Lakes 2014

Lough Talt

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INLAND FISHERIES IRELAND
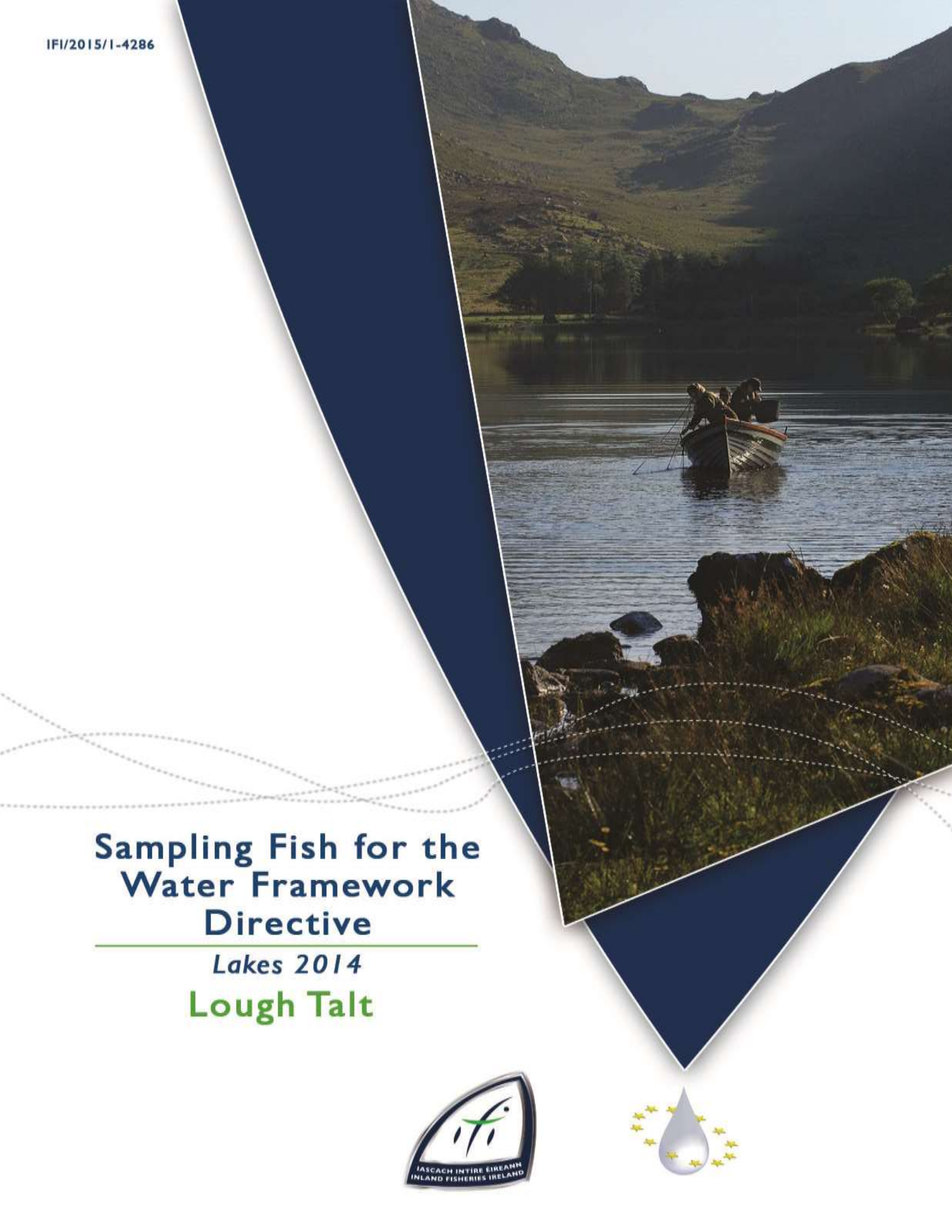
Water Framework Directive Fish Stock Survey of Lough Talt, September 2014

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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 is categorised as 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 $CaCO_3$).

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 recognised 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of perch (up to 880g in weight; average weight 510g) and two Arctic char (average weight = 255g) were recorded (IFI, unpublished data).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 Arctic char eggs were found where they had spawned. Despite this algal growth, Arctic 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 and 2011 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2009 and Kelly *et al*., 2012a). During the 2011 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 2014 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme.
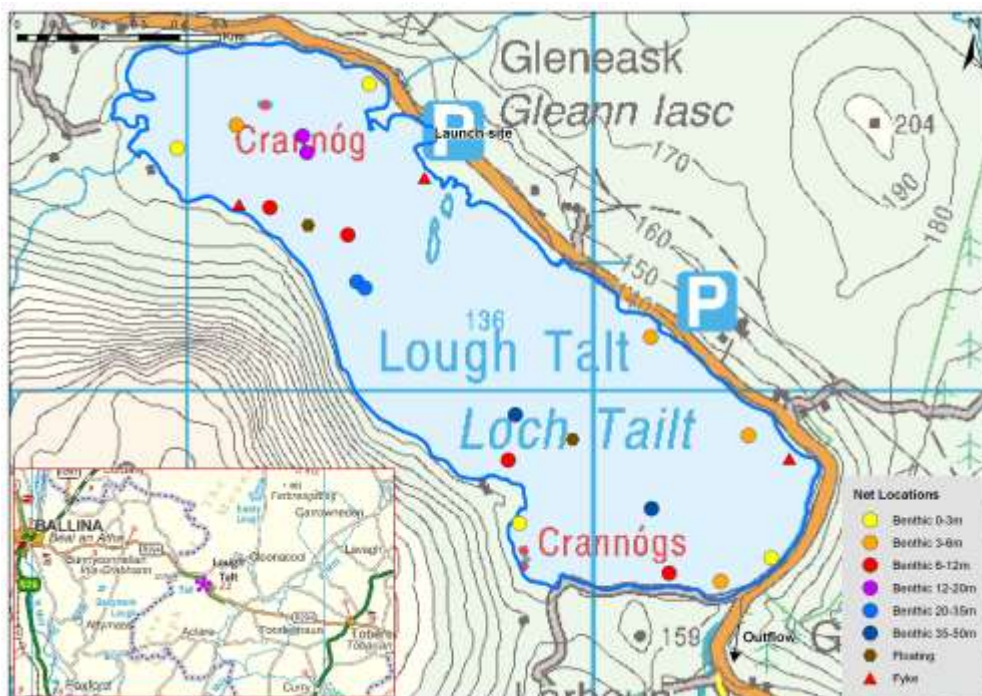
Plate 1.1. Lough Talt

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 22nd and the 24th of September 2014. 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 surveys in 2008 and 2011. 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 2014, with 344 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Three-spined stickleback was the most abundant fish species recorded, followed by brown trout, perch, Arctic char and eels. During the previous surveys in 2008 and 2011 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 2014

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Fyke nets	Total
Gasterosteus aculeatus	3-spined stickleback	221	0	1	222
Salmo trutta	Brown trout	88	0	3	91
Perca fluviatilis	Perch	22	0	0	22
Salvelinus alpinus	Arctic char	6	0	0	6
Anguilla anguilla	European eel	0	0	3	3

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 the 2008, 2011 and 2014 surveys are summarised in Table 1.2. Mean CPUE and BPUE for all species is illustrated in Figure 1.2 and 1.3.

Three-spined stickleback was the dominant species in terms of abundance (CPUE), followed by brown trout, and perch was the dominant species in terms of biomass (BPUE). Although the mean brown trout CPUE and BPUE fluctuated slightly over the three sampling years, these differences were not statistically significant (Table 1.2; Fig 1.2 and 1.3). The mean Arctic char CPUE and BPUE also fluctuated slightly over the three sampling years; however, these differences were also not statistically significant (Table 1.2; Fig 1.2 and 1.3).

Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on on Lough Talt, 2008, 2011 and 2014

Scientific name	Common name	2008	2011	2014
		Mean CPUE		
Gasterosteus aculeatus	3-spined stickleback	0.001 (0.001)	0.011 (0.007)	0.321 (0.308)
Salmo trutta	Brown trout	0.128 (0.031)	0.078 (0.019)	0.129 (0.041)
Perca fluviatilis	Perch	0.041 (0.013)	0.017 (0.008)	0.032 (0.015)
Salvelinus alpinus	Arctic char	0.017 (0.008)	0.026 (0.018)	0.009 (0.003)
Anguilla anguilla	European eel	0.016 (0.009)	0.05 (0.025)	0.017 (0.010)
		Mean BPUE		
Gasterosteus aculeatus	3-spined stickleback	0.005 (0.005)	0.014 (0.009)	0.271 (0.261)
Salmo trutta	Brown trout	16.286 (3.895)	10.771 (2.774)	16.133 (4.239)
Perca fluviatilis	Perch	7.685 (2.823)	1.665 (0.801)	12.252 (7.279)
Salvelinus alpinus	Arctic char	1.301 (0.811)	2.010 (1.311)	0.636 (0.314)
Anguilla anguilla	European eel	11.066 (5.999)	26.661 (11.841)	5.439 (4.083)

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

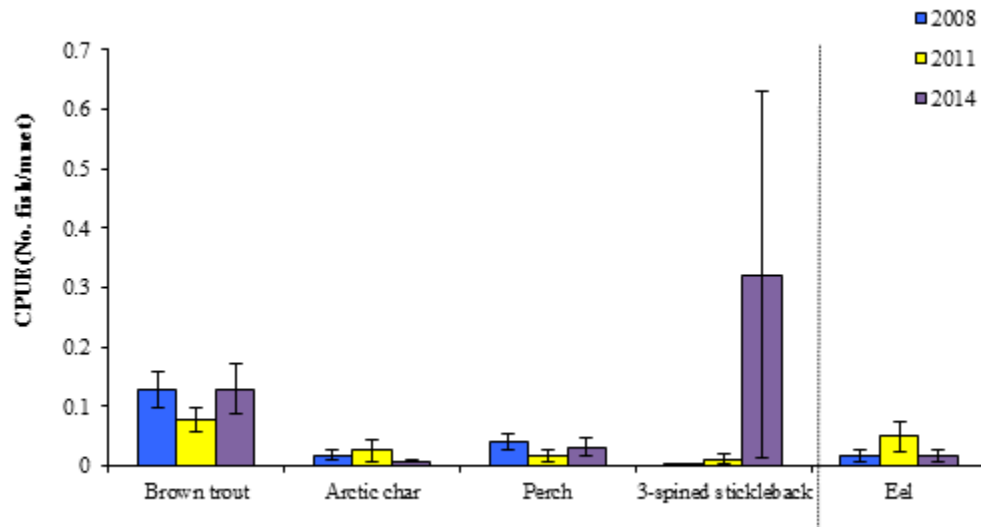*Eel CPUE and BPUE based on fyke nets only

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Talt (Eel CPUE based on fyke nets only), 2008, 2011 and 2014
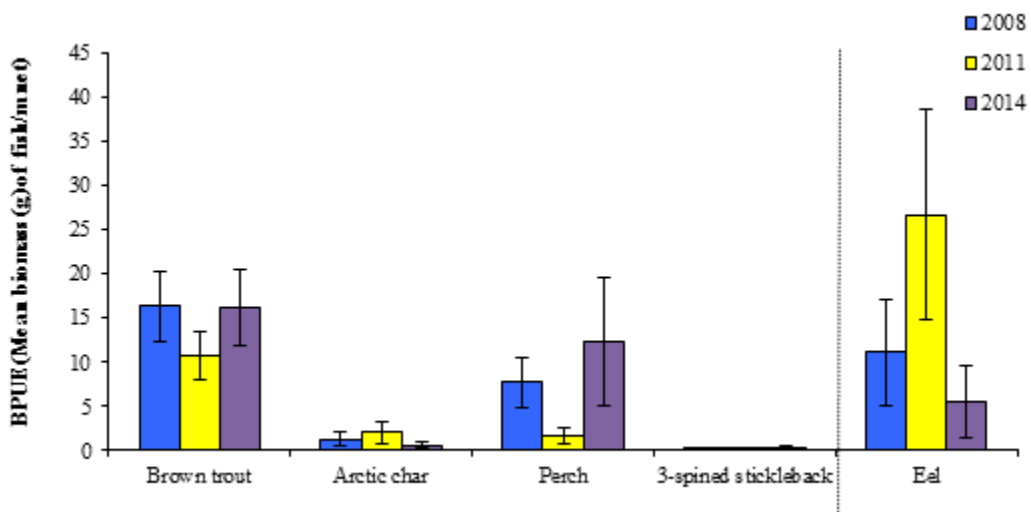

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Talt (Eel BPUE based on fyke nets only), 2008, 2011 and 2014

1.3.3 Length frequency distributions and growth

Brown trout captured during the 2014 survey ranged in length from 8.2cm to 34.0cm (mean = 21.3cm) (Fig. 1.4) with five age classes present, ranging from 0+ to 4+, with a mean L1 of 7.5cm (Table 1.3). The dominant age class was 2+ (Fig. 1.4). Mean brown trout L4 in 2014 was 23.1cm indicating a slow rate of growth for brown trout in this lake according to the classification scheme of Kennedy and Fitzmaurice (1971). Brown trout captured during the 2008 and 2011 surveys had a similar length range, age range and growth rate to the 2014 survey (Fig. 1.4).

Arctic char captured during the 2014 survey ranged in length from 7.8cm to 23.8cm (mean = 16.3cm) (Fig.1.5) with four age classes present, ranging from 0+ to 5+. Arctic char captured during the 2008 and 2011 surveys had a similar length range and ages ranged from 0+ to 3+ (Fig.1.5).

Three-spined stickleback captured during the 2014 survey ranged in length from 3.0cm to 6.0cm and eels ranged from 48.5cm to 65.0cm. Perch captured were aged from 1+ to 10+ and ranged in length from 12.8cm to 38.9cm.
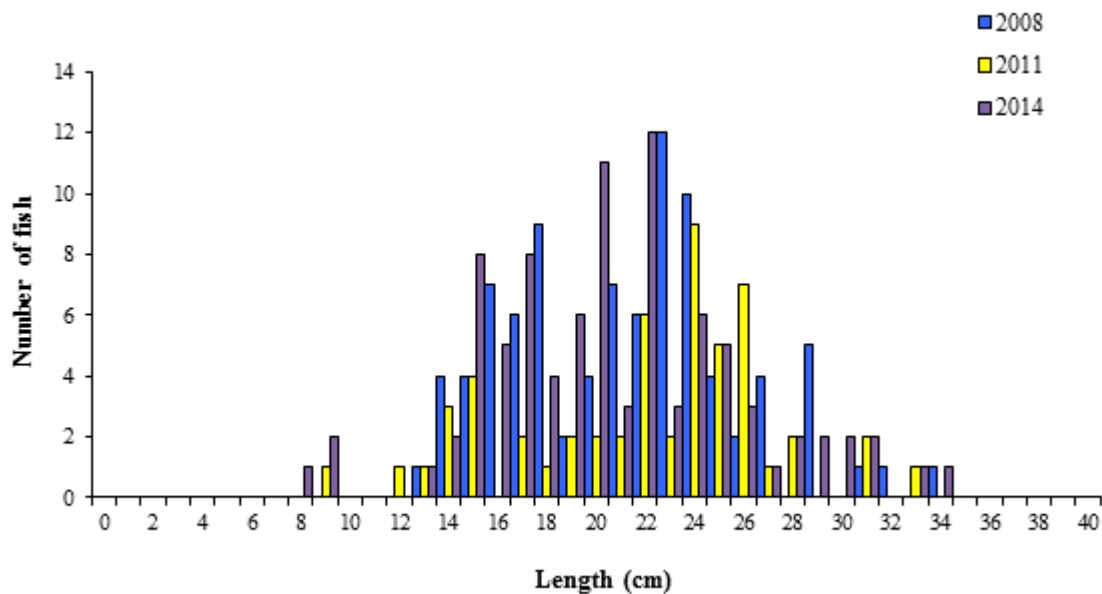

Fig. 1.4. Length frequency of brown trout captured on Lough Talt, 2008, 2011 and 2014
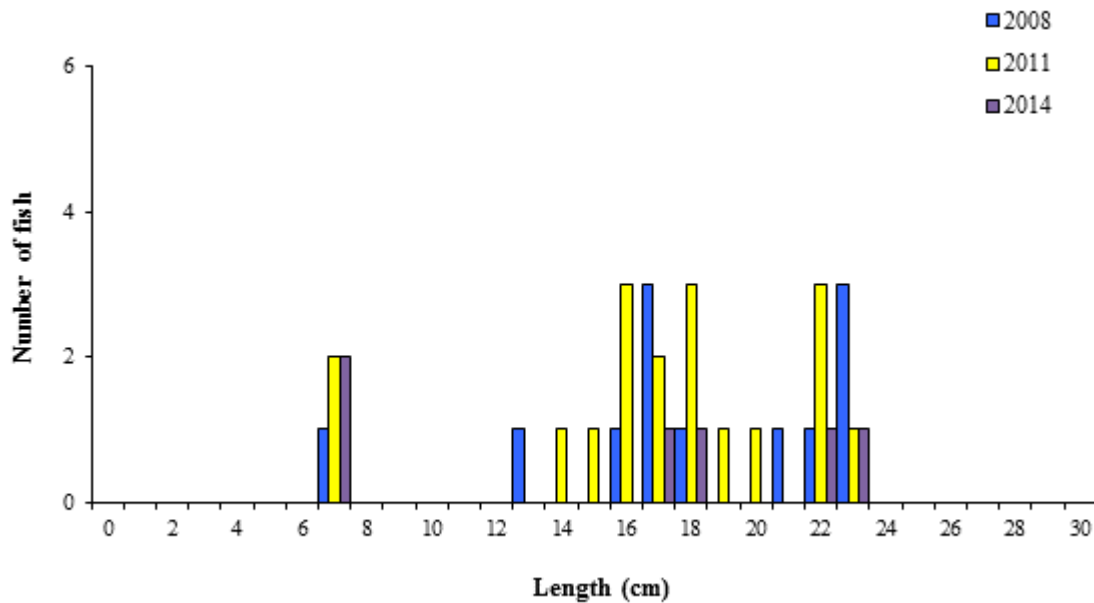
Fig. 1.5. Length frequency of Arctic char captured on Lough Talt, 2008, 2011 and 2014

Table 1.3. Mean (±SE) brown trout length (cm) at age for Lough Talt, September 2014

	L_1	L_2	L_3	L_4	Growth Category
Mean	7.5 (0.2)	16.8 (0.5)	23.9 (0.6)	27.3 (0.6)	Slow
N	49	39	17	4	
Range	4.1-11.5	10.3-23.6	18.9-28.5	25.6-28.2	

1.4 Summary

Three-spined stickleback was the dominant species in terms of abundance (CPUE) and perch was the dominant species in terms of biomass (BPUE) captured in the survey gill nets during the 2014 survey.

Although the mean brown trout CPUE and BPUE fluctuated slightly over the three sampling years, these differences were not statistically significant. Brown trout ranged in age from 0+ to 4+, indicating reproductive success in each of the previous five years. The dominant age class was 2+. 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 and BPUE also fluctuated slightly over the three sampling years; however, these differences were also not statistically significant. Arctic char ranged in age from 0+ to 5+, with four age classes present.

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*., 2012b). Using the FIL2 classification tool, Lough Talt has been assigned an ecological status of High for both 2008 and 2011 and Good in 2014 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Lough Talt an overall draft ecological status of Good, based on all monitored physico-chemical and biological elements, including fish.

1.5 References

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