National Research Survey Programme

Lakes 2017

Lough Talt

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Fish Stock Survey of Lough Talt, September 2017

Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

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Cover photo: Netting survey on Lough Derravaragh © 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 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 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 recognised historically as a good brown trout fishery and also holds a population of Arctic char, 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. Relatively 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of perch (up to 880g in weight; average weight 510g) and two Arctic char (average weight = 255g) were recorded (IFI, unpublished data).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). However, substantial algal growths were noted on the gravels used by Arctic char for spawning during the 2003 survey. 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 Arctic char in the Moy catchment.

Lough Talt was also previously surveyed in 2008, 2011 and 2014 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al*., 2009, 2012a, 2015a and 2015b). During the 2014 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 2017 fish stock survey carried out on the lake, as part of the Water Framework Directive surveillance monitoring programme and IFI's Arctic char research programme.

Plate 1.1. Lough Talt

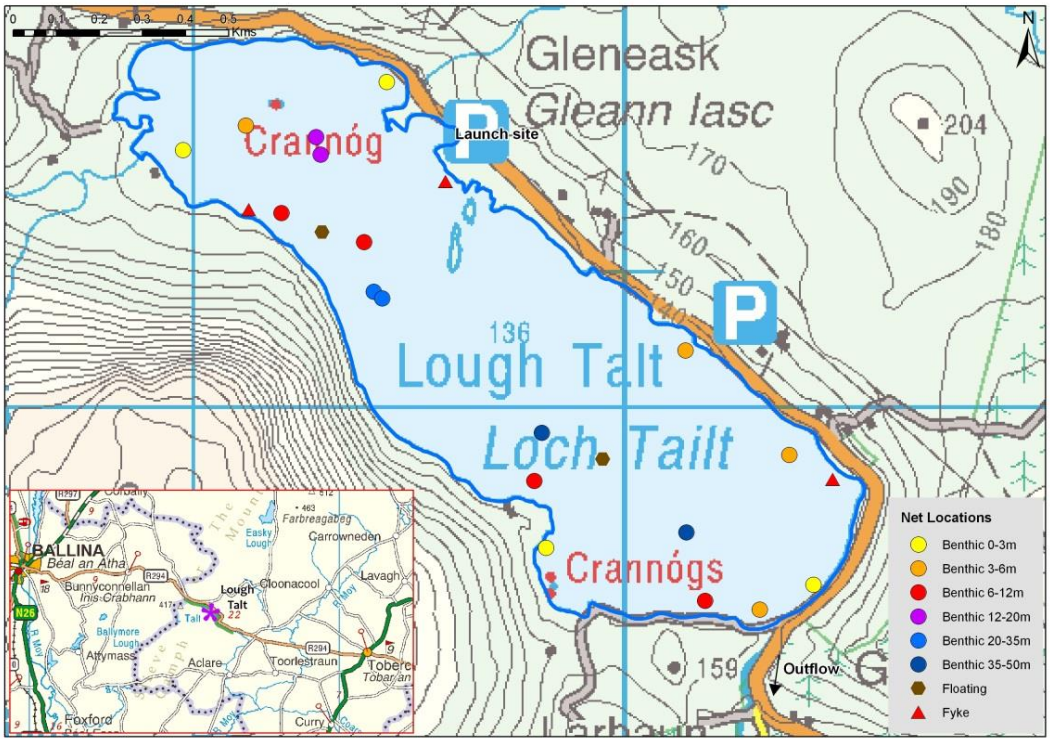

Fig. 1.1 Location map of Lough Talt showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

1.2.1 Netting methods

Lough Talt was surveyed over two nights between the 28th and the 30th of September 2017. A total of three sets of Dutch fyke nets, 18 benthic monofilament multi-mesh (BM CEN) (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 (FM CEN) (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. 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. Fish were frozen immediately after the survey and transported back to the IFI laboratory for later dissection.

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.

1.2.2 Fish diet

Total stomach contents were inspected and individual items were counted and identified to the lowest taxonomic level possible. The percentage frequency occurrence (%FO) of prey items were then calculated to identify key prey items (Amundsen *et al.*, 1996).

$$\%FO_i = (N_i / N) \times 100$$

Where:

$\%FO_i$ is the percentage frequency of prey item i,
N_i is the number of a particular species with prey i in their stomach,
N is total number of a particular species with stomach contents.

1.2.3 Biosecurity - disinfection and decontamination procedures

Procedures are required for disinfection of equipment in order to prevent dispersal of alien species and other organisms to uninfected waters. A standard operating procedure was compiled by Inland Fisheries Ireland for this purpose (Caffrey, 2010) and is followed by staff in IFI when moving between water bodies.

1.3 Results

1.3.1 Species Richness

A total of five fish species were recorded on Lough Talt in September 2017, with 166 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Brown trout was the most common fish species recorded, followed by three-spined stickleback, perch, Arctic char and eels. During the previous surveys in 2008, 2011 and 2014 the same species composition was recorded (Kelly *et al*., 2009, 2012a, 2015a and 2015b).

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Talt, September 2017

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
Salmo trutta	Brown trout	71	14	3	88
Gasterosteus aculeatus	3-spined stickleback	25	0	26	51
Perca fluviatilis	Perch	19	0	1	20
Salvelinus alpinus	Arctic char	6	0	0	6
Anguilla anguilla	European eel	0	0	1	1

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, 2014 and 2017 surveys are summarised in Table 1.2 and illustrated in Figures 1.2 and 1.3.

Brown trout

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE). Although the mean brown trout CPUE and BPUE fluctuated slightly over the four sampling occasions, these differences were not statistically significant (Table 1.2; Fig 1.2 and 1.3).

Arctic char

The mean Arctic char CPUE and BPUE also decreased slightly over the four sampling occasions; however, these differences were 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 Lough Talt, 2008, 2011, 2014 and 2017

Scientific name	Common name	2008	2011	2014	2017
			Mean CPUE (±S.E.)		
Salmo trutta	Brown trout	0.128 (0.031)	0.078 (0.019)	0.129 (0.041)	0.125 (0.033)
Gasterosteus aculeatus	3-spined stickleback	0.001 (0.001)	0.011 (0.007)	0.321 (0.308)	0.055 (0.025)
Perca fluviatilis	Perch	0.041 (0.013)	0.017 (0.008)	0.032 (0.015)	0.028 (0.010)
Salvelinus alpinus	Arctic char	0.017 (0.008)	0.026 (0.018)	0.009 (0.003)	0.009 (0.006)
Anguilla anguilla	European eel	0.016 (0.009)	0.05 (0.025)	0.017 (0.010)	0.006 (0.006)
			Mean BPUE (±S.E.)		
Salmo trutta	Brown trout	16.286 (3.895)	10.771 (2.774)	16.133 (4.239)	13.718 (3.572)
Gasterosteus aculeatus	3-spined stickleback	0.005 (0.005)	0.014 (0.009)	0.271 (0.261)	0.055 (0.025)
Perca fluviatilis	Perch	7.685 (2.823)	1.665 (0.801)	12.252 (7.279)	1.229 (0.442)
Salvelinus alpinus	Arctic char	1.301 (0.811)	2.010 (1.311)	0.636 (0.314)	0.485 (0.426)
Anguilla anguilla	European eel	11.066 (5.999)	26.661 (11.841)	5.439 (4.083)	10.666 (10.666)

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 (Connor et al., 2017).

*Eel CPUE and BPUE based on fyke nets only

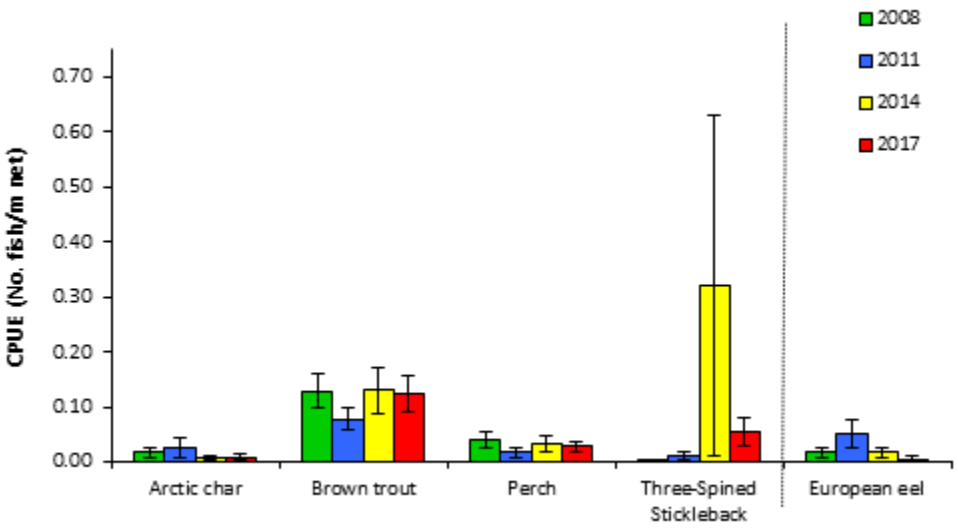

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Talt (Eel CPUE based on fyke nets only), 2008, 2011, 2014 and 2017

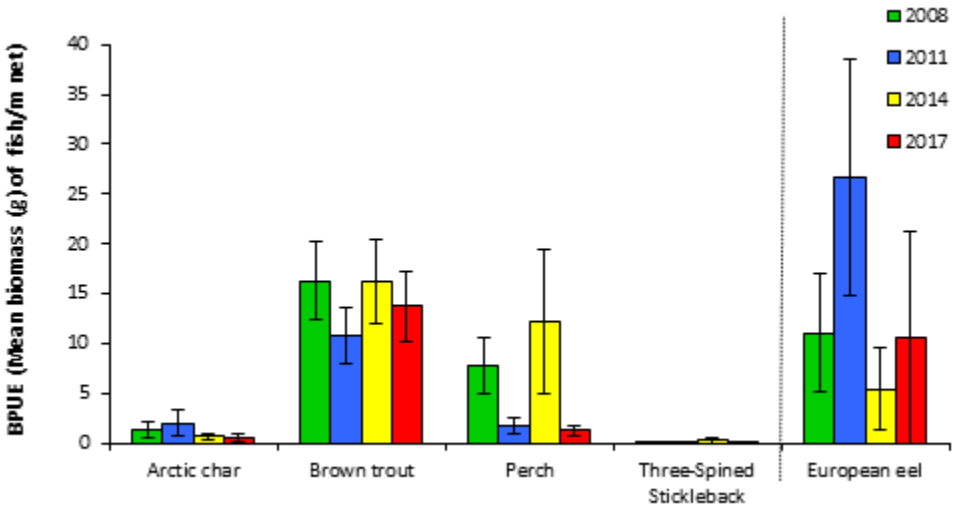

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Talt (Eel BPUE based on fyke nets only), 2008, 2011, 2014 and 2017

1.3.3 Length frequency distributions and growth

Brown trout

Brown trout captured during the 2017 survey ranged in length from 6.6cm to 33.7cm (mean = 20.5cm) (Fig. 1.4). Six age classes were present, ranging from 0+ to 5+, with a mean L1 of 6.2cm (Table 1.3). The dominant age class was 2+ (Fig. 1.4). Mean brown trout L4 in 2017 was 23.3cm indicating a very slow rate of growth for brown trout in this lake according to the classification scheme of Kennedy and Fitzmaurice (1971) (Table 1.3). Brown trout captured during the 2008, 2011 and 2014 surveys had similar length and age ranges (Fig.1.4).

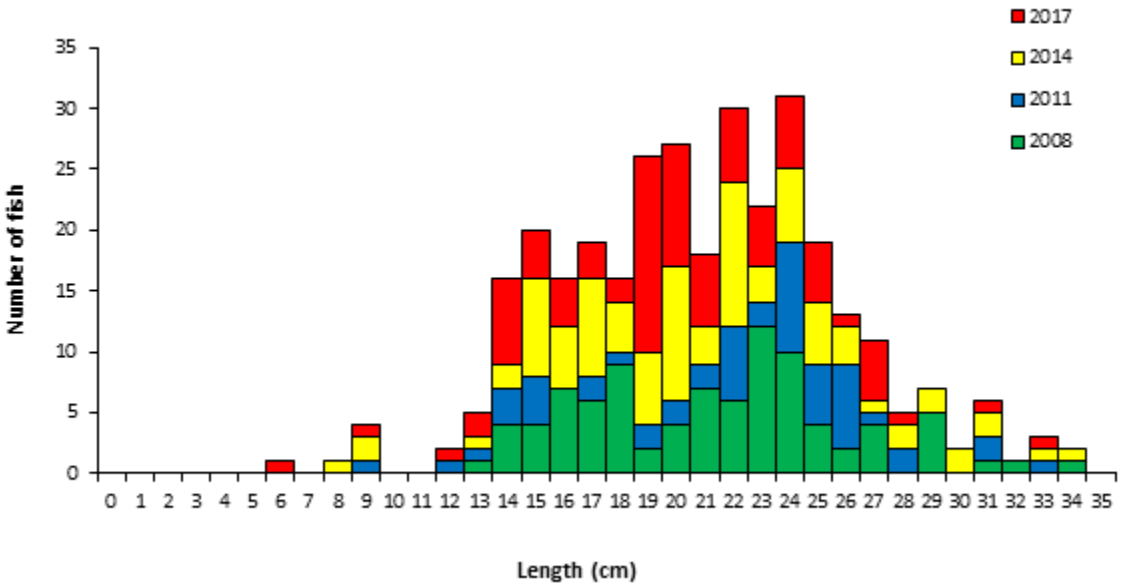

Fig. 1.4. Length frequency of brown trout captured on Lough Talt, 2008, 2011, 2014 and 2017

Table 1.3. Mean (±S.E.) brown trout length (cm) at age for Lough Talt, September 2017

	L_1	L_2	L_3	L_4	L_5	Growth Category
Mean (±S.E.)	6.2 (0.2)	11.4 (0.5)	18.1 (0.3)	23.3 (0.8)	27.1 (1.5)	Very slow
N	47	36	20	11	4	
Range	3.9-8.9	7.9-18.5	15.4-21.0	19.9-27.2	23.5-30.7	

Arctic char

Arctic char captured during the 2017 survey ranged in length from 10.3cm to 22.4cm (mean = 16.1cm) (Fig.1.5) with four age classes present, ranging from 1+ to 4+. Arctic char captured during the 2008, 2011 and 2014 surveys had a wider length and age range (Fig.1.5).

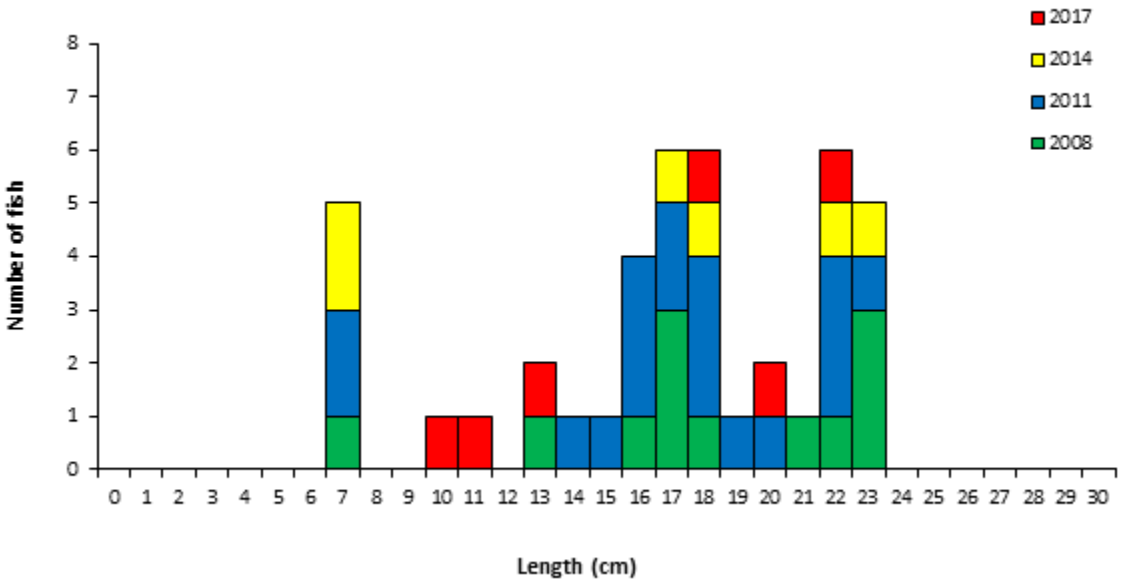

Fig. 1.5. Length frequency of Arctic char captured on Lough Talt, 2008, 2011, 2014 and 2017

Other fish species

One eel was captured during the 2017 survey and was measured at 56.0cm. Perch ranged in length from 9.4cm to 34.2cm with four age classes present ranging from 0+ to 4+. Three-spined stickleback ranged from 3.5cm to 5.6m.

1.3.4 Stomach and diet analysis

Dietary analysis studies provide a good indication of the availability of food items and the angling methods that are likely to be successful. However, the value of stomach content analysis is limited unless undertaken over a long period as diet may change on a daily basis depending on the availability of

food items. The stomach contents of a subsample of brown trout and perch captured during the survey were examined and are presented below.

Brown trout

Adult trout usually feed principally on crustaceans (*Asellus* sp. and *Gammarus* sp.), insects (principally chironomid larvae and pupae) and molluscs (snails) (Kennedy and Fitzmaurice, 1971, O'Grady, 1981). A total of 58 stomachs were examined. Of these 25 were found to contain no prey items. Of the remaining 33 stomachs containing food, 58% contained unidentified digested material, 27% invertebrates, 9% zooplankton and 6% fish (Fig. 1.6).

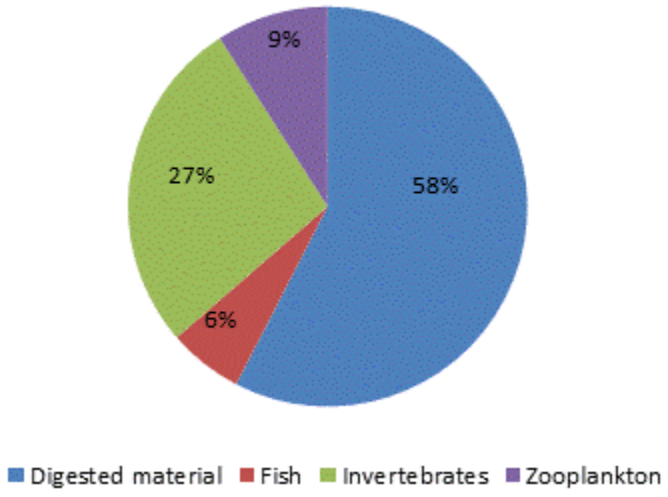

Fig 1.6. Diet of brown trout (n=33) captured on Lough Talt, 2017 (% FO)

Perch

Perch initially start to feed on pelagic zooplankton. Once they reach an intermediate size they start feeding on benthic resources eventually moving on to feed on fish once they are large enough (Hjelm *et al.*, 2000). A total of 18 stomachs were examined. Of these four were found to contain no prey items. Of the remaining 14 stomachs containing food, 36% contained fish, 29% invertebrates, 21% unidentified digested material and 14% zooplankton (Fig. 1.7).

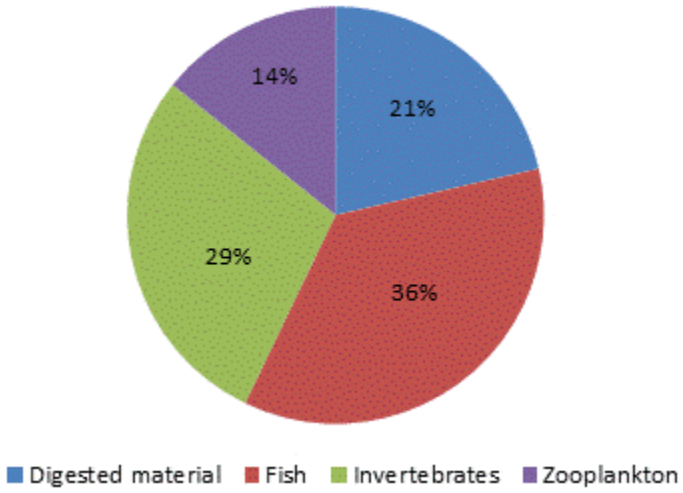

Fig 1.7. Diet of perch (n=14) captured on Lough Talt, 2017 (% FO)

1.4 Summary and ecological status

A total of five fish species were recorded in Lough Talt in September 2017. Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2017 survey.

Although the mean brown trout CPUE and BPUE fluctuated slightly over the four sampling occasions, these differences were not statistically significant. Brown trout ranged in age from 0+ to 5+, indicating reproductive success in each of the previous six years. The dominant age class was 2+. Length at age analyses revealed that brown trout in the lake exhibit a very slow rate of growth according to the classification scheme of Kennedy and Fitzmaurice (1971).

The mean Arctic char CPUE and BPUE decreased slightly over the four sampling occasions; however, these differences were not statistically significant. Arctic char ranged in age from 1+ to 4+, 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 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 2017 based on the fish populations present. In previous years the lake was assigned a fish status of High in 2008/2011 and Good in 2014.

In the 2010 to 2015 surveillance monitoring reporting period, the EPA assigned Lough Talt an overall ecological status of Good.

1.5 References

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