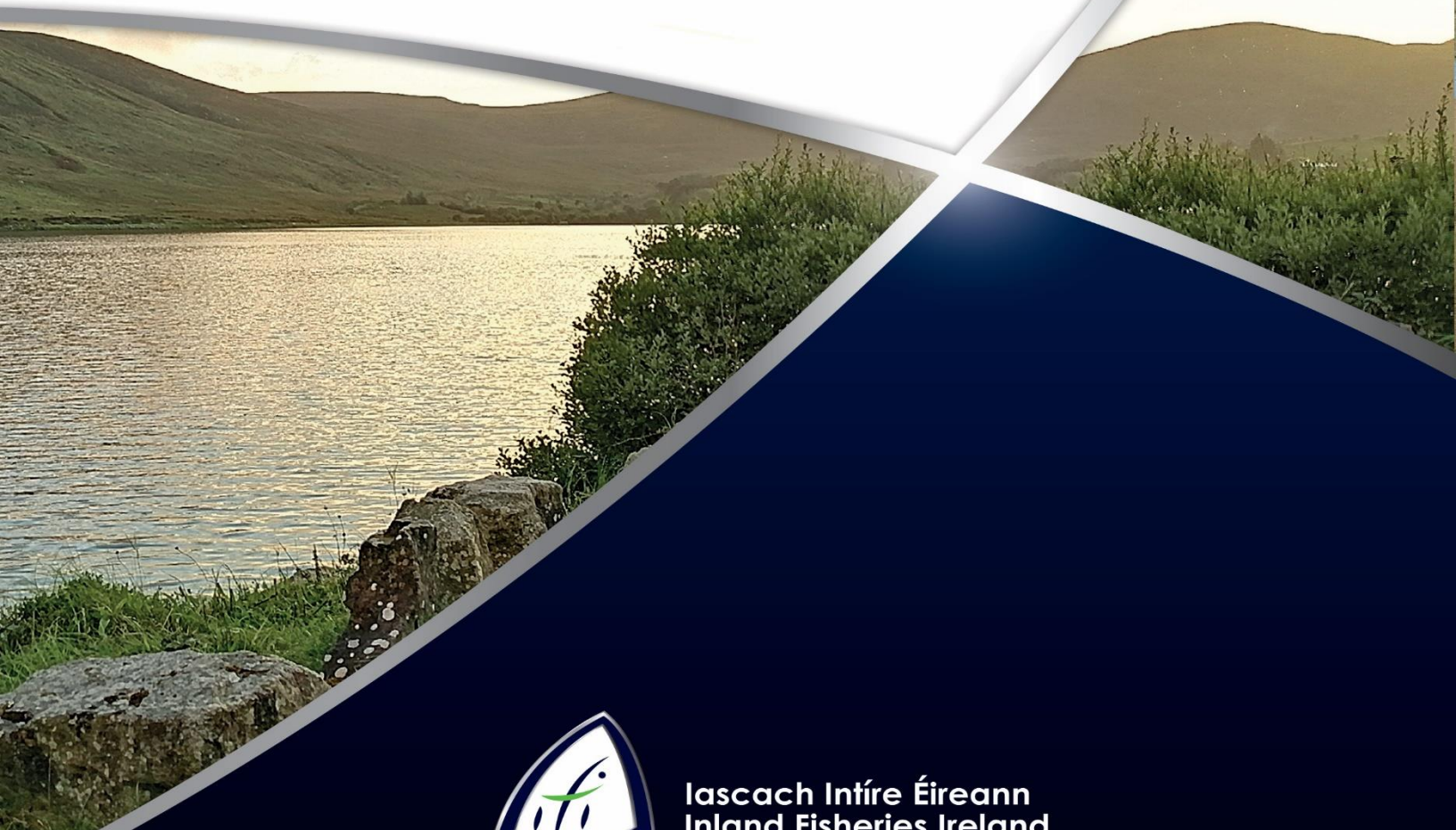


National Research Survey Programme

Lakes 2020

Lough Talt

IFI/2021/1-4554



Iascach Intíre Éireann
Inland Fisheries Ireland



Inland Fisheries Ireland
National Research Survey Programme
**Fish Stock Survey of Lough Talt,
September 2020**

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

William Corcoran, Lynda Connor, Paul McLoone, Anne Bateman, Daniel Cierpial, Áine Gavin, Paul Gordon, Elliot McCarthy, Dylan Putthaaree, Ciaran Twomey, Ronan Matson, Stephen Robson, Paul Duffy, Kieron Rocks, Róisín Donovan, Danielle Crowley and Fiona L. Kelly.

CITATION: Corcoran, W., Connor, L., McLoone, P., Bateman, A., Cierpial, D., Gavin, A., Gordon, P., McCarthy, E., Putthaaree, D., Twomey, C., Matson, R., Robson, S., Duffy, P., Rocks, K., Donovan, R., Crowley, D., and Kelly, F.L. (2021) Fish Stock Survey of Lough Anure, August 2020. National Research Survey Programme, Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.

Cover photo: Netting survey on Lough Talt © Inland Fisheries Ireland

© Inland Fisheries Ireland 2020



ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of all their colleagues in Inland Fisheries Ireland.

The authors would also like to acknowledge the funding provided for the project from the Department of Communications, Climate Action and Environment for 2020.

The report includes Ordnance Survey Ireland data reproduced under OSi Copyright Permit No. MP 007508.

*Unauthorised reproduction infringes Ordnance Survey Ireland and Government of Ireland copyright.
© Ordnance Survey Ireland, 2020.*



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 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 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 and therefore the lake was resurveyed in 2004. In 2004 high levels of algae were again noted and 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, 2014 and 2017 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009, 2012a, 2015a 2015b; Connor *et al.*, 2018)). During the 2017 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 2020 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

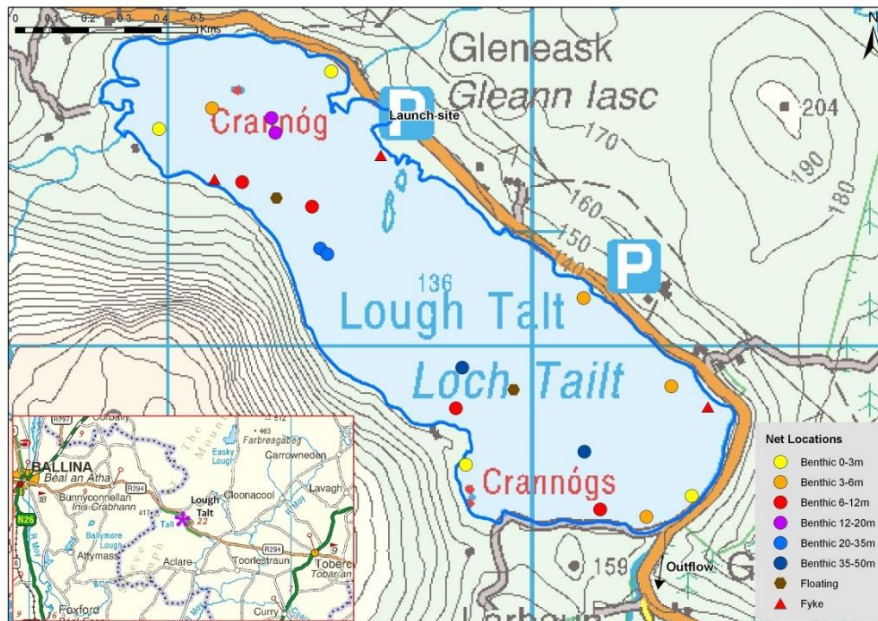


Fig. 1.1 Location map of Lough Talt showing locations and depths of each net (outflow is indicated on map)



1.2 Methods

1.2.1 Netting methods

Lough Talt was surveyed over three nights between the 1st and the 4th of September 2020. 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.

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. Fish were frozen immediately after the survey and transported back to the IFI laboratory for later dissection.

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).

$$FO_i = \left(\frac{N_i}{N} \right) * 100$$

Where:

FO_i is the percentage frequency of prey item i ,

N_i is the number of pike with prey i in their stomach,

N is total number of pike 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 2020. A total of 141 fish were 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 three-spined stickleback, Arctic char, perch and eels. During the previous surveys in 2008, 2011, 2014 and 2017 the same species composition was recorded (Kelly *et al.*, 2009, 2012a, 2015a, 2015b and 2018).

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Talt, September 2020

Scientific name	Common name	Number of fish captured			
		BM CEN	FM CEN	Fyke	Total
<i>Salmo trutta</i>	Brown trout	79	1	3	83
<i>Gasterosteus aculeatus</i>	3-spined stickleback	15	0	7	22
<i>Perca fluviatilis</i>	Perch	16	0	0	16
<i>Salvelinus alpinus</i>	Arctic char	19	0	0	19
<i>Anguilla anguilla</i>	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, 2017 and 2020 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). Mean CPUE and BPUE fluctuated slightly across the five survey occasions but remained relatively stable overall (Table 1.2; Fig 1.2 and 1.3).

Arctic char

More arctic char ($n = 16$) were captured in 2020 survey compared to the earlier surveys in 2014 and 2017 when six were captured on each occasion. This is consistent with the apparent increase in both CPUE and BPUE in 2020, when compared to the two most recent surveys (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, 2017 and 2020

Scientific name	Common name	2008	2011	2014	2017	2020
Mean CPUE (\pmS.E.)						
<i>Salmo trutta</i>	Brown trout	0.128 (0.031)	0.078 (0.019)	0.129 (0.041)	0.125 (0.033)	0.118 (0.030)
<i>Gasterosteus aculeatus</i>	3-spined stickleback	0.001 (0.001)	0.011 (0.007)	0.321 (0.308)	0.055 (0.025)	0.027 (0.012)
<i>Perca fluviatilis</i>	Perch	0.041 (0.013)	0.017 (0.008)	0.032 (0.015)	0.028 (0.010)	0.023 (0.009)
<i>Salvelinus alpinus</i>	Arctic char	0.017 (0.008)	0.026 (0.018)	0.009 (0.003)	0.009 (0.006)	0.032 (0.017)
<i>Anguilla anguilla</i>	European eel*	0.016 (0.009)	0.05 (0.025)	0.017 (0.010)	0.006 (0.006)	0.006 (0.006)
Mean BPUE (\pmS.E.)						
<i>Salmo trutta</i>	Brown trout	16.286 (3.895)	10.771 (2.774)	16.133 (4.239)	13.718 (3.572)	17.128 (4.697)
<i>Gasterosteus aculeatus</i>	3-spined stickleback	0.005 (0.005)	0.014 (0.009)	0.271 (0.261)	0.055 (0.025)	0.032 (0.014)
<i>Perca fluviatilis</i>	Perch	7.685 (2.823)	1.665 (0.801)	12.252 (7.279)	1.229 (0.442)	4.841 (2.481)
<i>Salvelinus alpinus</i>	Arctic char	1.301 (0.811)	2.010 (1.311)	0.636 (0.314)	0.485 (0.426)	2.170 (1.644)
<i>Anguilla anguilla</i>	European eel*	11.066 (5.999)	26.661 (11.841)	5.439 (4.083)	10.666 (10.666)	2.077 (2.077)

Note:

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

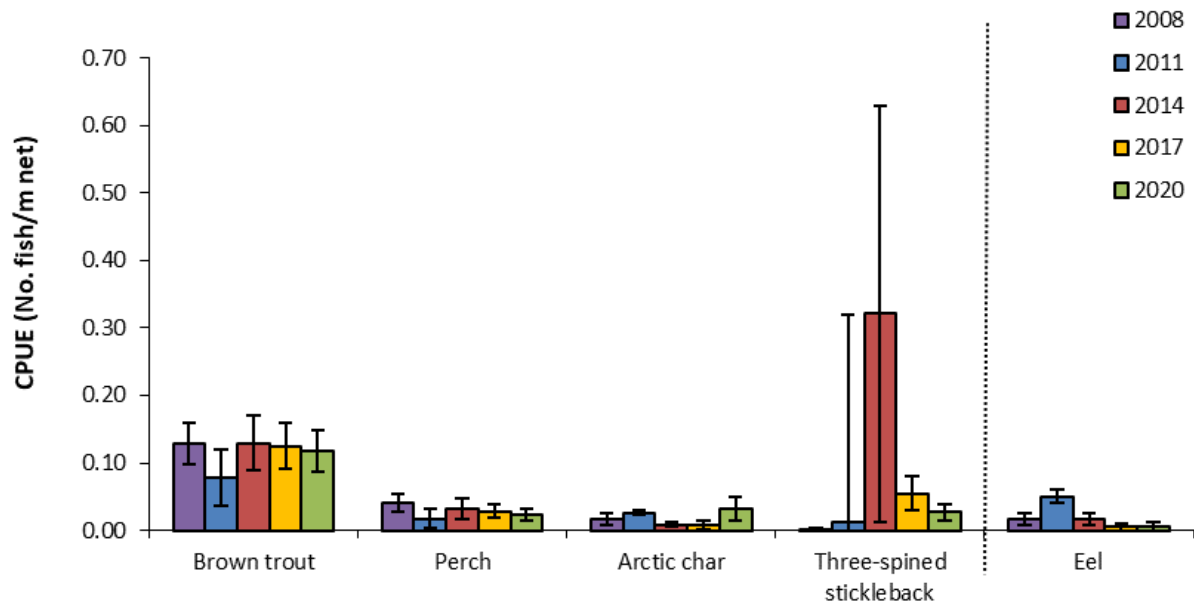


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Lough Talt (Eel CPUE based on fyke nets only), 2008, 2011, 2014, 2017 and 2020

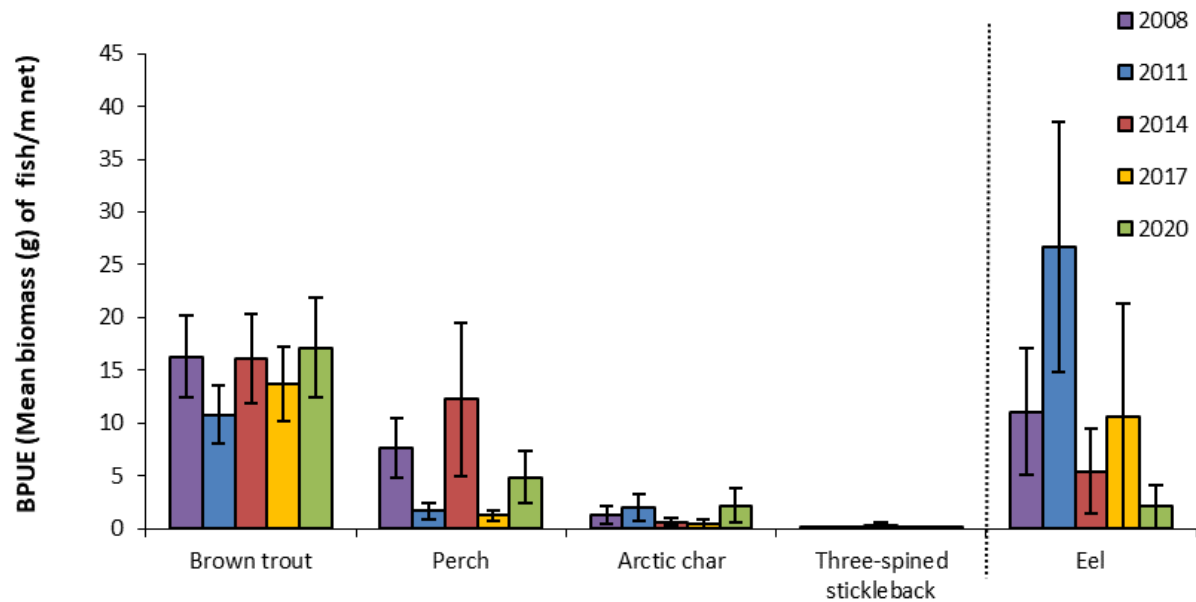


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Lough Talt (Eel BPUE based on fyke nets only), 2008, 2011, 2014, 2017 and 2020

1.3.3 Length frequency distributions and growth

Brown trout

Brown trout captured during the 2020 survey ranged in length from 8.0cm to 34.0cm (mean = 21.75cm) (Fig. 1.4). Six age classes were present, ranging from 0+ to 5+. The most abundant age class was 1+, although older cohorts (i.e. >3+) persist in this population. Mean length of brown trout after their first year (L1) was estimated at 6.1cm. Mean brown trout L4 in 2020 was 22.2cm 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 previous surveys had similar length and age ranges (Fig.1.4).

Table 1.3. Mean (\pm S.E.) brown trout length (cm) at age for Lough Talt, September 2020

	L ₁	L ₂	L ₃	L ₄	L ₅	Growth Category
Mean (\pm S.E.)	6.1 (0.2)	11.9 (0.4)	17.4 (0.5)	22.2 (0.5)	25.2 (1.1)	Very slow
N	55	40	30	24	7	
Range	3.6-8.2	7.0-16.6	11.5-21.5	16.8-26.1	21.6-28.9	



Arctic char

Arctic char captured during the 2020 survey ranged in length from 6.6cm to 22.4cm (mean = 17.9cm) (Fig.1.5). There were four age classes present, ranging from 0+ to 5+. While no 1+ or 2+ fish were recorded on this occasion, more 0+ (i.e. 6-8cm) Arctic char were captured in 2020 compared to other years. Length and age ranges have fluctuated throughout the five sampling occasions (Fig 1.5).

Other fish species

Perch ranged from 14.5cm to 36.0cm. Five age classes were present from 1+ to 8+. No perch fry were captured and the population aged was dominated by 2+ fish. This cohort represented 62.5% of all perch captured during the 2020 survey. One eel was captured during the 2020 survey and was measured at 60.0cm. Three-spined stickleback ranged from 2.0cm to 9.5cm.

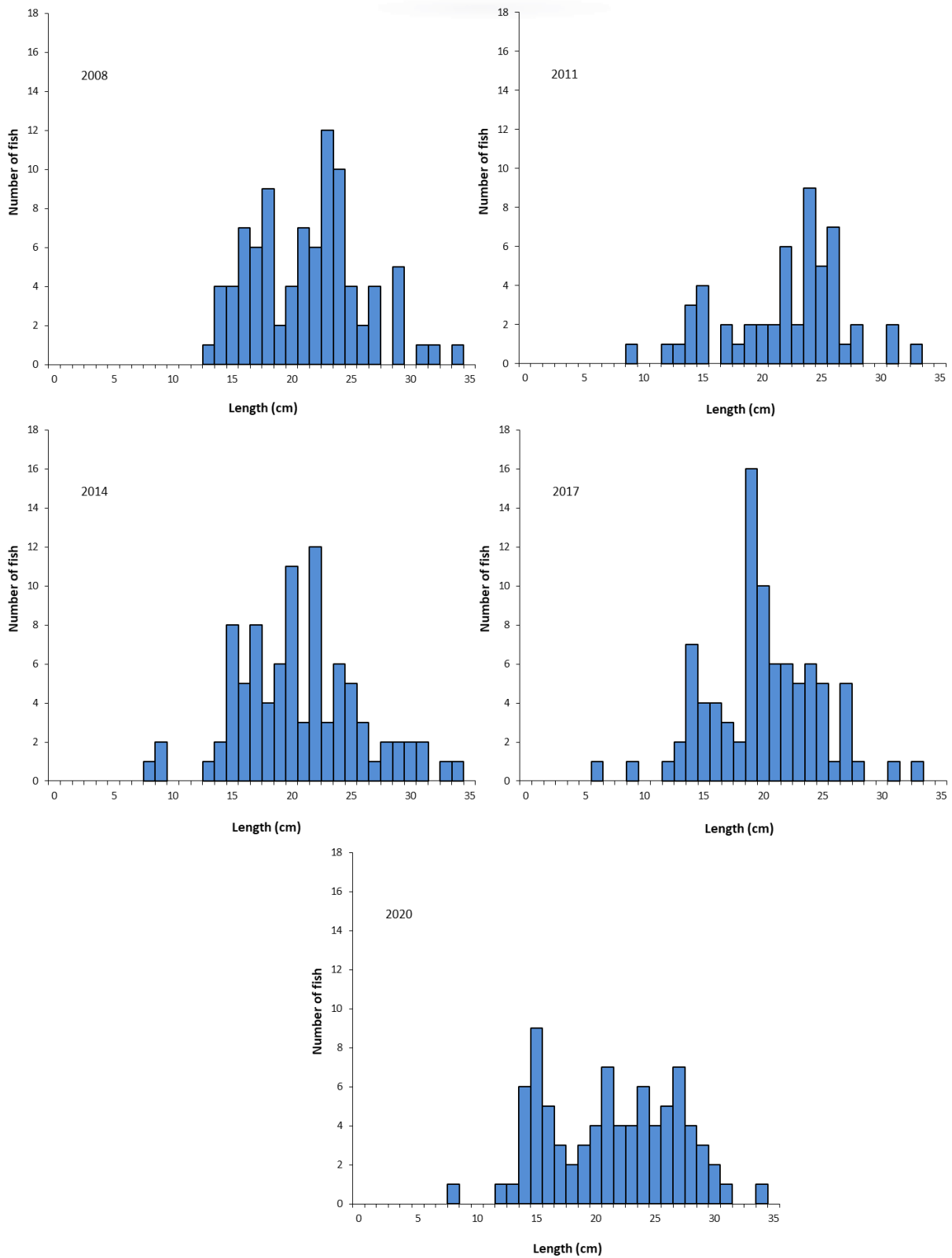


Fig. 1.4. Length frequency of brown trout captured on Lough Talt, 2008, 2011, 2014, 2017 and 2020

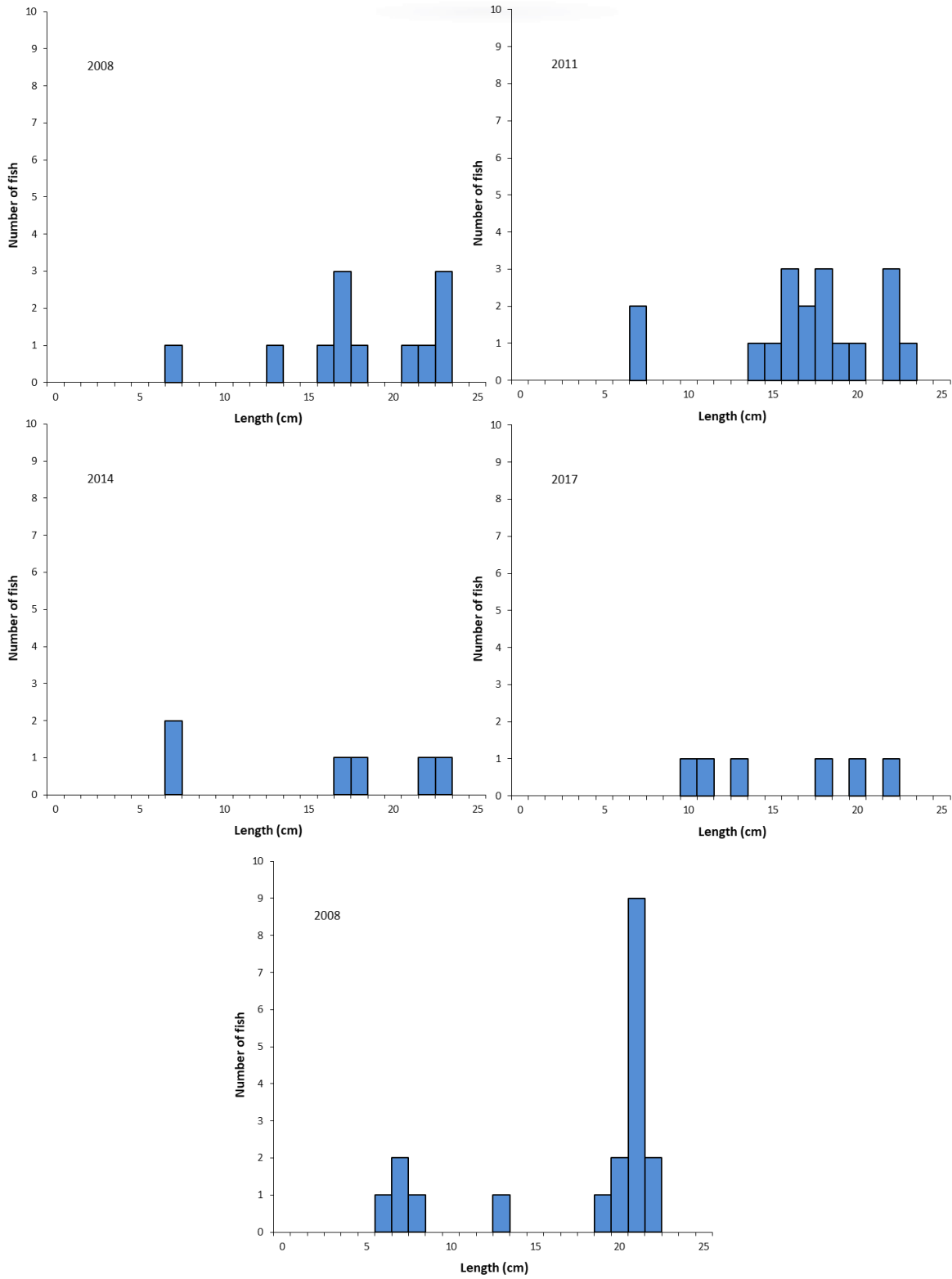


Fig. 1.5. Length frequency of Arctic char captured on Lough Talt, 2008, 2011, 2014, 2017 and 2020

1.3.4 Stomach and diet analysis

Dietary analysis can provide insight into potential prey resource use and competition use within and between species. It can also give an indication of the availability of food items and the angling methods that are likely to be successful. The stomach contents of three species captured is 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 69 stomachs were examined. Of these 21 were found to contain no prey items. Of the remaining 48 stomachs containing food, 33 (69%) contained invertebrates only, eight (17%) contained fish. Four brown trout stomachs (8%) contained zooplankton. Three individual fish (each 2%) contained fish/invertebrate, invertebrate/plant material and plant material respectively (Fig. 1.5).

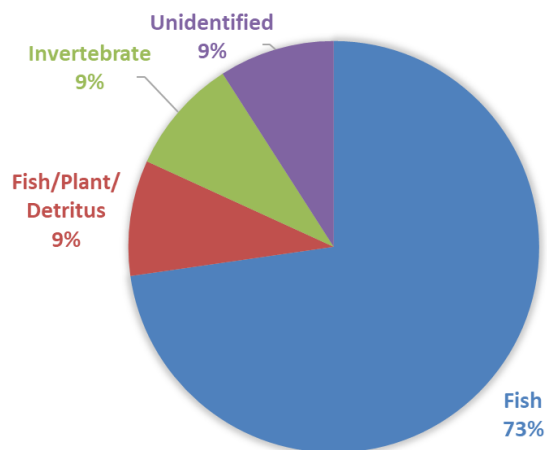


Fig 1.5. Diet of brown trout (n=48) captured on Lough Talt, September 2020 (% FO)

Perch

A total of 16 perch stomachs were available for analysis. Eight of these contained no prey items. Of the remaining 11 stomachs containing food, eight (73%) contained fish only and one perch stomach (9%) contained fish and plant material/detritus. Two individual perch stomachs (each 9%) contained invertebrates and unidentified material respectively (Figure 1.6)

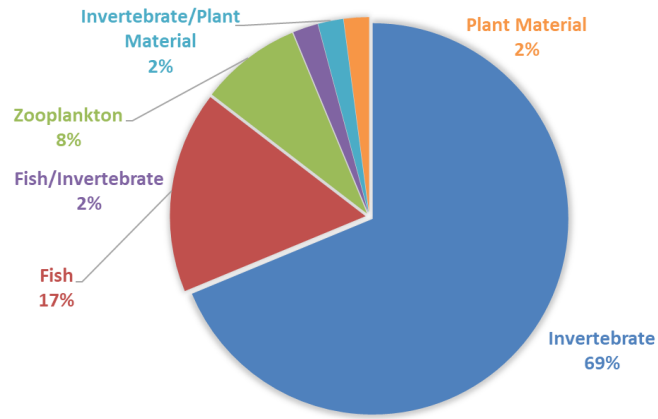


Fig 1.6. Diet of perch (n=11) captured on Lough Talt, September 2020 (% FO)

Arctic char

Nine arctic char stomach were available for analysis. All stomachs were empty.



1.4 Summary and ecological status

A total of five fish species were recorded in Lough Talt in September 2020.

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2020 survey. The mean brown trout CPUE and BPUE fluctuated slightly over the five sampling occasions; however overall the population remained stable. Brown trout ranged in age from 0+ to 5. The most abundant age class was 1+. 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 increased in 2020 when compared to previous surveys. Arctic char ranged in age from 0+ to 5+. Four age classes present. While no 1+ or 2+ fish were captured possibly indicating limited recruitment in those years, a greater number of 0+ fish were captured on this occasion compared to previous surveys.

Perch have been captured in all surveys since 2008 and were also recorded in 1986. However, the population remains small and recruitment is apparently limited.

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 2020 based on the fish populations present. Lough Talt was also assigned a status of High in 2017. In previous years the lake was assigned a fish status of High in 2008 and 2011 and Good in 2014 (Fig. 1.7).

In the 2013 to 2018 surveillance monitoring reporting period, the EPA assigned Lough Talt an overall ecological status of Good.

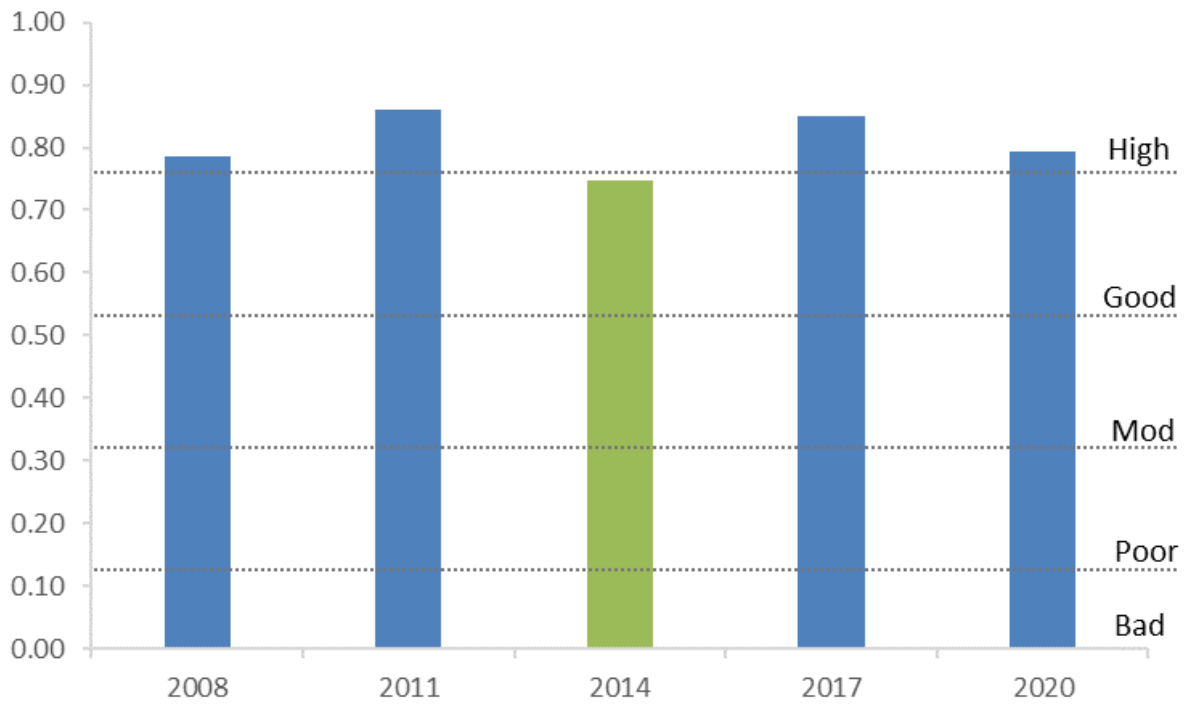


Fig. 1.7. Fish ecological status of Lough Talt, 2008, 2011, 2014, 2017 and 2020



1.5 References

- Amundsen, P.A., Gabler H.M., Staldvik F.J. (1996) A new approach to graphical analysis of feeding strategy from stomach contents data—modification of the Costello (1990) method. *Journal of Fish Biology*, **48**, 607–614.
- Caffrey, J. (2010) *IFI Biosecurity Protocol for Field Survey Work*. Inland Fisheries Ireland.
- Connor, L., Matson R. and Kelly F.L. (2017) Length-weight relationships for common freshwater fish species in Irish lakes and rivers. *Biology and Environment: Proceedings of the Royal Irish Academy*. Vol. **117**, No. 2, 65-75.
- Connor, L., Coyne, J., Corcoran, W., Cierpial, D., Ni Dhonnaibháin L., Delanty, K., McLoone, P., Morrissey, E., Gordon, P., O’ Briain, R., Matson, R., Rocks, K., O’ Reilly, S., Brett A., Garland D. and Kelly, F.L. (2018) *Fish Stock Survey of Lough Talt, September 2017*. National Research Survey Programme, Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24.
- Kelly, F.L., Harrison, A., Connor, L., Allen, M., Rosell, R. and Champ, T. (2008) *FISH IN LAKES Task 6.9: Classification tool for Fish in Lakes. FINAL REPORT*. Central Fisheries Board, NS Share project.
- Kelly, F.L., Connor, L., Wightman, G., Matson, R. Morrissey, E., O’Callaghan, R., Feeney, R., Hanna, G. and Rocks, K. (2009) *Sampling fish for the Water Framework Directive – Summary report 2008*. Central and Regional Fisheries Boards report.
- Kelly, F.L., Connor, L., Morrissey, E., Wogerbauer, C., Matson, R., Feeney, R. and Rocks, K. (2012a) *Water Framework Directive Fish Stock Survey of Lough Talt, September 2011*. Inland Fisheries Ireland.
- Kelly, F.L., Harrison, A.J., Allen, M., Connor, L. and Rosell, R. (2012b) Development and application of an ecological classification tool for fish in lakes in Ireland. *Ecological Indicators*, **18**, 608-619.
- Kennedy, M. and Fitzmaurice, P. (1971) Growth and Food of Brown Trout *Salmo Trutta* (L.) in Irish Waters. *Proceedings of the Royal Irish Academy*, **71 (B) (18)**, 269-352.
- Kelly, F.L., Connor, L., Morrissey, E., Coyne, J., Feeney, R., Matson, R. and Rocks, K. and Rocks, K. (2015a) *Sampling Fish for the Water Framework Directive – Summary Report 2014*. Inland Fisheries Ireland.
- Kelly, F.L., Connor, L., Morrissey, E., Coyne, J., Feeney, R., Matson, R. and Rocks, K. (2015b) *Water Framework Directive Fish Stock Survey of Lough Talt, September 2014*. Inland Fisheries Ireland.



King, J., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J., Fitzpatrick, U., Gargan, P., Kelly, F., O' Grady, M., Poole, R., Roche, W. and Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles and Freshwater Fish*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS (1997) Site synopsis: *Lough Hoe Bog SAC. Site code: 000633*. Site Synopsis report, National Parks and Wildlife Service.

O' Grady, M.F. (1981) *A Study of Brown Trout (Salmo trutta L.) Populations in Selected Irish Lakes*. Ph.D. Thesis, National University of Ireland.

O' Reilly, P. (1998) *Loughs of Ireland, A Flyfisher's Guide*. UK. Merlin Unwin Books.

Western People Press Release (2004) www.westernpeople.ie.

**Inland Fisheries Ireland
3044 Lake Drive,
Citywest Business Campus,
Dublin 24,
Ireland.
D24 Y265**

**www.fisheriesireland.ie
info@fisheriesireland.ie**

+353 1 8842 600