National Research Survey Programme
Lakes 2018

Lough Corrib

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Iascach Intíre Éireann
Inland Fisheries Ireland

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National Research Survey Programme

**Fish Stock Survey of Lough Corrib,
June/July 2018**

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

ACKNOWLEDGEMENTS

1.1 Introduction

Lough Corrib the second largest lake in Ireland (after Lough Neagh), is situated in Co. Galway in the River Corrib catchment (Plates 1.1, 1.2 and 1.3). The lake stretches from outside Galway city to within three kilometers of Maam Cross, a distance of over 50 kilometers (Figs. 1.1 and 1.2). The main rivers draining into Lough Corrib include the Black, Clare, Dooghta, Cregg, Owenriff and the Cong canal which joins Lough Corrib to Lough Mask. The lake can be divided into two parts; Lower Lough Corrib - a relatively shallow basin underlain by carboniferous limestone in the south (Fig. 1.1), and Upper Lough Corrib - a larger, deeper basin underlain by more acidic granite, schists, shales and sandstones to the north (Fig. 1.2) (NPWS, 2004). The lake has a surface area of 16,562Ha (5,042ha Lower Lough and 11,520ha Upper Lough), and has a maximum depth of 42m. The lower lake is categorised as typology class 10 (as designated by the EPA for the Water Framework Directive), i.e. shallow (mean depth <4m), greater than 50ha and high alkalinity (>100mg/l CaCO3) and the upper lake fits into typology class 12, i.e. deep (mean depth >4m), greater than 50ha and high alkalinity (>100mg/l CaCO3). The lake supports 14 protected habitats and six species, including salmon that are listed on Annex I and Annex II respectively of the EU Habitats Directive (NPWS, 2004). The lake is currently classified as mesotrophic (Tierney *et al*., 2011).

Lough Corrib is one of the best game fisheries in the world and is internationally renowned for its brown trout fishing. The lake is known to hold brown trout, salmon, perch, roach, bream, roach x bream hybrids, eels, 3-spined stickleback and pike.

Roach a non-native invasive fish species was first identified in Lower Lough Corrib in the early 1980s and subsequently spread to all corners of the lake. High numbers of roach were observed in routine netting operations on the lake from the late 1980s until 1992 when a decline in the stock was observed (O' Grady, 1996). In early 2007, large numbers of the protozoan parasite Cryptosporidium sp. were detected in water from the lake, leading to contamination of the public water supply and an outbreak of cryptosporidiosis in Galway city. Another unwelcome visitor to the lake is the highly invasive plant species *Lagarosiphon major* (also known as "Curly Waterweed") which was first identified in the lake in 2005. This rapidly colonizing plant has excluded native plant species from bays in which it has become established. Control measures have been implemented on the lake to clear large bays of the plant. The zebra mussel (*Dreissena polymorpha*), another invasive species in Ireland was first recorded in Lough Corrib during 2007 and it is thought they were introduced to the lake in 2000/2001.

The lake was previously surveyed to assess its fish stocks by Inland Fisheries Ireland (formerly the Central Fisheries Board and the Western Regional Fisheries Board) in 1986 and 1996 (O' Grady, 1986; O' Grady et al., 1996). The lake was also surveyed in 2008, 2011 and 2014 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2009, 2012a and 2015). During the 2014 survey, roach followed by perch were found to be the dominant species present in the lake. Brown trout, salmon, three-spined stickleback, nine-spined stickleback, pike, roach x bream hybrids, rudd, stoneloach and eels were also captured during the survey.

This report summarises the results of the 2018 fish stock survey carried out on the lake.

Plate 1.1. Lower Lough Corrib west shore (near L. Kip river) (Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps (Aer Chór na hÉireann))

Plate 1.2. Lough Corrib

Plate 1.3. Survey boats on Lough Corrib
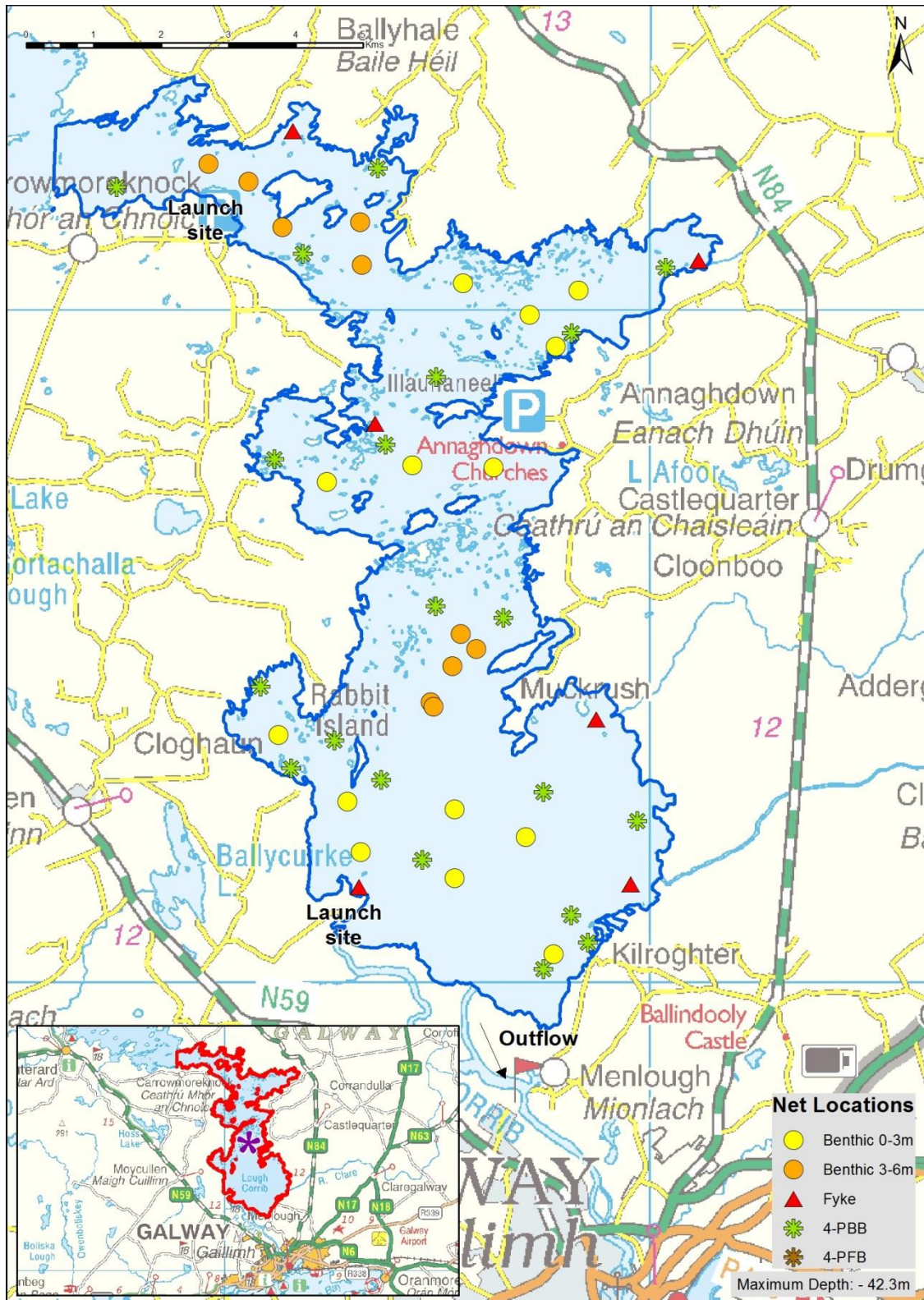
Fig. 1.1. Location map of Lower Lough Corrib showing locations and depths of each net (outflow is indicated on map)

Fig. 1.2. Location map of Upper Lough Corrib showing locations and depths of each net (outflow is indicated on map)

1.2 Methods

1.2.1 Netting methods

Lower Lough Corrib was surveyed over three nights between the 18th and the 21st of June 2018. A total of six sets of Dutch fyke nets (Fyke) and 24 benthic monofilament multi-mesh (BM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets (19 @ 0-2.9m and 5 @ 3-5.9m) were deployed in the lake (30 sites). The netting effort was supplemented using 20 four-panel benthic braided survey gill nets (4-PBB) at 20 additional sites. The 4-panel nets are composed of four 27.5m long panels each a different mesh size (55mm, 60mm, 70mm and 90mm knot to knot).

Upper Lough Corrib was surveyed over six nights between the 21st June and the 3rd July 2018. A total of nine sets of Dutch fyke nets (Fyke), 49 benthic monofilament multi-mesh (BM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets (11 @ 0-2.9m, 11 @ 3-5.9m, 11 @ 6-11.9m, 6 @ 12-19.9m, 7 @ 20-34.9m and 3 @ 35-49.9m) and eleven floating monofilament multi-mesh (FM CEN) (12 panel, 5-55mm mesh size) CEN standard survey gill nets were deployed in the lake (69 sites). The netting effort was supplemented using 40 four-panel benthic (36) and floating (4) braided survey gill nets (4-PBB/4-PFB) at 40 additional sites. The 4-panel survey nets are composed of four 27.5m long panels each a different mesh size (55mm, 60mm, 70mm and 90mm knot to knot).

Nets were deployed in the same locations as were randomly selected in previous surveys. 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, salmon, bream, roach, roach x bream hybrids and pike. Live fish were returned to the water whenever practical or 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).

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

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 eight fish species and one type of hybrid were recorded on Lower Lough Corrib in June 2018, with 567 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Perch was the most abundant fish species recorded, followed by roach. Roach x bream hybrid, pike, brown trout, three-spined stickleback, salmon, stone loach and eels were also recorded.

A total of eight fish species and one type of hybrid were recorded on Upper Lough Corrib in June/July 2018, with 841 fish being captured. The number of each species captured by each gear type is shown in Table 1.2. Perch was the most abundant fish species recorded, followed by roach x bream hybrids. Roach, brown trout, pike, salmon, bream, three-spined stickleback and eels were also recorded.

During the previous surveys in 2008, 2011 and 2014 the same species composition was recorded, with the exception of salmon, which were not recorded during the 2008 survey. Rudd and nine-spined stickleback were only recorded in the 2014 survey. Sea lamprey, tench and roach x rudd hybrids were

only recorded in 2011 and stone loach were recorded in 2014 and 2018 only (Kelly *et al.,* 2009, 2012 and

2015).

Table 1.1. Number of each fish species captured by each gear type during the survey on Lower Lough Corrib, June 2018

Scientific name	Common name	Number of fish captured			
		BM CEN	4-Panel	Fyke	Total
Perca fluviatilis	Perch	328	0	0	328
Rutilus rutilus	Roach	120	1	0	121
Rutilus rutilus x Abramis brama	Roach x bream hybrid	3	43	0	46
Salmo trutta	Brown trout	15	13	0	28
Esox lucius	Pike	14	0	1	15
Gasterosteus aculeatus	3-spined stickleback	7	0	0	7
Salmo salar	Salmon	1	1	0	2
Barbatula barbatula	Stone loach	2	0	0	2
Anguilla anguilla	European eel	0	0	18	18

Table 1.2. Number of each fish species captured by each gear type during the survey on Upper Lough Corrib, June/July 2018

Scientific name	Common name	Number of fish captured				
		BM CEN	FM CEN	4-Panel	Fyke	Total
Perca fluviatilis	Perch	567	0	3	1	571
Rutilus rutilus x Abramis brama	Roach x bream hybrid	15	0	59	0	74
Rutilus rutilus	Roach	51	5	0	8	64
Salmo trutta	Brown trout	33	1	18	0	52
Esox lucius	Pike	2	0	3	2	7
Salmo salar	Salmon	3	1	2	0	6
Abramis brama	Bream	1	0	1	0	2
Gasterosteus aculeatus	3-spined stickleback	1	0	0	0	1
Anguilla anguilla	European eel	0	0	0	64	64

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 Lower Lough Corrib 2018 survey are summarised in Table 1.3 and Upper Lough Corrib in Table 1.4.

Perch was the dominant fish species In Lower Lough Corrib in terms of abundance (CPUE) and roach x bream hybrids were the dominant fish species in terms of biomass (BPUE) captured during the 2018

survey (Table 1.3). In Upper Lough Corrib perch was the dominant fish species in terms of abundance (CPUE) and perch were the dominant fish species in terms of biomass (BPUE) captured during the 2018 survey (Table 1.4).

The mean CPUE and BPUE (excluding the 55mm, 70mm and 90mm mesh panel of 4-PBB) for all species captured in the 2008, 2011, 2014 and 2018 surveys are illustrated in Figures 1.3 to 1.6. On Lower Lough Corrib, the mean brown trout and pike CPUE fluctuated slightly over the four sampling occasions, however, variation in mean perch and roach CPUE was larger (Fig. 1.3). Mean perch CPUE and BPUE fluctuated slightly over the four sampling occasions on Upper Lough Corrib, with the highest CPUE and BPUE recorded in 2008. The mean brown trout and pike CPUE fluctuated slightly on Upper Lough Corrib over the four sampling occasions, however, the mean roach CPUE and BPUE decreased over the four years (Table 1.3 and 1.4; Fig 1.3 to 1.6). Mean BPUE of perch, roach and pike on Lower Lough Corrib displayed a downward trend (Fig. 1.4). A similar trend was observed in Upper Lough Corrib (Fig. 1.6).

Table 1.3. Mean (S.E.) CPUE and BPUE for all fish species captured on Lower Lough Corrib, 2018

Scientific name	Common name	Mean CPUE (± S.E) **
Perca fluviatilis	Perch	0.219 (0.048)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0.010 (0.005)
Rutilus rutilus	Roach	0.080 (0.020)
Salmo trutta	Brown trout	0.012 (0.004)
Esox lucius	Pike	0.010 (0.003)
Gasterosteus aculeatus	3-spined stickleback	0.005 (0.003)
Salmo salar	Salmon	0.001 (0.001)
Barbatula barbatula	Stone loach	0.001 (0.001)
*Anguilla anguilla**	European eel*	0.050 (0.027)*
		Mean BPUE (± S.E) **
Perca fluviatilis	Perch	6.505 (1.598)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	12.984 (6.630)
Rutilus rutilus	Roach	3.710 (1.186)
Salmo trutta	Brown trout	5.219 (1.635)
Esox lucius	Pike	1.122 (0.380)
Gasterosteus aculeatus	3-spined stickleback	0.003 (0.002)
Salmo salar	Salmon	0.472 (0.448)
Barbatula barbatula	Stone loach	0.005 (0.004)
*Anguilla anguilla**	European eel*	10.258 (5.909)*

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

**CPUE and BPUE data above for all fish species except eels are not comparable to earlier surveys as extra panels were added to the 1-PBB to provide additional information on large fish.

Table 1.4. Mean (S.E.) CPUE and BPUE for all fish species captured on Upper Lough Corrib, 2018

Scientific name	Common name	Mean CPUE (± S.E) **
Perca fluviatilis	Perch	0.174 (0.033)
Rutilus rutilus	Roach	0.018 (0.005)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	0.010 (0.003)
Salmo trutta	Brown trout	0.012 (0.003)
Esox lucius	Pike	0.001 (0.001)
Salmo salar	Salmon	0.001 (0.001)
Abramis brama	Bream	0.0003 (0.0003)
Gasterosteus aculeatus	3-spined stickleback	0.0003 (0.0003)
Anguilla anguilla*	European eel*	0.119 (0.058)*
		Mean BPUE (± S.E) **
Perca fluviatilis	Perch	13.684 (2.846)
Rutilus rutilus	Roach	3.326 (1.031)
Rutilus rutilus x Abramis brama	Roach x bream hybrid	11.007 (3.519)
Salmo trutta	Brown trout	5.374 (1.337)
Esox lucius	Pike	0.705 (0.478)
Salmo salar	Salmon	0.665 (0.479))
Abramis brama	Bream	0.251 (0.216)
Gasterosteus aculeatus	3-spined stickleback	0.0001 (0.0001)
Anguilla anguilla*	European eel*	32.668 (15.790)*

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

**CPUE and BPUE data above for all fish species except eels are not comparable to earlier surveys as extra panels were added to the 1-PBB to provide additional information on large fish.
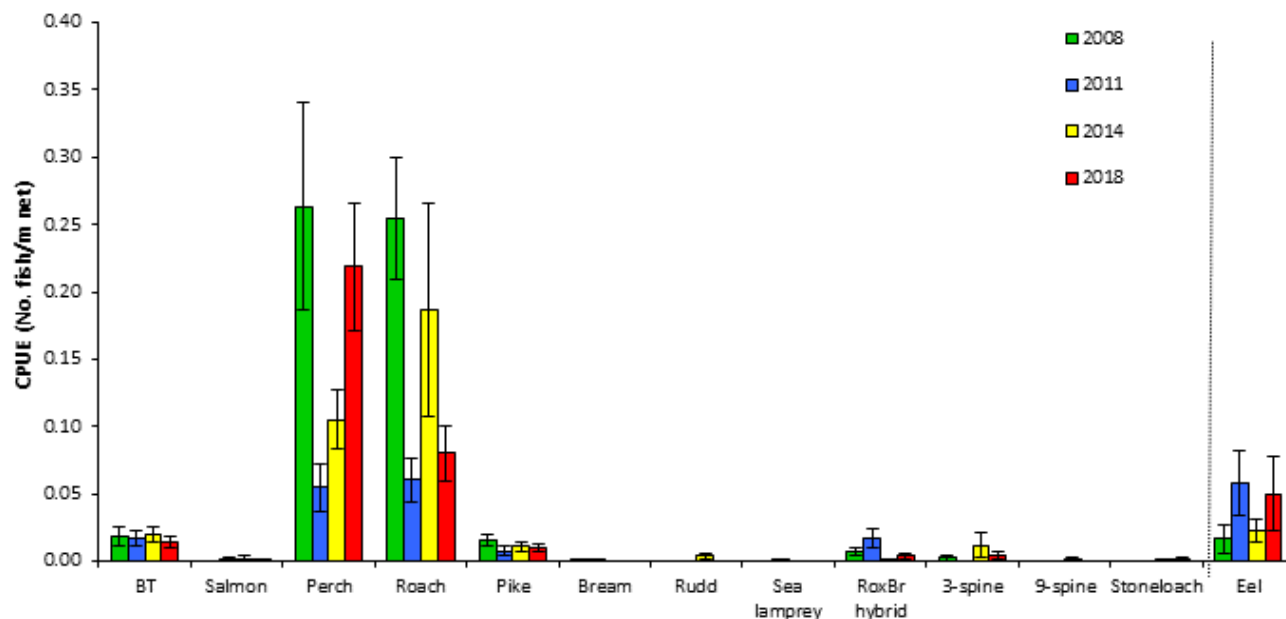
Fig. 1.3. Mean (±S.E.) CPUE for all fish species captured in Lower Lough Corrib (Eel CPUE based on fyke nets only), 2008, 2011, 2014 and 2018

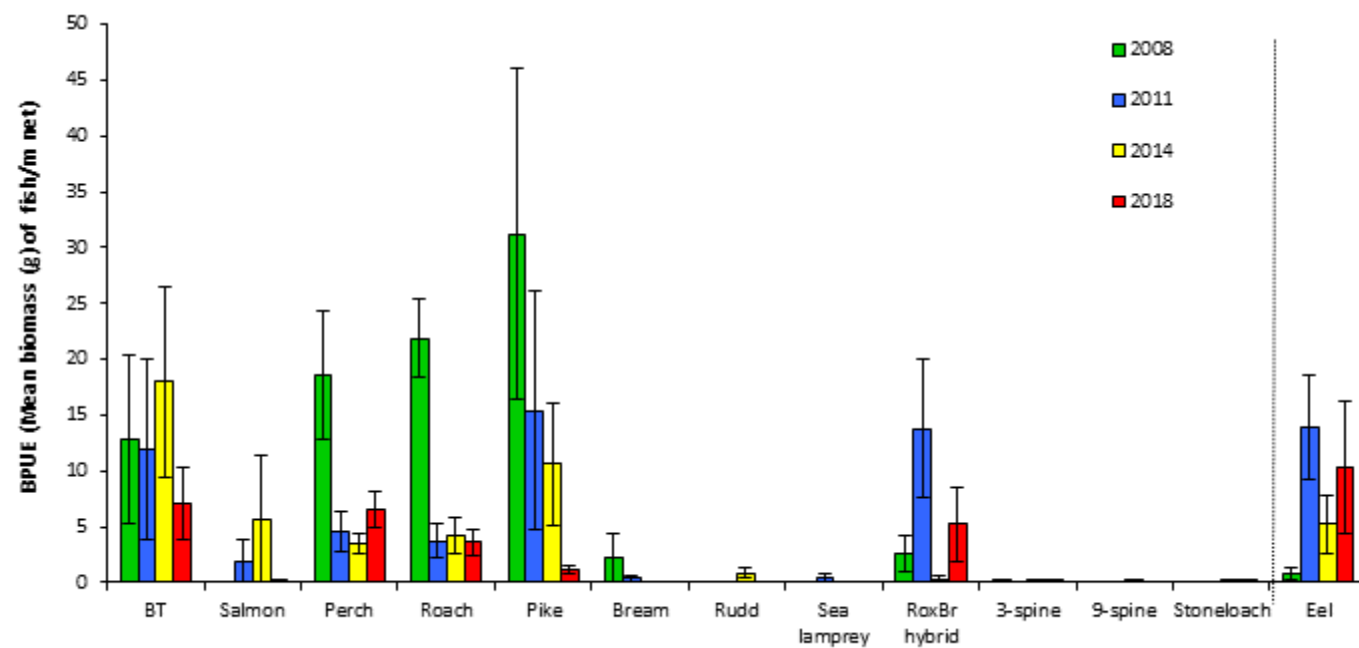

Fig. 1.4. Mean (±S.E.) BPUE for all fish species captured in Lower Lough Corrib (Eel BPUE based on fyke nets only), 2008, 2011, 2014 and 2018

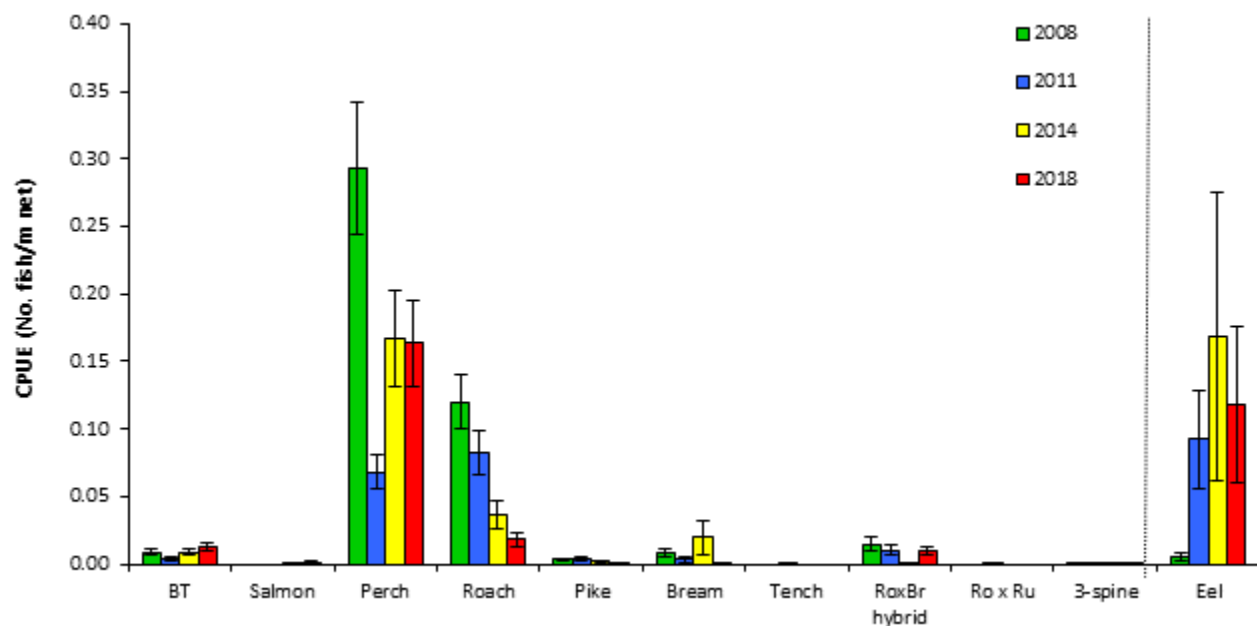**Fig. 1.5. Mean (±S.E.) CPUE for all fish species captured in Upper Lough Corrib (Eel CPUE based on fyke nets only), 2008, 2011, 2014 and 2018**
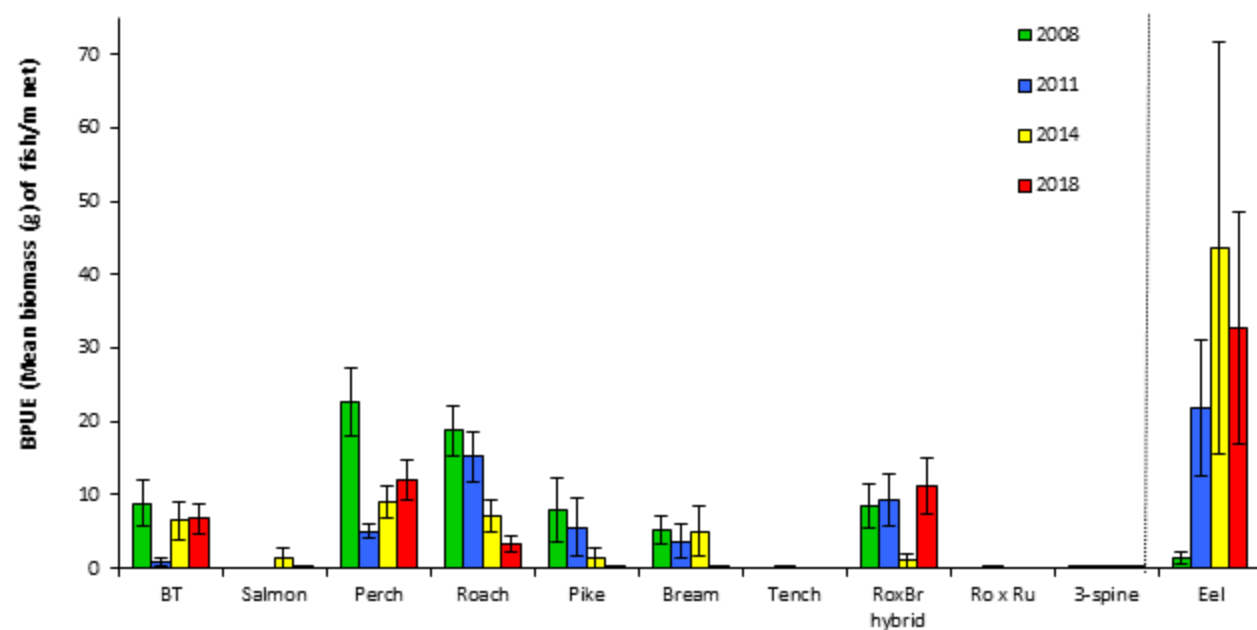

Fig. 1.6. Mean (±S.E.) BPUE for all fish species captured in Upper Lough Corrib (Eel BPUE based on fyke nets only), 2008, 2011, 2014 and 2018

1.3.3 Length frequency distributions and growth

Lower Lough Corrib:

Perch

Perch captured during the 2018 survey ranged in length from 3.2cm to 22.7cm (mean = 10.2cm) (Fig.1.7) with seven age classes present, ranging from 0+ to 6+ with a mean L1 of 6.1cm (Table 1.5). The dominant age class was 0+ (Fig. 1.7). Perch captured during the 2008, 2011 and 2014 surveys had a similar length and age range with the smallest range exhibited in the 2014 survey (Fig.1.7).
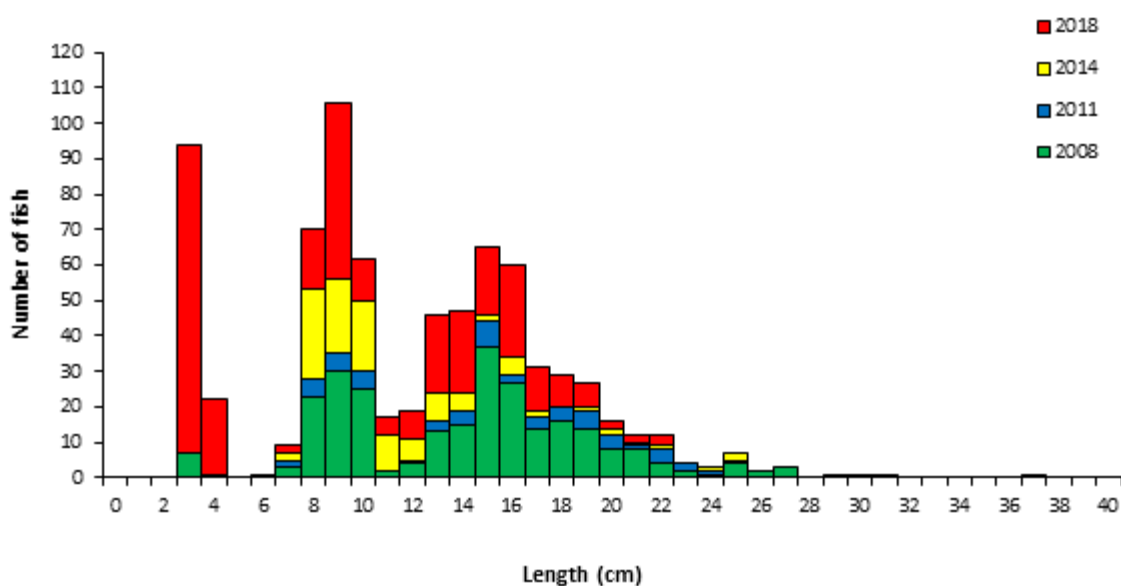

Fig. 1.7. Length frequency of perch captured on Lower Lough Corrib, 2008, 2011, 2014 and 2018

Table 1.5. Mean (±S.E.) perch length (cm) at age for Lower Lough Corrib, June 2018

	L_1	L_2	L_3	L_4	L_5	L_6
Mean (±S.E.)	6.1 (0.1)	11.6 (0.3)	15.7 (0.6)	17.5 (0.9)	17.0 (0.4)	18.1
N	66	46	16	8	2	1
Range	4.1-8.8	7.2-15.4	10.7-18.7	13.8-20.5	16.6-17.4	18.1-18.1

Roach

Roach captured during the 2018 survey ranged in length from 2.5cm to 31.4cm (mean = 11.7cm) (Fig.1.8) with eight age classes present, ranging from 1+ to 9+ (Table 1.6). Roach captured during the 2008, 2011 and 2014 surveys had a similar length and age range (Fig.1.8).
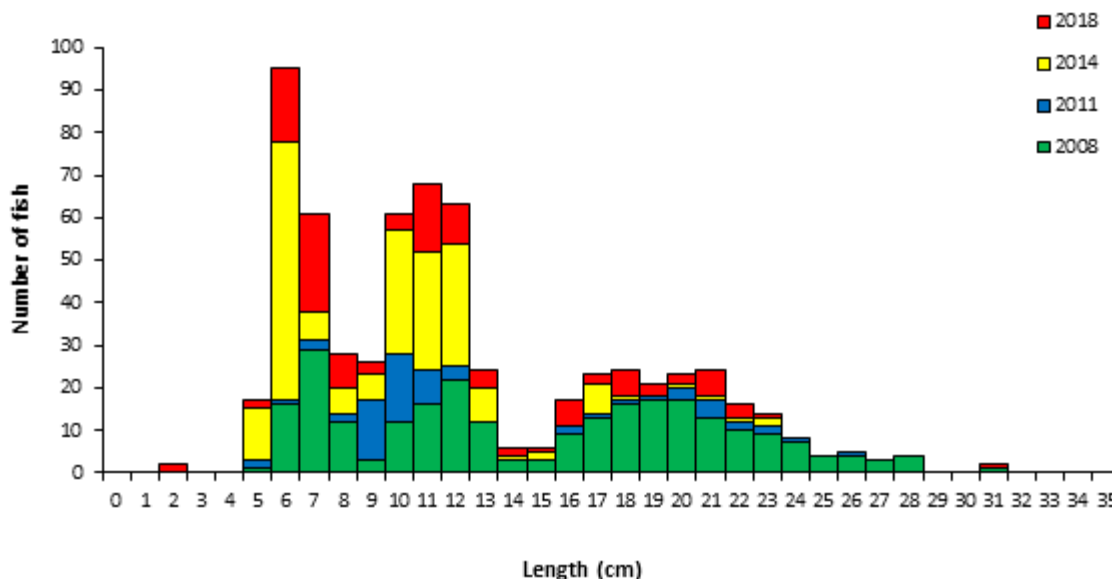

Fig. 1.8. Length frequency of roach captured on Lower Lough Corrib, 2008, 2011, 2014 and 2018

Table 1.6. Summary age data for a sub-sample of roach captured on Lower Lough Corrib, June 2018. Number of fish and length ranges of all fish aged in the sample is presented

	Age class								
	1+	**2+**	**3+**	**4+**	**5+**	**6+**	**7+**	**8+**	**9+**
Mean (cm)	6.7	10.5	13.6	18.4	19.6	22.2	22.8	-	31.4
N	16	13	13	9	5	5	1	-	1
Range (cm)	5.5-8.2	8.0-12.5	11.0-18.4	16.0-21.4	16.3-22.0	21.1-23.8	22.8	-	31.4

Brown trout

Brown trout captured during the 2018 survey ranged in length from 13.9cm to 53.7cm (mean = 27.2cm) (Fig. 1.9). Eight age classes were present, ranging from 1+ to 8+, with a mean L1 of 8.1cm (Table 1.7). The dominant age class was 1+ (Fig. 1.9). Mean brown trout L4 in 2018 was 32.0cm indicating a fast rate of growth for brown trout in this lake according to the classification scheme of Kennedy and Fitzmaurice

(1971) (Table 1.7). Brown trout captured during the 2008, 2011 and 2014 surveys had similar length and age ranges (Fig.1.9).
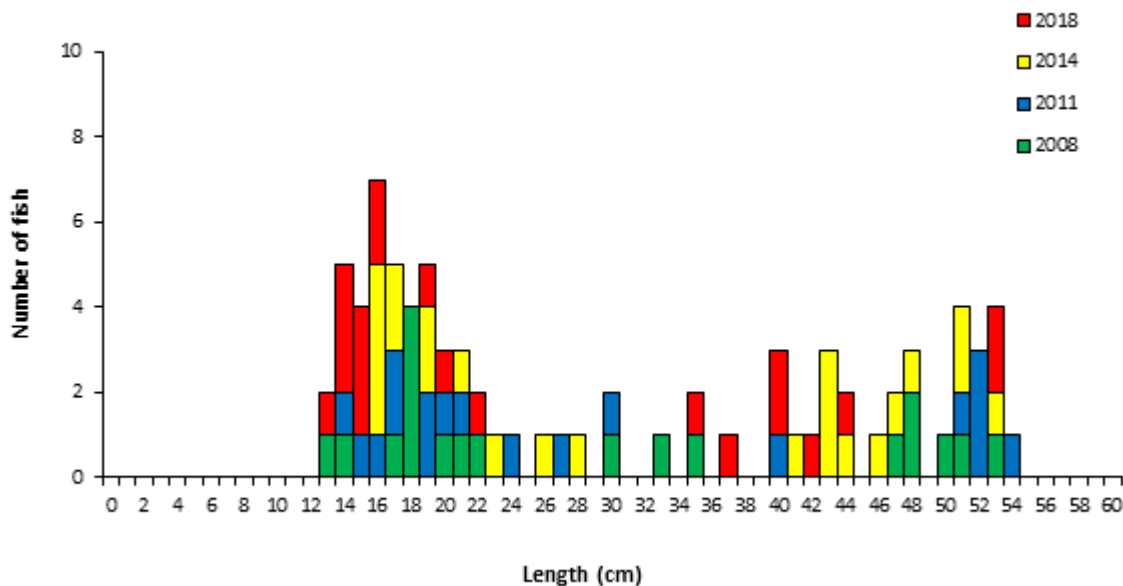

Fig. 1.9. Length frequency of brown trout captured Lower Lough Corrib, 2008, 2011, 2014 and 2018

Table 1.7. Mean (±S.E.) brown trout length (cm) at age for Lower Lough Corrib, June 2018

	L_1	L_2	L_3	L_4	L_5	Growth Category
Mean (±S.E.)	8.1 (0.4)	14.3 (1.8)	22.5 (1.7)	32.0 (4.1)	36.7	Fast
N	14	5	4	3	1	
Range	5.7-10.8	10.4-20.5	19.7-27.4	23.9-37.3	36.7-36.7	

Other fish species

Three-spined stickleback were captured during the 2018 survey and ranged in length from 4.0cm to 4.6cm. Two stone loach at 6.8cm and 7.9cm were recorded and one salmon was captured measuring 58.5cm in length and aged 2.1+. Roach x bream hybrids ranged in length from 7.1cm to 47.4cm (1+ to 19+) and pike ranged in length from 7.5cm to 35.1cm. Eels ranged in length from 39.7m to 54.7cm.

Upper Lough Corrib:

Perch

Perch captured during the 2018 survey ranged in length from 3.7cm to 29.7cm (mean = 15.8cm) (Fig.1.10) with ten age classes present, ranging from 0+ to 10+ with a mean L1 of 6.1cm (Table 1.8). Perch captured during the 2008, 2011 and 2014 surveys had similar length and age ranges (Fig.1.10).
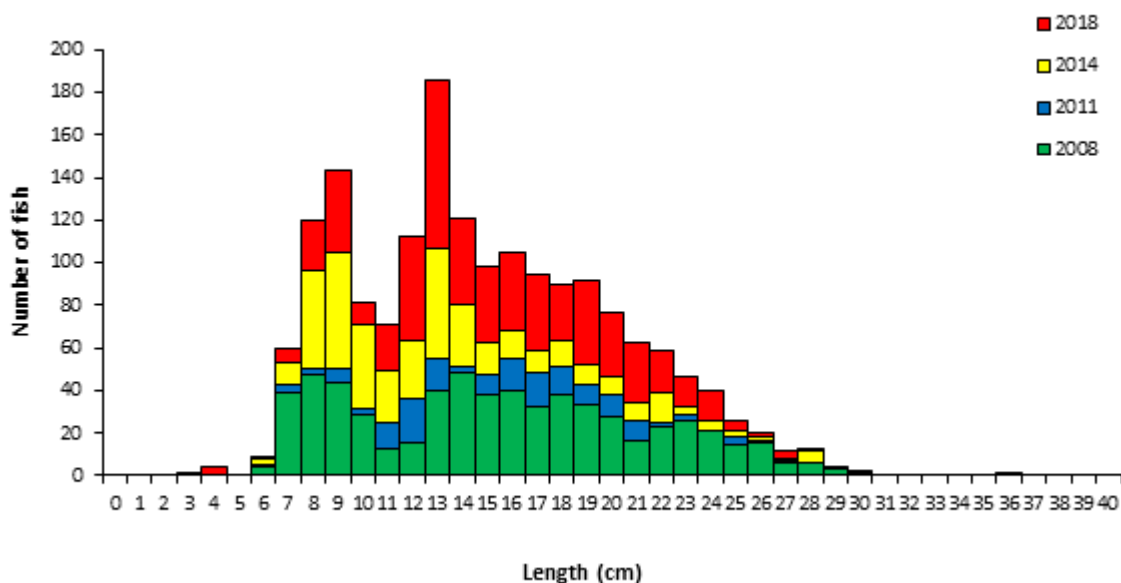

Fig. 1.10. Length frequency of perch captured on Upper Lough Corrib, 2008, 2011, 2014 and 2018

Table 1.8. Mean (±S.E.) perch length (cm) at age for Upper Lough Corrib, June/July 2018

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}
Mean	6.2	11.4	16.0	19.1	21.7	22.8	24.2	25.9	24.0	24.8
(±S.E.)	(0.1)	(0.2)	(0.3)	(0.3)	(0.5)	(0.7)	(1.9)	(2.7)		
N	104	84	54	45	29	12	4	2	1	1
Range	3.3-9.9	8.3-16.3	12.2-21.2	14.2-24.2	16.5-26.2	18.5-25.9	20.6-27.4	23.2-28.6	24.0-24.0	24.8-24.8

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Roach

Roach captured during the 2018 survey ranged in length from 6.7cm to 28.8cm (mean = 19.6cm) (Fig.1.11) with six age classes present, ranging from 1+ to 7+ (Table 1.9). Roach captured during the 2008, 2011 and 2014 surveys had similar length and age ranges (Fig.1.11).
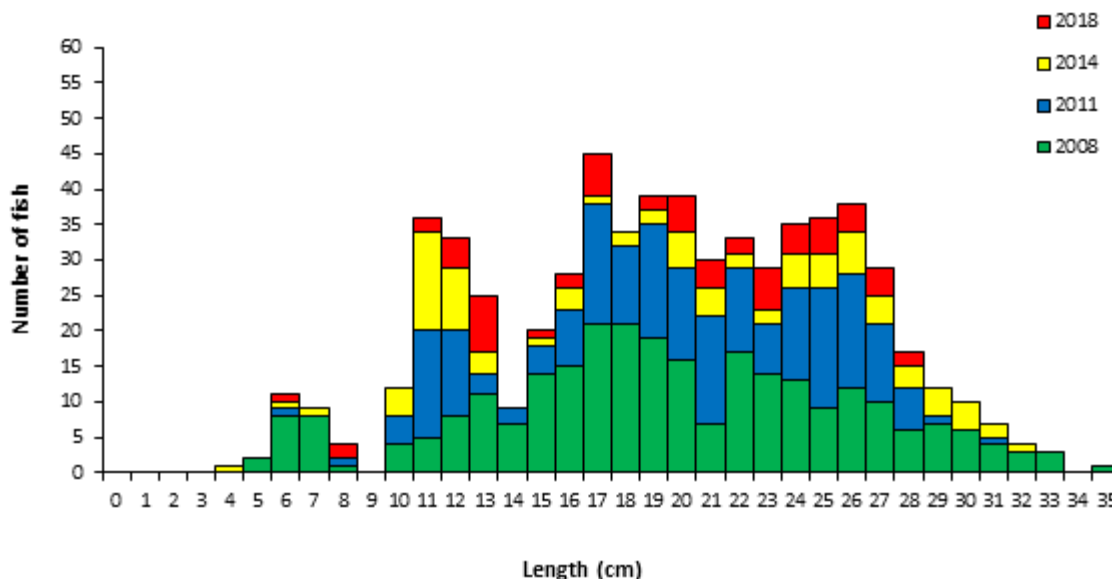

Fig. 1.11. Length frequency of roach captured on Upper Lough Corrib, 2008, 2011, 2014 and 2018

Table 1.9. Summary age data for a sub-sample of roach captured on Upper Lough Corrib, June/July 2018. Number of fish and length ranges of all fish aged in the sample is presented

	Age class						
	1+	2+	3+	4+	5+	6+	7+
Mean (cm)	6.7	-	12.3	18.9	22.0	24.5	25.9
N	1	-	2	4	9	12	10
Range (cm)	6.7	-	11-13.6	17.6-21.3	17.2-24.2	19.8-27.6	20.5-28.8

Brown trout

Brown trout captured during the 2018 survey ranged in length from 13.0cm to 61.8cm (mean = 31.3cm) (Fig. 1.12). Seven age classes were present, ranging from 1+ to 8+, with a mean L1 of 6.8cm (Table 1.10). The dominant age class was 1+ (Fig. 1.12). Brown trout captured during the 2008, 2011 and 2014 surveys had similar length and age ranges (Fig.1.12).
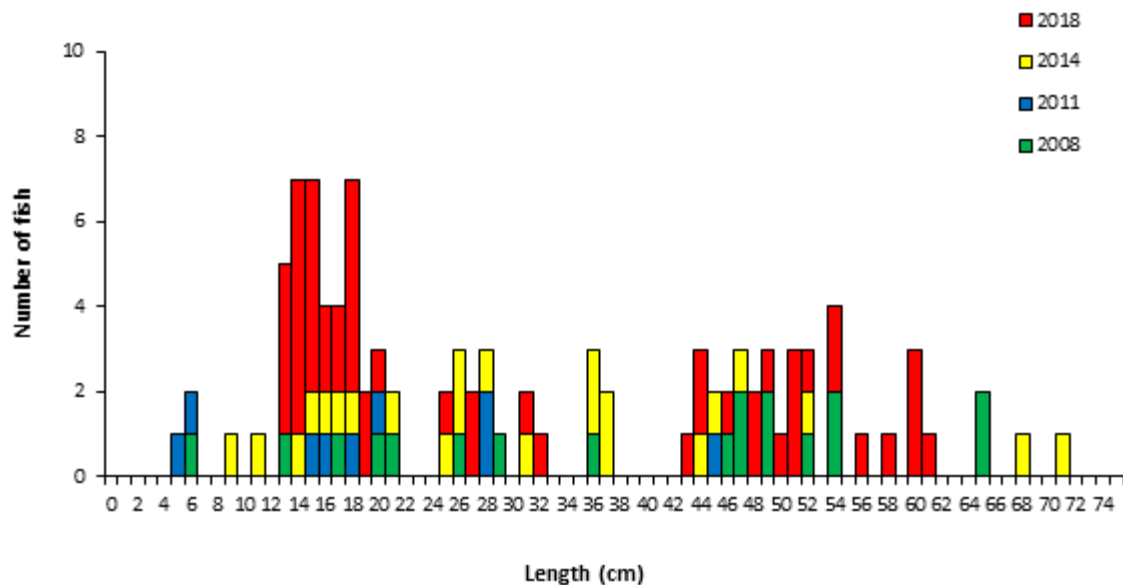
Fig. 1.12. Length frequency of brown trout captured Upper Lough Corrib, 2008, 2011, 2014 and 2018

Table 1.10. Mean (±S.E.) brown trout length (cm) at age for Upper Lough Corrib, June/July 2018

	L_1	L_2	L_3	L_4	L_5	Growth Category
Mean (±S.E.)	6.8 (0.3)	12.2 (0.7)	21.0 (2.3)	28.3 (4.3)	33.7 (5.3)	Slow
N	24	11	3	2	2	
Range	4.5-9.7	8.9-18.1	16.4-24.1	24.0-32.6	28.4-38.9	

Other fish species

Two bream were captured during the 2018 survey and were measured at 19.5cm (4+) and 49.7cm (15+). One three-spined stickleback at 4.0cm was recorded and salmon captured ranged in length from 9.3cm to 77.0cm (1+ to 2.2+). Roach x bream hybrids ranged in length from 10.8cm to 48.0cm (2+ to 20+) and pike ranged in length from 5.0cm to 76.5cm. Eels ranged in length from 41.0cm to 74.0cm.

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 perch captured during the survey were examined and are presented below.

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 50 stomachs were examined from Lower Lough Corrib. Of these 21 were found to contain no prey items.   The remaining 29 stomachs contained invertebrates (41%), fish (28%), unidentified digested material (17%), zooplankton (10%) and fish/invertebrates (4%) (Fig. 1.13). A total of 89 stomachs were examined from Upper Lough Corrib. Of these 39 were found to contain no prey items. Of the remaining 50 stomachs containing food, 48% contained unidentified digested material, 44% fish and 8% zooplankton (Fig. 1.14).
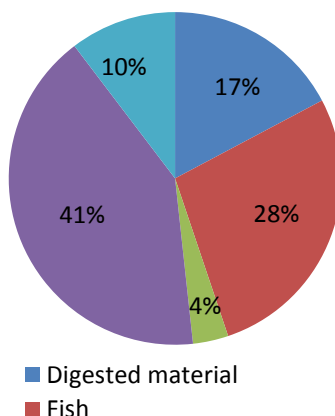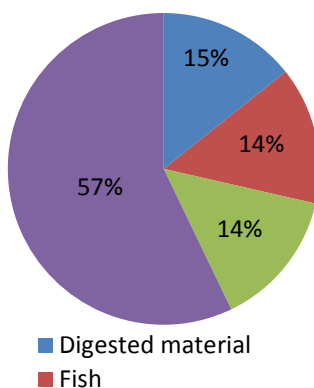

Fig 1.13. Diet of perch (n=29) captured on Lower Lough Corrib, 2018 (% FO)
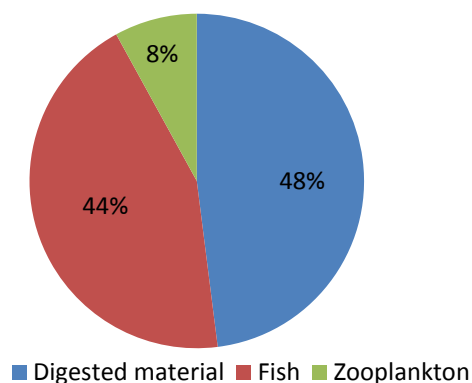
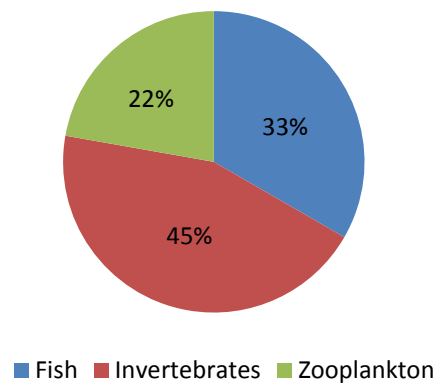**Fig 1.14. Diet of perch (n=50) captured on Upper Lough Corrib, 2018 (% FO)**

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 15 stomachs were examined from Lower Lough Corrib. Of these eight were found to contain no prey items. Of the remaining seven stomachs containing food, 57% contained zooplankton, 15% unidentified digested material, 14% fish and 14% invertebrates/zooplankton (Fig. 1.15). A total of 29 brown trout stomachs from Upper Lough Corrib were examined. Of these 20 were found to contain no prey items. Of the remaining nine stomachs containing food, 45% contained invertebrates, 33% fish and 22% zooplankton (Fig. 1.16).

Fig 1.15. Diet of brown trout (n=7) captured on Lower Lough Corrib, 2018 (% occurrence)

Fig 1.16. Diet of brown trout (n=9) captured on Upper Lough Corrib, 2018 (% occurrence)

1.4 Summary and ecological status

A total of eight fish species and one type of hybrid were recorded on Lower Lough Corrib in June 2018. Perch was the dominant fish species in terms of abundance and roach x bream hybrids were the dominant fish species in terms of biomass captured during the 2018 survey.

Perch captured during the 2018 survey ranged in length from 3.2cm to 22.7cm, with seven age classes present, ranging from 0+ to 6+, indicating reproductive success in each of the previous seven years. The dominant age class was 0+.

Roach captured during the 2018 survey ranged in length from 2.5cm to 31.4cm, with eight age classes present, ranging from 1+ to 9+, indicating reproductive success in eight of the previous ten years.

Brown trout ranged in age from 1+ to 8+, indicating reproductive success in eight of the previous nine years. The dominant age class was 1+. Length at age analyses revealed that brown trout in the lake exhibit a fast rate of growth according to the classification scheme of Kennedy and Fitzmaurice (1971).

A total of eight fish species and one type of hybrid were recorded on Upper Lough Corrib in June/July 2018. Perch was the dominant fish species in terms of abundance and eels followed by perch were the dominant fish species in terms of biomass captured during the 2018 survey.

Perch captured during the 2018 survey ranged in length from 3.7cm to 29.7cm, with ten age classes present, ranging from 0+ to 10+, indicating reproductive success in each of the previous eleven years.

Roach captured during the 2018 survey ranged in length from 6.7cm to 28.8cm, with six age classes present, ranging from 1+ to 7+, indicating reproductive success in six of the previous eight years.

Brown trout ranged in age from 1+ to 8+, indicating reproductive success in seven of the previous nine years. The dominant age class was 1+.

The main notable change observed in species composition and abundance (CPUE)/biomass (BPUE) was the reduction in the roach and perch population between 2008 and 2011, however, perch abundance increased again in 2014 and 2018, with more of an increase observed in Lower Lough Corrib in 2018. Roach abundance in 2014 only increased in Lower Lough Corrib and decreased further in Upper Lough Corrib. Further decreases in roach abundances were observed in the 2018 survey. A decrease in brown

trout abundance and biomass in the Upper Lake was also observed between 2008 and 2011 and increased again in 2014 and further increased in 2018. In addition there was also a decrease in roach x bream hybrids in both the Upper and Lower Loughs in 2014 with an increase observed again in 2018. Reasons for these significant fluctuations in abundance for certain fish species are unknown but may be attributable to a number of factors, such as the harsh winters of the previous years affecting recruitment and to the spread of zebra mussels throughout the lake since 2007. The zebra mussel can disturb the food web in a lake by filtering microscopic algae (phytoplankton) from the water column, divert nutrients from open water to lake bottom systems, thus favouring bottom-feeding fish such as bream and roach x bream hybrids (and their predators) over those fish species (and their predators) which feed in the open water.

Arctic char have historically existed in Lough Corrib; however none were recorded in the 2008, 2011, 2014 or 2018 surveys or in the previous 1996 survey. The last reports of Arctic char in the lake came from anglers in the 1980's (O' Grady, 1996). It is most likely that char became extinct between the late 1980's and early 1990's due to a moderate increase in trophic status observed in the lake (O' Grady, 1996) as it is known that Arctic char are sensitive to changes in water quality (Baroudy, 1995).

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*., 2012). Using the FIL2 classification tool, both Lower Lough Corrib and Upper Lough Corrib have been assigned an ecological status of Good for 2018 based on the fish populations present. Lower Lough Corrib has been assigned an ecological status of Poor in 2008 and Moderate in both 2011 and 2014 based on the fish populations present and Upper Lough Corrib has been assigned an ecological status of Poor in 2011 and Good for both 2008 and 2014 based on the fish populations present.

In the 2010 to 2015 surveillance monitoring reporting period, the EPA assigned Lower Lough Corrib an overall ecological status of Moderate and Upper Lough Corrib was assigned as Poor.

1.5 References

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