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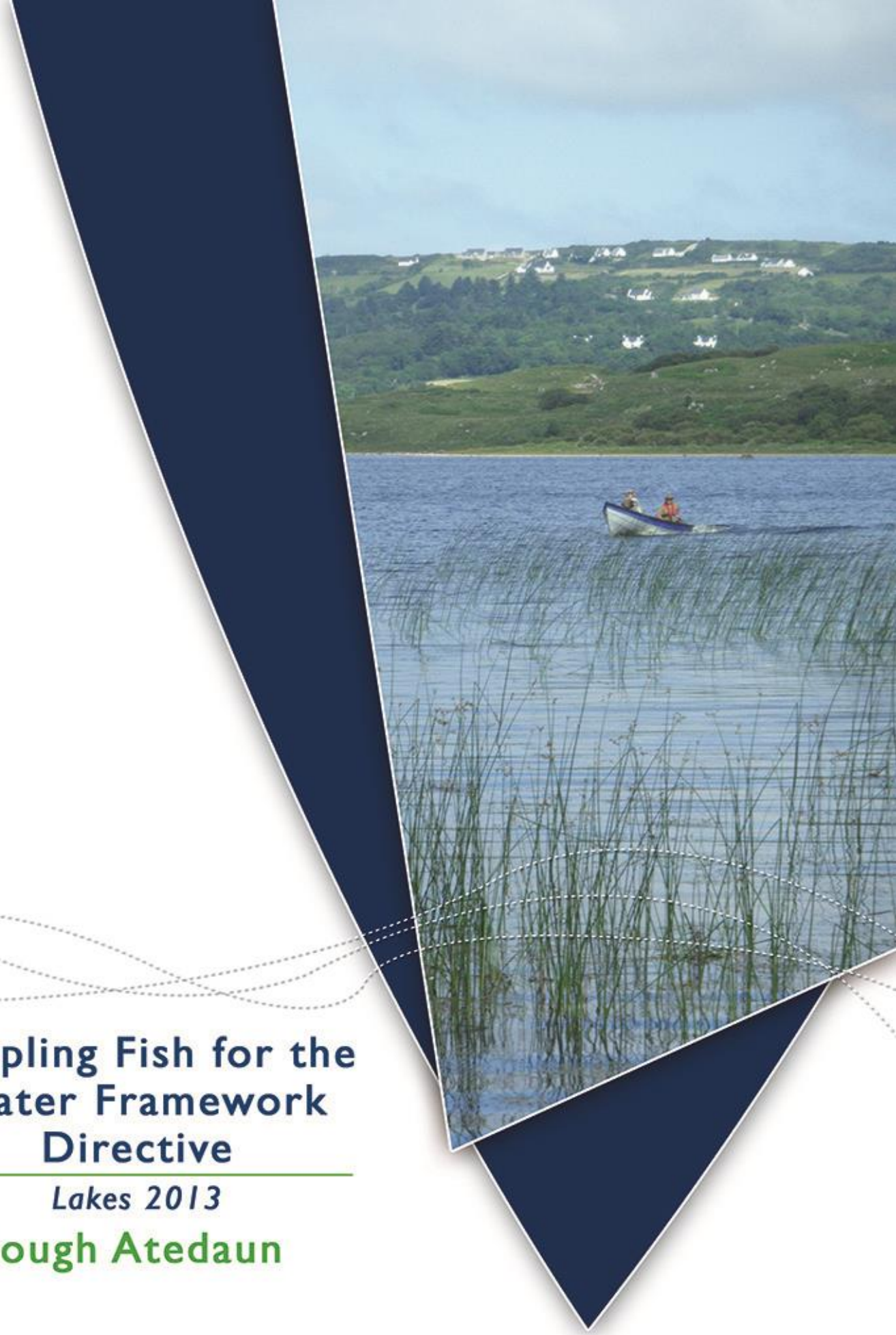

Sampling Fish for the Water Framework Directive

Lakes 2013

Lough Atedaun

Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Lough Atedaun, September 2013

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1.1 Introduction

Lough Atedaun is situated in the Fergus catchment in Co. Clare, adjacent to the town of Corrofin (Plate 1.1, Fig. 1.1). The lake is situated at an altitude of 22m a.s.l., has a surface area of 38.0ha, a mean depth of 2.3m and a maximum depth of 7.0m. The lake falls into typology class 9 (as designated by the EPA for the Water Framework Directive), i.e. shallow (<4m), less than 50ha and high alkalinity (>100mg/l $CaCO_3$). The underlying geology has been categorized as calcareous. Lough Atedaun is a popular lake for pike fishing (Cleary, M. former ShRBD, *pers. comm*.). The lake is highly eutrophic and a thick carpet of submerged macrophytes covers shallow areas of the lake.

Lough Atedaun is located in the "East Burren Complex" Special Area of Conservation. This is a large area that encompasses all of the high ground in the eastern section of the Burren. A total of 12 different habitats listed on Annex I of the EU Habitats Directive are present within the site, including areas of limestone pavement, calcareous grasslands, heath scrub, woodlands and calcareous lakes and turloughs (NPWS, 2001). The site exhibits some of the best and most extensive areas of oligotrophic limestone wetlands found in the Burren and indeed in Europe. Some of the most extensive calcareous swamp fen communities in the country also occur within this complex (NPWS, 2001).

Lough Atedaun was previously surveyed in 2007 and 2010 as part of the WFD surveillance monitoring programme (Kelly and Connor, 2007 and Kelly *et al*., 2011). During the 2010 survey, perch were found to be the dominant species present. Rudd, pike and eels were also captured during the 2010 survey. There was once a population of brown trout in this lake (Inland Fisheries Trust, unpublished data). A survey in May 1976 yielded brown trout, perch, pike and rudd (Inland Fisheries Trust archival data). In early 2010 a waste water treatment plant was opened in Corofin town which may help to alleviate the problem of nutrient enrichment in the lake in the future.

Plate 1.1. Lough Atedaun

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

1.2 Methods

Lough Atedaun was surveyed on the 9th and 10th of September 2013. A total of three sets of Dutch fyke nets and five benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill nets (2 @ 0-2.9m and 3 @ 3-5.9m) were deployed in the lake (8 sites). The netting effort was supplemented using two benthic braided survey gill nets (62.5mm mesh knot to knot) at two additional 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 rudd and pike. 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 Atedaun in September 2013, with 143 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 rudd and pike. During the previous surveys in 2010 and 2007 the same species composition was recorded with the exception of stone loach which were only recorded in 2013.

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Atedaun, September 2013

Scientific name	Common name	Number of fish captured			
		Benthic mono multimesh gill nets	Benthic braided gill nets	Fyke nets	Total
Perca fluviatilis	Perch	123	0	1	124
Scardinius erythrophthalmus	Rudd	7	0	0	7
Esox lucius	Pike	6	0	1	7
Anguilla anguilla	European eel	0	0	4	4
Barbatula barbatula	Stone loach	1	0	0	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 2010 and 2013 surveys are summarised in Table 1.2. Mean CPUE and BPUE for all species is illustrated in Figure 1.2 and 1.3.

Perch was the dominant fish species in terms of both abundance (CPUE) and biomass (BPUE).

Although the mean perch CPUE and BPUE fluctuated between the three sampling years, there was no statistical difference between years (Table 1.2; Fig 1.2 and 1.3).

Although the mean rudd CPUE and BPUE decreased slightly from 2007 to 2010 and 2013, 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 Atedaun, 2007, 2010 and 2013

Scientific name	Common name	2007	2010	2013
			Mean CPUE	
Perca fluviatilis	Perch	0.408 (0.177)	0.383 (0.210)	0.412 (0.188)
Scardinius erythrophthalmus	Rudd	0.083 (0.047)	0.026 (0.017)	0.023 (0.012)
Esox lucius	Pike	0.022 (0.010)	0.013 (0.005)	0.022 (0.009)
Barbatula barbatula	Stone loach	-	-	0.003 (0.003)
Anguilla anguilla	European eel	0.156 (0.056)	0.011 (0.011)	0.022 (0.022)
			Mean BPUE	
Perca fluviatilis	Perch	23.150 (12.019)	17.176 (10.799)	25.875 (16.940)
Scardinius erythrophthalmus	Rudd	7.830 (4.115)	1.143 (0.708)	2.363 (1.450)
Esox lucius	Pike	24.045 (19.958)	14.016 (8.880)	11.775 (7.524)
Barbatula barbatula	Stone loach	-	-	0.010 (0.010)
Anguilla anguilla	European eel	76.477 (34.428)	2.638 (2.638)	11.178 (11.178)

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

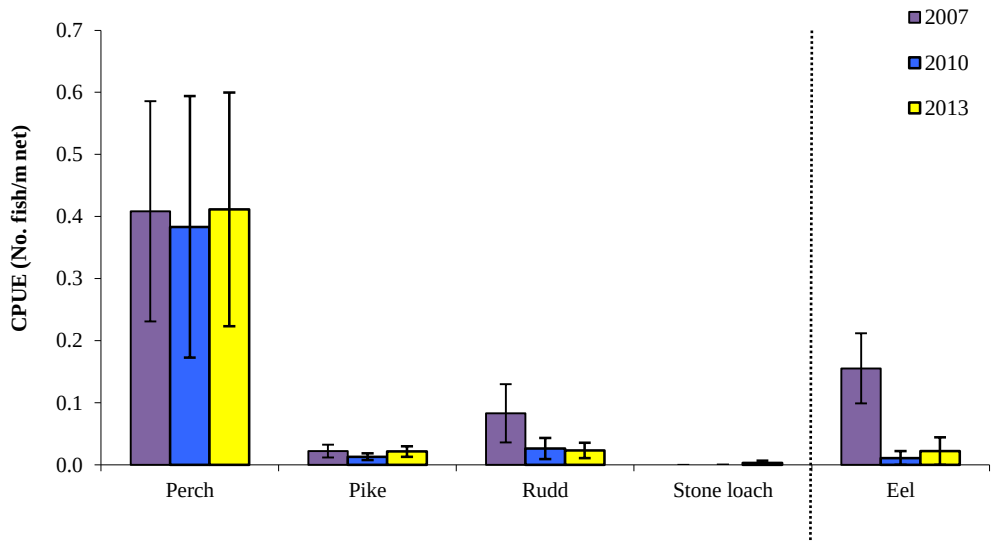

Fig. 1.2. Mean (±S.E.) CPUE on Lough Atedaun (Eel CPUE based on fyke nets only), 2007, 2010 and 2013

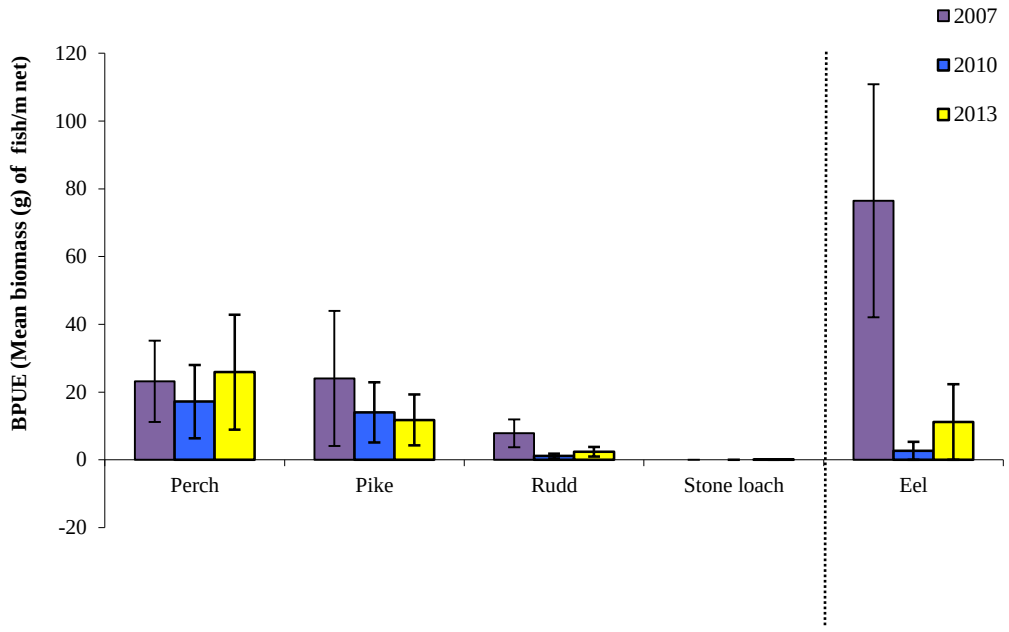

Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Atedaun (Eel BPUE based on fyke nets only), 2007, 2010 and 2013

1.3.3 Length frequency distributions and growth

Perch captured during the 2013 survey ranged in length from 5.9cm to 26.3cm (mean = 14.1cm) (Fig. 1.4) with seven age classes present, ranging from 0+ to 6+, with a mean L1 of 6.2cm (Table 1.3). The dominant age class was 1+ (Fig 1.4). Perch captured during the 2010 and 2007 surveys had a similar length range, age range and growth patterns (Fig. 1.4). The dominant age class in 2013 was 1+ and 1+ and 2+ in 2007 and 2010 respectively (Fig 1.4).

Rudd captured during the 2013 survey ranged in length from 15.2cm to 21.9cm (mean = 17.3cm) (Fig.1.5) with three age classes present, ranging from 3+ to 5+, with a mean L1 of 1.9cm (Table 1.4). The dominant age class was 4+ (Fig 1.5). Rudd captured during the 2010 survey ranged in length from 5.7cm to 21.0cm (Fig.1.5) and had an age range of 1+ to 3+. Rudd captured during the 2007 survey had a similar length range to 2013 and ranged in age from 1+ to 3+. The dominant age class in 2010 and 2007 was 2+ (Fig 1.5).

Eels captured during the 2013 survey ranged in length from 46.9cm to 83cm and pike ranged from 18.0cm to 67.0cm (aged at 1+ to 2+). One stone loach was captured was 7.4cm in length.

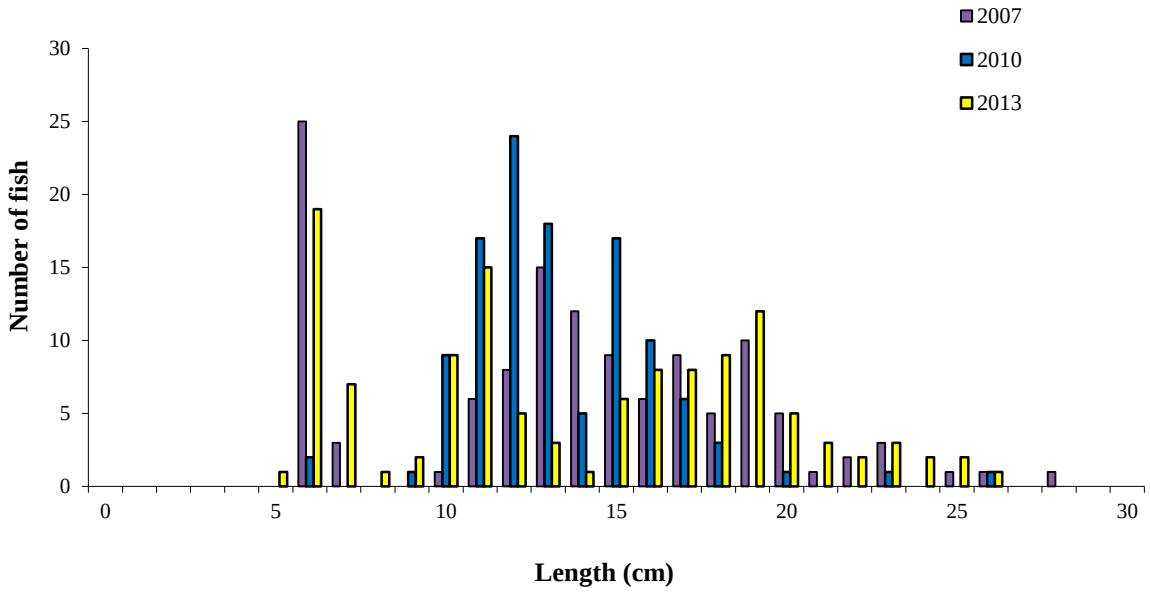

Fig. 1.4. Length frequency of perch captured on Lough Atedaun, 2007, 2010 and 2013

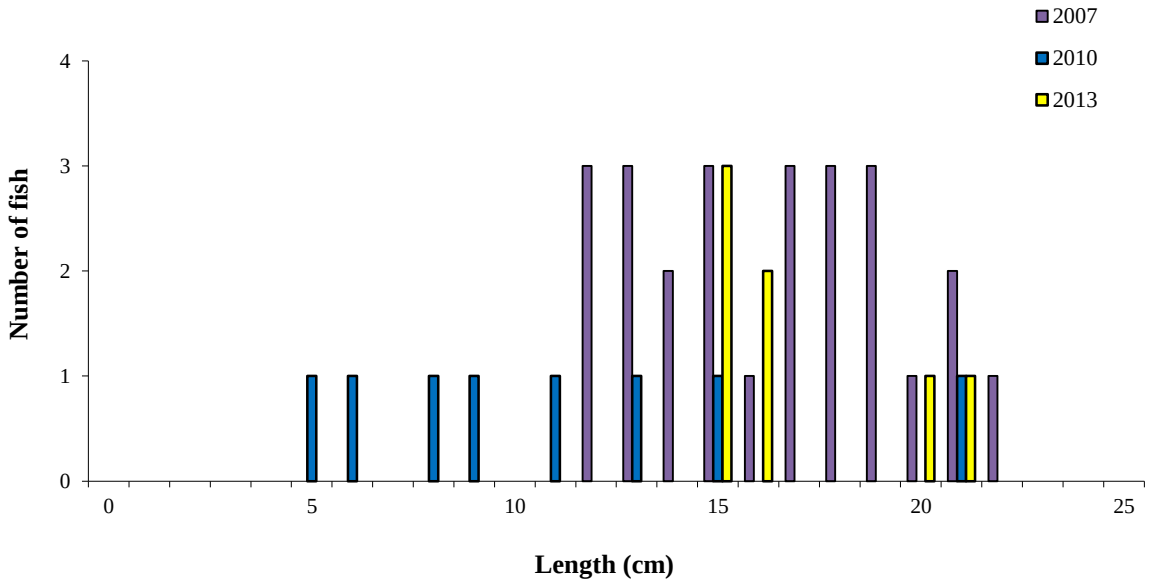

Fig. 1.5. Length frequency of rudd captured on Lough Atedaun, 2007, 2010 and 2013

Table 1.3. Mean (±SE) perch length (cm) at age for Lough Atedaun, September 2013

	L_1	L_2	L_3	L_4	L_5	L_6
Mean	6.2 (0.1)	11.5 (0.3)	16.1 (0.4)	19.7 (0.5)	21.9 (1.3)	25.6
N	74	49	28	13	4	1
Range	4.1-9.0	7.5-15.9	11.8-19.7	16.0-23.1	18.1-24.2	25.6-25.6

Table 1.4. Mean (±SE) rudd length (cm) at age for Lough Atedaun, September 2013

	L_1	L_2	L_3	L_4	L_5
Mean	1.9 (0.3)	5.5 (0.7)	9.5 (0.8)	12.9 (0.9)	17.4 (1.5)
N	7	7	7	5	2
Range	1.5-3.5	3.6-9.0	5.9-12.6	10.3-15.3	15.8-18.9

1.4 Summary

Perch was the dominant fish species in terms of both abundance (CPUE) and biomass (BPUE) during the 2013 survey.

Although the mean perch CPUE and BPUE fluctuated between the three sampling years, these differences were not statistically significant. Perch ages ranged from 0+ to 6+ indicating reproductive success in each of the previous seven years. The dominant age class was 1+.

Although the mean rudd CPUE and BPUE decreased slightly from 2007 to 2010 and 2013, these differences were not statistically significant. Rudd ranged in age from 3+ to 5+, indicating reproductive success in three of the previous six years; however, no young of the year or 1+ or 2+ fish were recorded.

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 Atedaun has been assigned an ecological status of Good for 2007, 2010 and 2013 based on the fish populations present.

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

1.5 References

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