

# Lough Acoose



## Sampling Fish for the Water Framework Directive - Lakes 2008



The Central and Regional  
Fisheries Boards

## **ACKNOWLEDGEMENTS**

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## 1.1 Introduction

Lough Acoose (Plate 1.1, Fig 1.1) is situated in Co. Kerry in the upper Caragh catchment. The lake is located approximately seven kilometres south of Killorglin, between Glencar and Kilorglin. The lake has a surface area of 66ha and a maximum depth of 19m. Lough Acoose falls into typology class 4 (as designated by the EPA for the Water Framework Directive), i.e. deep (mean depth >4m), greater than 50ha and low alkalinity (<20mg/l CaCO<sub>3</sub>).

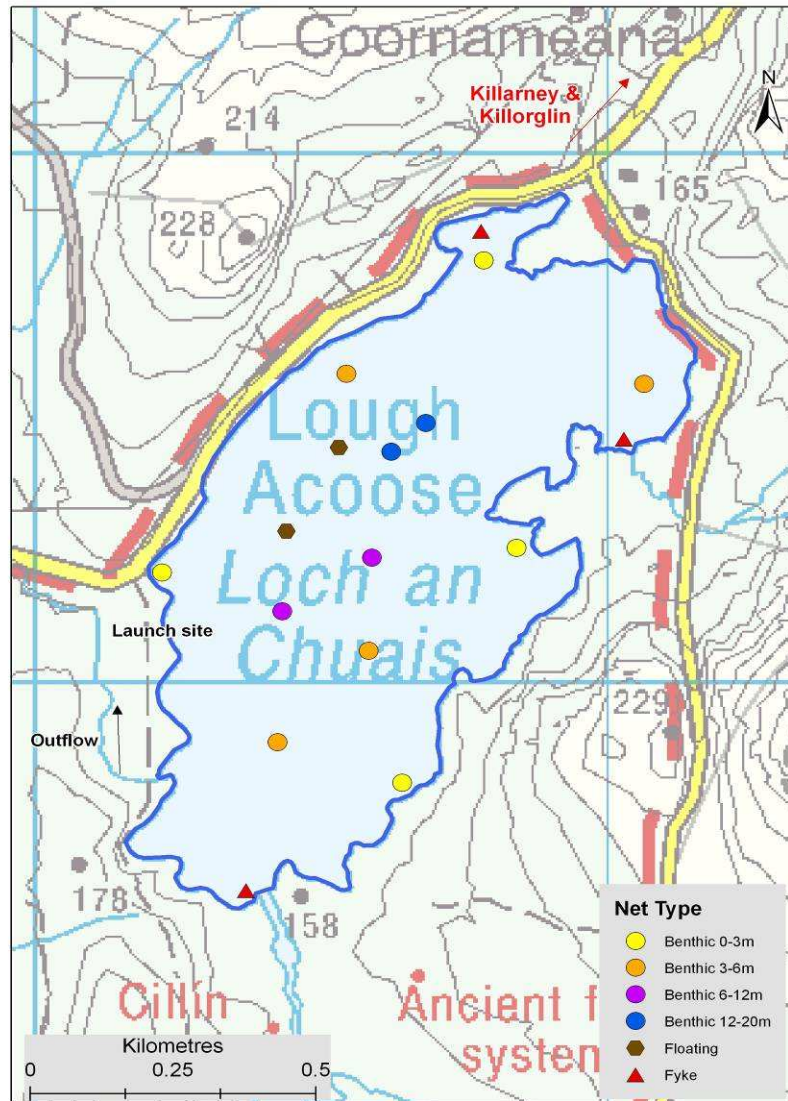
Lough Acoose forms part of the Killarney National Park, Macgillicuddy's Reeks and Caragh river catchment candidate Special Area of Conservation. This is a large area that encompasses a wide variety of habitats designated under Annex I of the EU Habitats Directive, including blanket bog, alluvial woodlands, alpine heath and both upland and lowland oligotrophic lakes. The site has also been selected for the following species; Killarney fern, slender naiad, freshwater pearl mussel, Kerry slug, marsh fritillary, Killarney shad, Atlantic salmon, brook lamprey, river lamprey, sea lamprey, lesser horseshoe bat and otter; all species listed on Annex II of the EU Habitats Directive (NPWS 2005).

Lough Acoose is historically known to hold a stock of brown trout and gets a run of grilse from July onwards. The lake also historically held a population of Arctic char (Went, 1945) a rare and threatened species listed in the Irish Red Data Book for fish as vulnerable (Whilde, 1993). A review paper on the distribution and status of Arctic Char in Ireland (Igoe *et al.*, 2003) reported that char were not present in the lake following a 1983 survey. In 2006 however, an EPA funded PhD studentship at University College Cork investigating the vulnerability of char eggs to environmental change found a char population present in the lake (E. Morrissey, *pers. com.*).



Plate 1.1. Lough Acoose, August 2008





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

### 1.2 Methods

Lough Acoose was surveyed over two nights from the 18<sup>th</sup> to the 20<sup>th</sup> August 2008. A total of three sets of Dutch fyke nets, 12 benthic monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m, 2 @ 6-11.9m and 2 @ 12-19.9m) and two surface floating monofilament multi-mesh (12 panel, 5-55mm mesh size) survey gillnets were deployed randomly in the lake (17 sites). Survey locations were randomly selected using a grid placed over a map of the lake. 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 were measured and weighed on site and scales were removed from brown trout. 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 returned to the laboratory for further analysis.

### 1.3 Results

#### 1.3.1 Species Richness

A total of three fish species were recorded in Lough Acoose in August 2008. A list of the species encountered and numbers captured by each gear type is compiled in Table 1.1. A total of 242 fish were captured during the survey. Brown trout, followed by char were the most common fish species encountered in the benthic gill nets. Eels were captured solely in the fyke nets.

**Table 1.1. List of fish species recorded (including numbers captured) during the survey on Lough Acoose, August 2008**

Scientific name	Common name	Number of fish captured			Total
		Benthic mono multimesh gill nets	Surface mono multimesh gill nets	Dutch fykes	
<i>Salmo trutta</i>	Brown trout	153	31	3	187
<i>Salvelinus alpinus</i>	Arctic Char	27	7	0	34
<i>Anguilla anguilla</i>	Eel	0	0	21	21

#### 1.3.2 Fish abundance

Fish abundance was calculated as the mean number of fish caught per metre of net, i.e. mean CPUE. Fish biomass was calculated as the mean weight of fish caught per metre of net, i.e. mean BPUE. A summary of CPUE and BPUE data for each species and gear type is shown in Table 1.2.

**Table 1.2. Mean CPUE (mean number of fish per m of net) and mean BPUE (mean weight of fish per m of net) for all fish species recorded on Lough Acoose, August 2008**

Gear type	Brown trout	Char	Eel
<b>Mean CPUE (mean number of fish/m of net)</b>			
Gill nets (all)	0.438	0.081	-
Fyke nets	0.017	-	0.117
<b>Mean BPUE (mean weight (g) of fish/m of net)</b>			
Gill nets (all)	38.257	3.481	-
Fyke nets	0.728	-	23.767

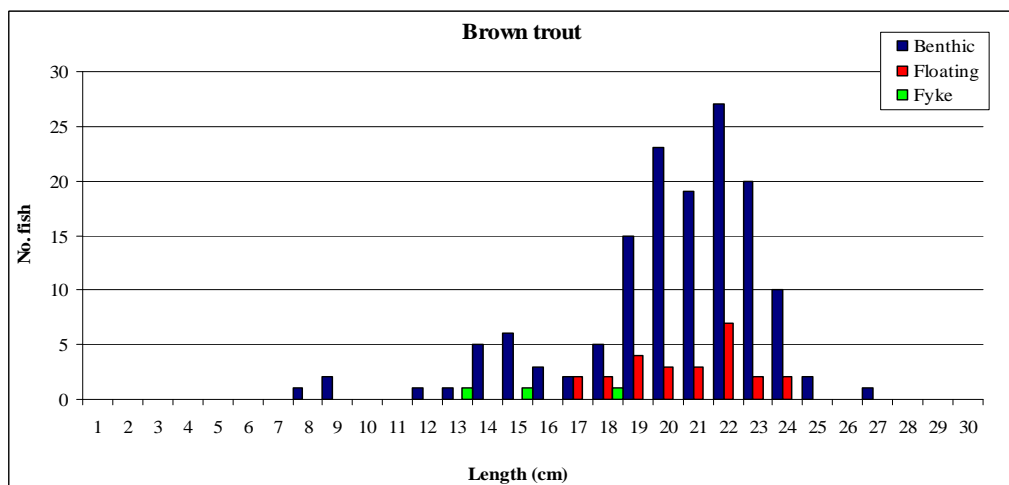
\* On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species



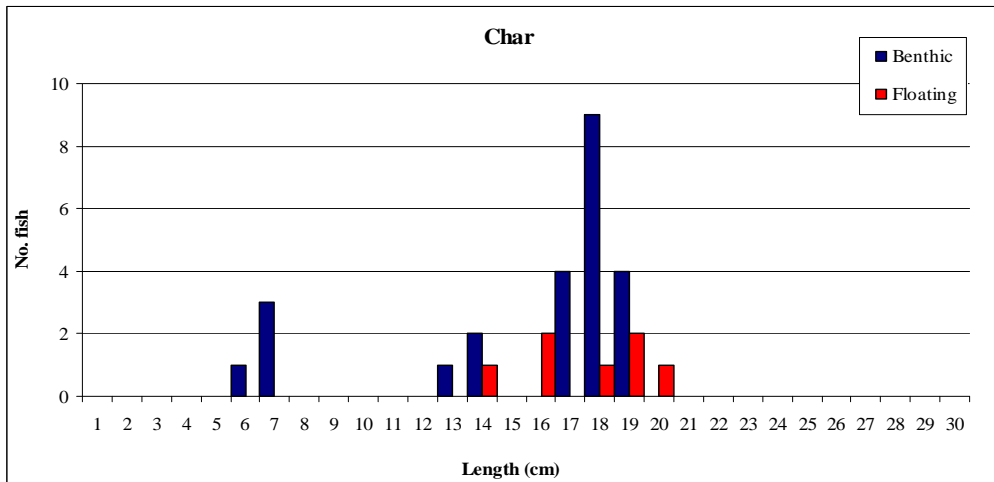
**Plate 1.2. Arctic char from Lough Acoose, August 2008**

1.3.3 Length frequency distributions

Brown trout ranged in length from 8.0cm to 26.2cm (mean = 19.9 cm) (Fig. 1.2). Arctic char ranged in length from 6.0cm to 19.2cm (mean = 15.7cm) (Fig. 1.3). Eels ranged in length from 37.0cm to 73.0cm.



**Fig. 1.2. Length frequency of brown trout captured on Lough Acoose, August 2008**



**Fig. 1.3. Length frequency of arctic char captured on Lough Acoose, August 2008**

#### 1.3.4 Fish age and growth

Brown trout ranged in age from 0+ to 3+. Length frequency and age analysis revealed that 2+ and 3+ were the dominant age groups in the population accounting for approximately 87% of the fish recorded. Mean brown trout L1 was 6.9cm (Table 1.3). Arctic char ranged in age from 0+ to 4+ and length frequency and age analysis showed that 3+ was the dominant age group in the population.

**Table 1.3. Mean (SD) brown trout length (cm) at age for L. Acoose, August 2008**

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>
Mean	6.9 (1.5)	16.3 (1.8)	20.3 (1.0)
N	54	45	8
Range	4.2-11.3	12.2-19.8	18.9-21.8

#### 1.4 Summary

Brown trout was the dominant fish species in Lough Acoose followed by Arctic char and eels. The mean CPUE for brown trout in the lake was high when compared with other low alkalinity lakes surveyed during 2008, e.g. Upper Lake, Killarney and Lough Caragh, Co. Kerry (Kelly *et al.*, 2009). Lough Acoose had the highest mean CPUE for Arctic char from all the lakes surveyed in 2008. The mean arctic char CPUE was over seven times greater than that of Lough Caragh, which is also a low alkalinity lake in the same catchment. Mean CPUE for eels in Lough Acoose was comparable to other low alkalinity lakes surveyed (Kelly *et al.*, 2009).

The brown trout from Lough Acoose had a fast growth rate when compared to other low alkalinity lakes surveyed during 2008, e.g. Lough Brin, Co. Kerry and Lough Barra, Co. Donegal (Kelly *et al.*, 2009). Brown trout growth was relatively fast between L1 and L2 however there was a slow down between L2 and L3, perhaps due to a slow down in somatic growth after an individual reaches sexual

maturity. Approximately 55% of the 1+ brown trout were maturing males with the remainder immature, while 97% of the 2+ brown trout were mature males and females.

The fish population in Lough Acoose should be closely monitored particularly as it contains a population of arctic char, a salmonid species that is listed in the Irish Red Data Book (Whilde, 1983) as vulnerable, and is very sensitive to anthropogenic impacts. The presence of coniferous forestry on the steep sided mountain above the lake is one of the main causes for concern both in terms of nutrient input and acidification of the water body.

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 new WFD multimetric fish classification tool has been developed for the island of Ireland (Ecoregion 1) using Agri-Food and Biosciences Institute Northern Ireland (AFBINI) and CFB data (Kelly *et al.*, 2008). Using this tool and expert opinion Lough Acoose has been assigned a draft classification of good status for the fish population. The EPA has assigned an overall status of high to Lough Acoose in an interim draft classification. This is based on physico-chemical parameters and biotic elements such as macroinvertebrates and macrophytes.



## **1.5 References**

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**The Central Fisheries Board  
Swords Business Campus,  
Swords,  
Co. Dublin,  
Ireland.**

**Web: [www.wfdfish.ie](http://www.wfdfish.ie)  
[www.cfb.ie](http://www.cfb.ie)  
Email: [info@cfb.ie](mailto:info@cfb.ie)  
Tel: +353 1 8842600  
Fax: +353 1 8360060**



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