



Sampling Fish for the Water Framework Directive

Lakes 2013

Lough Bane



Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Lough Bane, July 2013

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1.1 Introduction

Lough Bane is situated on the Meath-Westmeath border within the Boyne catchment, approximately 10km south of Oldcastle (Plate 1.1 and Fig. 1.1). It has a surface area of 75ha, a mean depth of >4m and a maximum depth of 16m. The lake is categorised as typology class 12 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. deep (>4m), greater than 50ha and high alkalinity (>100mg/l CaCO₃). Lough Bane is a public water supply for the north Meath area.

Lough Bane historically held a stock of wild brown trout; however it is also stocked regularly by the Lough Bane Angling Association, who control fishing on the lake (O' Reilly, 2007). The angling association has been in existence for 24 years and has been stocking approximately 1,000 brown trout and 1,000 rainbow trout into the lake each year. In a survey carried out during 2007, brown trout were not captured in the lake (Kelly and Connor, 2007).

Lough Bane is one of three lakes, along with Lough Glass and Lough Glass North, to make up the Lough Bane and Lough Glass Special Area of Conservation (NPWS, 2000). The lakes are situated in a shallow valley that occurs at the headwaters of the River Deel, with the main outflow at the south-east end of Lough Bane. Lough Bane is a good example of a hard water marl lake, an important habitat listed on Annex I of the E.U. Habitats Directive (NPWS, 2000). The lake contains well developed stonewort communities, and at least four species of Charophyte. Mixed woodland composed of beech (*Fagus sylvatica*), oak (*Quercus* sp.), holly (*Ilex aquifolium*), Scots pine (*Pinus sylvestris*) and European larch (*Larix decidua*) occur along parts of the southern and northern shores of the lake. Lough Bane was once home to a population of white-clawed crayfish (*Austropotamobius pallipes*), a species listed on Annex II of the E.U. Habitats Directive (NPWS, 2007). However, in 1986 this species was declared extinct from the lake due to an infestation of the fungal plague, *Aphanomyces astaci* (NPWS, 2000). Crayfish have successfully been reintroduced to other lakes in the area and it is the intention of National Parks and Wildlife to reintroduce them to Lough Bane. Bird species found at the lake include the little grebe, cormorant, lapwing, curlew and snipe (NPWS, 2000).

Lough Bane was previously surveyed in 2007 and 2010 as part of the Water Framework Directive 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 in the lake. Brown trout (stocked), rainbow trout (stocked), nine-spined stickleback, pike and eels were also captured during the survey.



Plate 1.1. Lough Bane

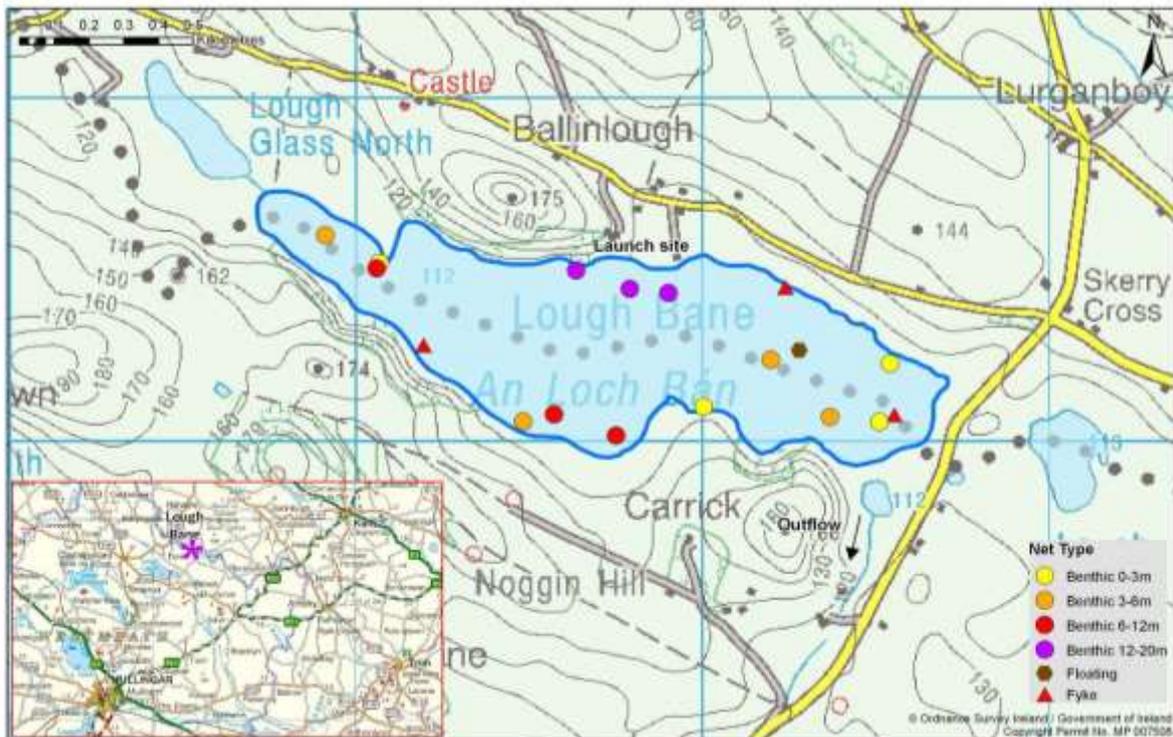


Fig. 1.1. Location map of Lough Bane and depths of each net (outflow is indicated on map)

1.2 Methods

Lough Bane was surveyed over two nights from the 2nd to 4th of July 2013. A total of three sets of Dutch fyke nets, 14 benthic monofilament multi-mesh CEN standard survey gill nets (4 @ 0-2.9m, 4 @ 3-5.9m, 3 @ 6-11.9m and 3 @ 12-19.9m) and one floating monofilament multi-mesh (12 panel, 5-55mm mesh size) CEN standard survey gill net were deployed in the lake (18 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 brown trout and rainbow 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 retained for further analysis.

1.3 Results

1.3.1 Species Richness

A total of four fish species were recorded on Lough Bane in July 2013, with 191 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. A single wild brown trout was recorded during the 2013 survey. During the previous surveys in 2010 and 2007 a similar species composition was recorded, with the exception of pike and nine-spined stickleback which were recorded in 2010 but were not captured in 2013. No brown trout were recorded in the 2007 survey, stocked brown trout were recorded in 2010 and both wild and stocked brown trout were recorded in the 2013 survey.

Table 1.1. Number of each fish species captured by each gear type during the survey in Lough Bane, July 2013

| Scientific name | Common name | Number of fish captured | | | Total |
|----------------------------|-------------------------|----------------------------------|----------------------------------|-----------|-------|
| | | Benthic mono multimesh gill nets | Surface mono multimesh gill nets | Fyke nets | |
| <i>Perca fluviatilis</i> | Perch | 173 | 0 | 6 | 179 |
| <i>Salmo trutta</i> | Brown trout (stocked) | 5 | 0 | 0 | 5 |
| <i>Salmo trutta</i> | Brown trout (wild) | 1 | 0 | 0 | 1 |
| <i>Oncorhynchus mykiss</i> | Rainbow trout (stocked) | 1 | 0 | 0 | 1 |
| <i>Anguilla anguilla</i> | European eel | 0 | 0 | 5 | 5 |

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

Although the mean perch CPUE was lower in 2013 and 2007 than in 2010 and the mean perch BPUE was higher in 2013 than the other two sampling years, 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 in Lough Bane, 2007, 2010 and 2013

| Scientific name | Common name | 2007 | 2010 | 2013 |
|----------------------------|-------------------------|----------------|-----------------|-----------------|
| Mean CPUE | | | | |
| <i>Perca fluviatilis</i> | Perch | 0.154 (0.055) | 0.657 (0.249) | 0.326 (0.119) |
| <i>Salmo trutta</i> | Brown trout (stocked) | - | 0.009 (0.005) | 0.009 (0.005) |
| <i>Salmo trutta</i> | Brown trout | - | - | 0.002 (0.002) |
| <i>Oncorhynchus mykiss</i> | Rainbow trout (stocked) | 0.003 (0.002) | 0.015 (0.008) | 0.002 (0.002) |
| <i>Esox lucius</i> | Pike | 0.005 (0.003) | 0.008 (0.003) | - |
| <i>Pungitius pungitius</i> | Nine-spined stickleback | 0.041 (0.029) | 0.007 (0.004) | - |
| <i>Anguilla anguilla</i> | European eel* | 0.011 (0.006) | 0.033 (0.026) | 0.033 (0.025) |
| Mean BPUE | | | | |
| <i>Perca fluviatilis</i> | Perch | 17.725 (8.923) | 17.995 (8.676) | 28.952 (11.990) |
| <i>Salmo trutta</i> | Brown trout (stocked) | - | 10.481 (5.972) | 8.465 (3.841) |
| <i>Salmo trutta</i> | Brown trout | - | - | 0.702 (0.702) |
| <i>Oncorhynchus mykiss</i> | Rainbow trout (stocked) | 3.379 (2.405) | 9.620 (5.126) | 0.626 (0.626) |
| <i>Esox lucius</i> | Pike | 0.144 (0.079) | 4.137 (2.779) | - |
| <i>Pungitius pungitius</i> | Nine-spined stickleback | 0.135 (0.091) | 0.007 (0.004) | - |
| <i>Anguilla anguilla</i> | European eel* | 1.252 (0.875) | 25.777 (20.137) | 14.533 (11.670) |

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

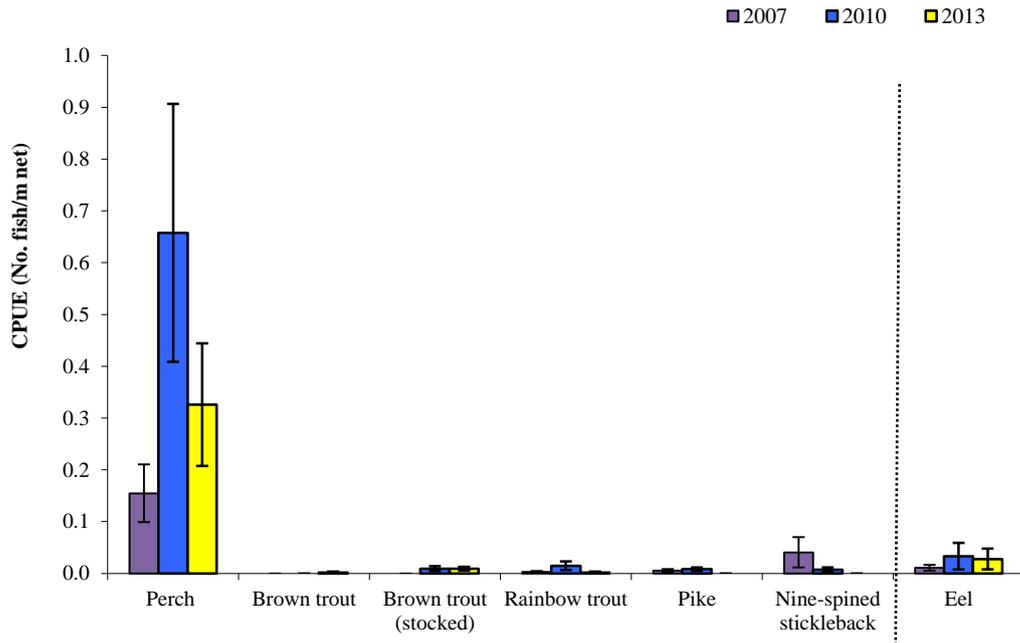


Fig. 1.2. Mean (\pm S.E.) CPUE for all fish species captured in Lough Bane (Eel CPUE based on fyke nets only), 2007, 2010 and 2013

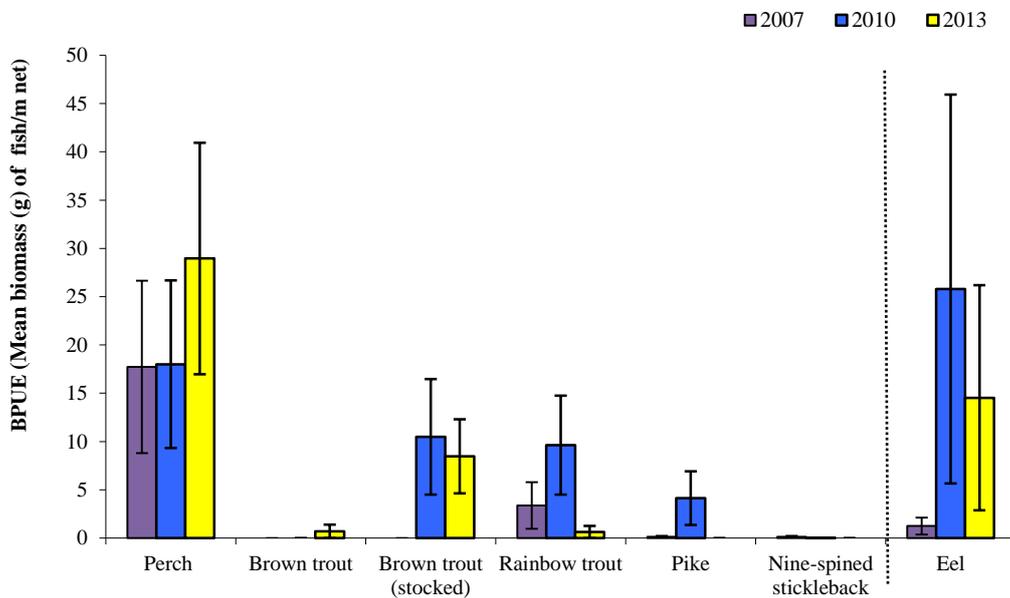


Fig. 1.3. Mean (\pm S.E.) BPUE for all fish species captured in Lough Bane (Eel BPUE based on fyke nets only), 2007, 2010 and 2013

1.3.3 Length frequency distributions and growth

Perch captured during the 2013 survey ranged in length from 6.0cm to 35.5cm (mean = 14.1cm) (Fig. 1.4) with eight age classes present, ranging from 1+ to 8+, with a mean L1 of 5.8cm (Table 1.3). The dominant age class was 1+ (Fig. 1.4). Perch captured during the 2010 survey had a similar length and age range apart from a large number of fish in the 3-4cm range (Fig. 1.4). Perch captured during the 2007 survey ranged in length from 8.6cm to 33.2cm and ranged in age from 1+ to 4+ (Fig. 1.4). The dominant age class in 2010 was 0+, corresponding to the 3cm to 4cm length class, whereas the dominant age class in 2007 was 1+.

Brown trout (stocked) captured during the 2013 survey ranged in length from 31.9 to 52.9 (mean = 42.0cm) (ranged in age from 2+ to 5+) and one wild brown trout was measured at 32.8cm (aged at 2+) (Fig.1.5). Brown trout (stocked) captured during the 2010 survey ranged in length from 37.2cm to 54.5cm (Fig.1.5). No brown trout were recorded in 2007.

Eels captured during the 2013 survey ranged in length from 54.5cm to 76.5cm. One rainbow trout measuring 31.5cm were also captured.

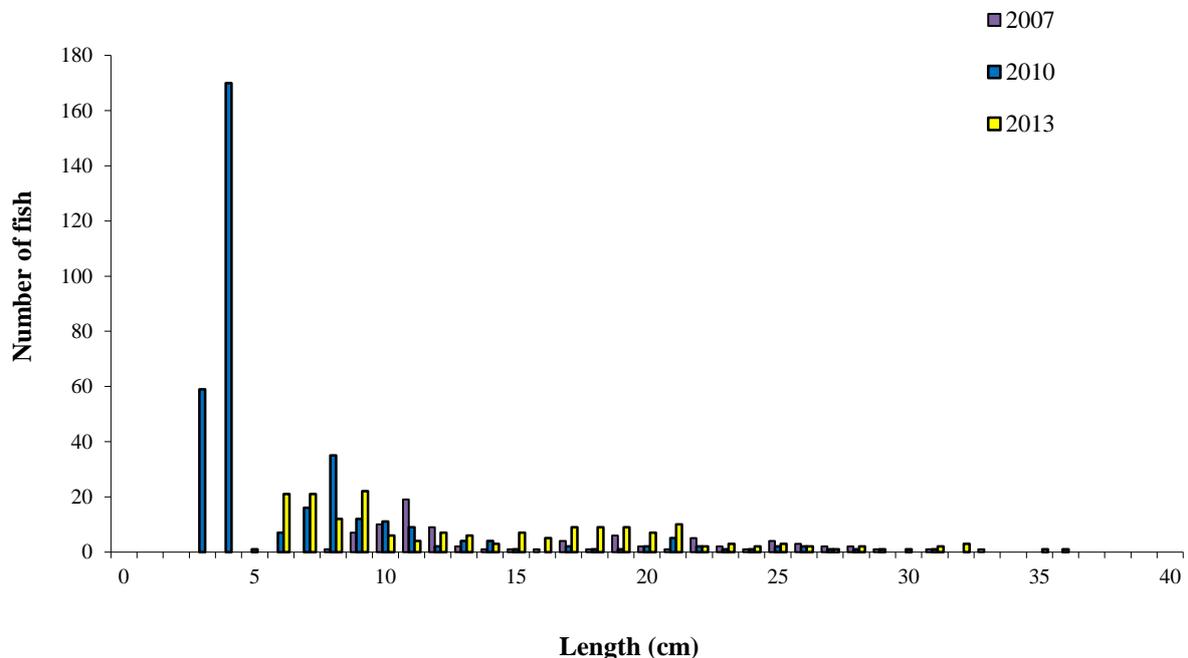


Fig. 1.4. Length frequency of perch captured in Lough Bane, 2007, 2010 and 2013

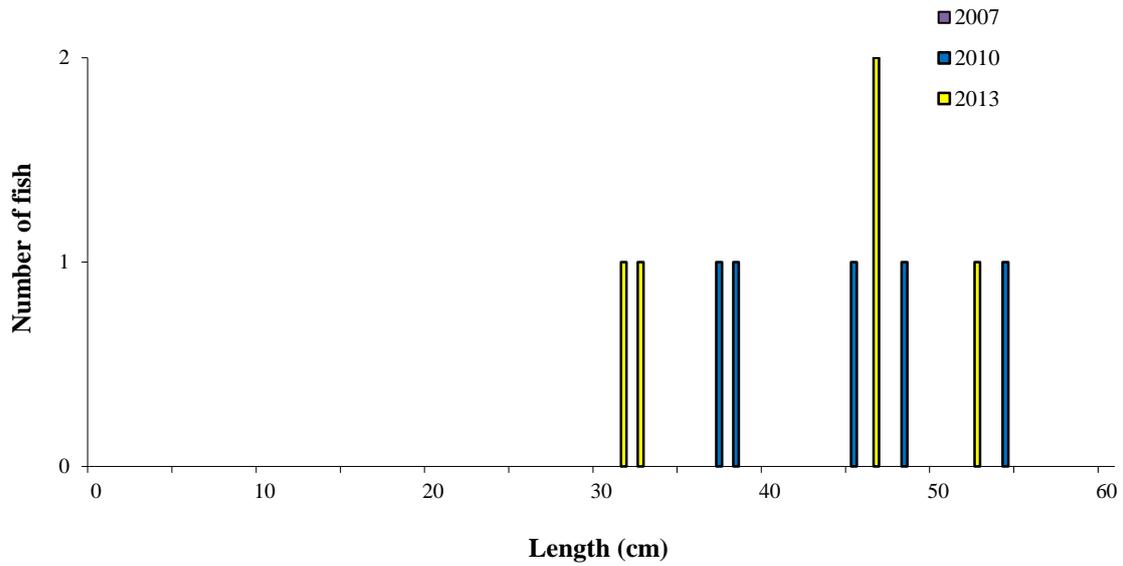


Fig. 1.5. Length frequency of brown trout (stocked) captured in Lough Bane, 2007, 2010 and 2013

Table 1.3. Mean (\pm SE) perch length (cm) at age for Lough Bane, July 2013

| | L₁ | L₂ | L₃ | L₄ | L₅ | L₆ | L₇ | L₈ |
|-------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Mean | 5.8 (0.1) | 11.0 (0.2) | 17.3 (0.4) | 23.0 (0.8) | 28.7 (0.6) | 30.8 (0.6) | 32.1 (0.8) | 31.9 (0.3) |
| N | 96 | 68 | 51 | 24 | 7 | 6 | 5 | 2 |
| Range | 4.1-8.7 | 8.2-18.7 | 10.9-22.9 | 15.0-27.3 | 26.5-31.0 | 29.3-33.6 | 30.9-34.9 | 31.6-32.1 |

1.4 Summary

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

Although the mean perch CPUE was lower in 2013 and 2007 than in 2010 and the mean perch BPUE was higher in 2013 than the other two sampling years, these differences were not statistically significant. The dominant age class of perch captured during 2013 was 1+, with ages ranging from 1+ to 8+ indicating reproductive success in eight of the previous nine years.

No brown trout were recorded in the 2007 survey, stocked brown trout were recorded in 2010 and both wild and stocked brown trout were recorded in the 2013 survey.

Lough Bane is stocked annually with brown trout and rainbow trout (a non-native species). These hatchery reared fish have been released into the lake to create an angling amenity in the area, as the native brown trout stock have declined in recent years and cannot support large fishing pressures. Only a small number of stocked rainbow trout and brown trout were captured during the present survey. These ranged in age from 2+ to 5+.

A summary of the effects of stocking on the lake and recommendations for the future can be found in the previous report (Kelly *et al.*, 2011).

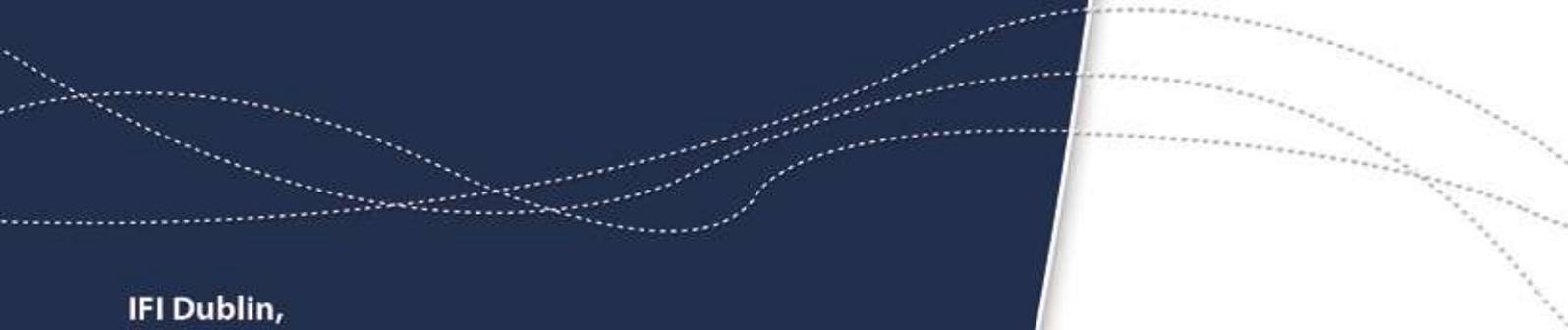
Classification and assigning lakes with an ecological status is a critical part of the WFD monitoring programme. It allows River Basin District managers to identify and prioritise lakes that currently fall short of the minimum “Good Ecological Status” that is required by 2015 if Ireland is not to incur 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 Bane has been assigned an ecological status of High based on the fish populations present in 2013. The ecological status assigned to the lake based on the 2010 survey data was Good and the ecological status was High in 2007.

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

1.5 References

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