National Research Survey Programme

Lakes 2015

Lough Nasnahida

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Inland Fisheries Ireland

National Research Survey Programme

**Fish Stock Survey of Lough Nasnahida,
July 2015**

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

1.1 Introduction

Lough Nasnahida is located in western Donegal, close to the village of Doochary and approximately 10km southeast of Dungloe (Plate 1.1, Fig. 1.1). It is a small oligotrophic lake on the Owenamarve system, situated at an altitude of 189m a.s.l., with an approximate area of 12.1ha and a maximum depth of 11m. It is located within the Cloghernagore Bog and Glenveagh National Park Special Area of Conservation (SAC). This is a particularly large SAC located in north-west Donegal containing many different habitats ranging from exposed rock and scree mountains to blanket bogs, lakes and rivers (NPWS, 2009).

The lake is not heavily fished and appears to be in a natural state with good spawning streams (Gerry McCafferty IFI, *pers. comm.*) The lake is categorised as typology class 1 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), less than 50ha and low alkalinity (<20 mg/l CaCO3).

This lake was surveyed as part of the Water Framework Directive surveillance monitoring programme and was previously surveyed in 2009 and 2012 (Kelly *et al*., 2010 and 2013). During both of these surveys, brown trout were found to be the dominant species present in the lake. Eels were also captured during both surveys.
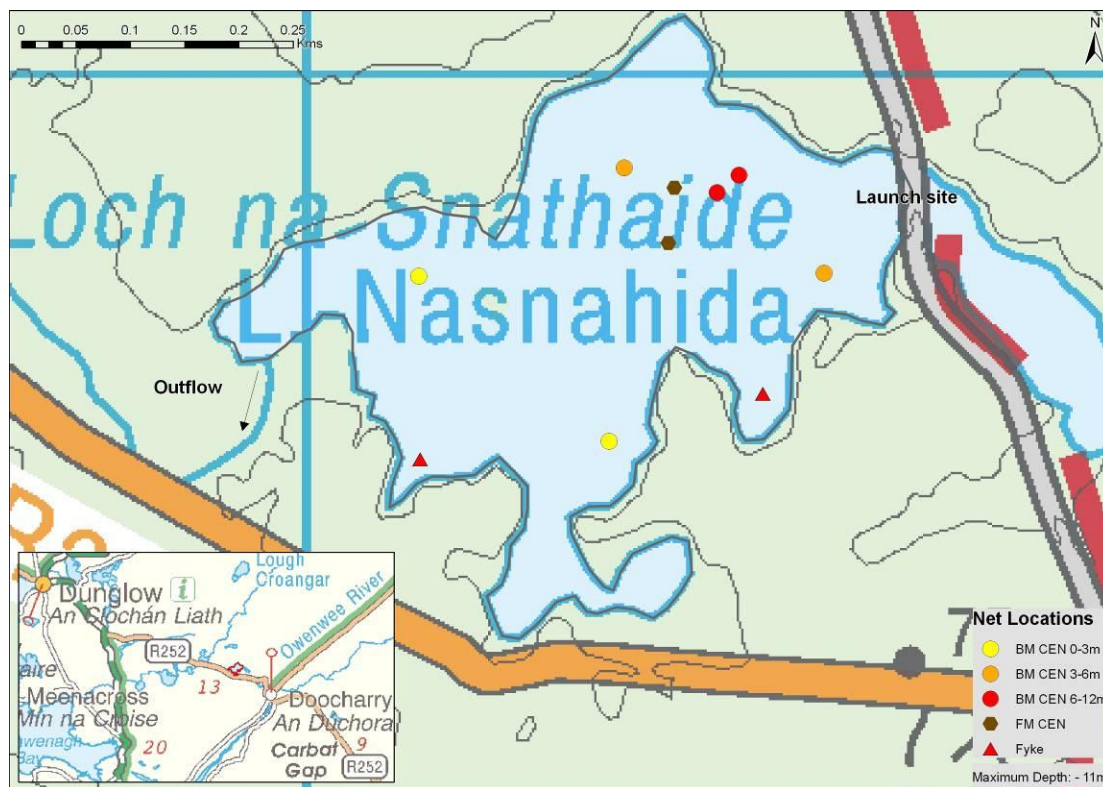

Plate 1.1. Lough Nasnahida

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

1.2 Methods

1.2.2 Netting methods

Lough Nasnahida was surveyed over one night on the 22nd July 2012. A total of two sets of Dutch fyke nets (fyke) and six benthic monofilament multi-mesh (BM CEN) (12 panel, 5-55mm mesh knot to knot) CEN standard survey gill nets (2 @ 0-2.9m, 2 @ 3-5.9m and 2 @ 6-11.9m) and two surface monofilament multi-mesh (FM CEN) (12 panel, 5-55mm mesh knot to knot) CEN standard survey gill nets were deployed randomly in the lake (10 sites). Nets were deployed in the same locations as were randomly selected in the previous surveys in 2009 and 2012. 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 all 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.

1.2.2 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 on the IFI NRSP team when moving between water bodies.

1.3 Results

1.3.1 Species Richness

Brown trout was the only fish species recorded during the survey on Lough Nasnahida in July 2015, with 79 fish being captured (Table 1.1). Eels were captured in the 2009 and 2012 surveys but were not recorded in the 2015 survey (Kelly *et al*., 2010 and 2013).

Table 1.1. Number of each fish species captured by each gear type during the survey on Lough Nasnahida, July 2015

Scientific name	Common name	Number of fish captured			
		BM CEN	**FM CEN**	**Fyke**	**Total**
Salmo trutta	Brown trout	64	8	7	79

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 2009, 2012 and 2015 surveys are summarised in Table 1.2. Mean CPUE and BPUE for all species is illustrated in Figure 1.2 and 1.3.

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE). Although the mean brown trout CPUE and BPUE fluctuated slightly over the three sampling occasions, 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 Nasnahida, 2009, 2012 and 2015

Scientific name	Common name	2009	2012	2015
		Mean CPUE		
Salmo trutta	Brown trout	0.268 (0.080)	0.347 (0.112)	0.252 (0.065)
Anguilla anguilla	European eel*	0.017 (0.017)	0.041 (0.041)	-
		Mean BPUE		
Salmo trutta	Brown trout	15.121 (4.465)	24.265 (7.659)	16.713 (4.249)
Anguilla anguilla	European eel*	3.900 (3.900)	5.801 (5.801)	-

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.
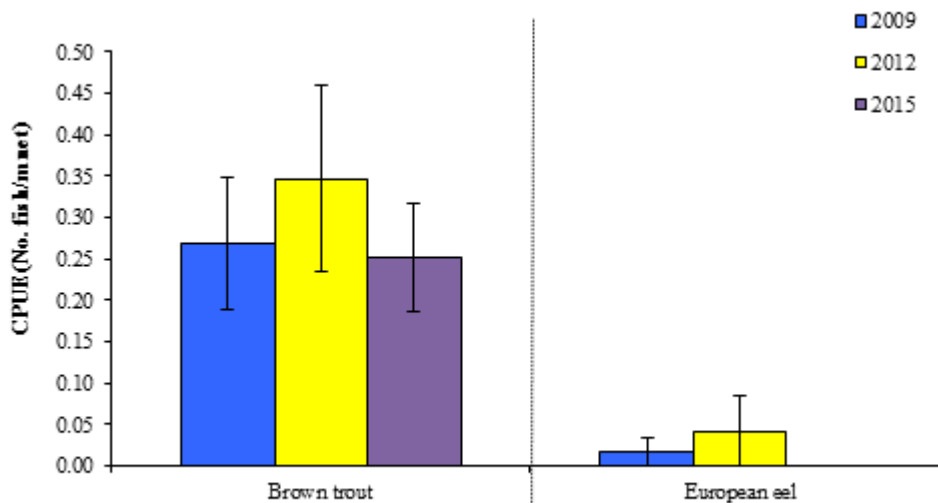
*Eel CPUE and BPUE based on fyke nets only

Fig. 1.2. Mean (±S.E.) CPUE for all fish species captured in Lough Nasnahida (Eel CPUE based on fyke nets only), 2009, 2012 and 2015
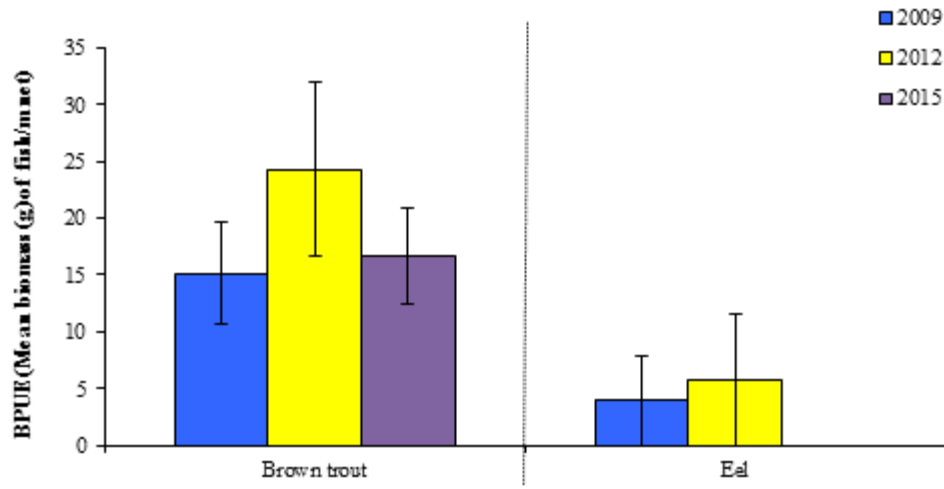
Fig. 1.3. Mean (±S.E.) BPUE for all fish species captured in Lough Nasnahida (Eel BPUE based on fyke nets only), 2009, 2012 and 2015

1.3.3 Length frequency distributions and growth

Brown trout captured during the 2015 survey ranged in length from 11.5cm to 25.2cm (mean = 17.7cm) (Fig. 1.5). Four age classes were present, ranging from 1+ to 4+, with a mean L1 of 6.0cm (Table 1.3). The dominant age class was 3+ (Fig. 1.5). Mean brown trout L4 in 2015 was 18.3cm 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 2009 and 2012 surveys had similar length and age ranges, with some smaller fish (0+) recorded in the 2012 survey (Fig.1.4).
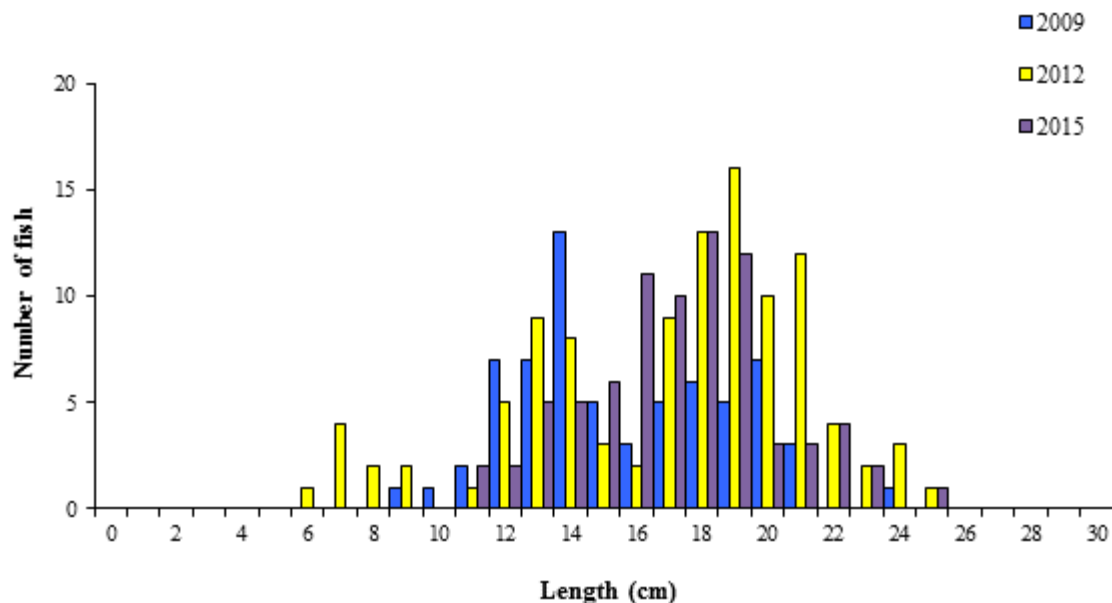
Fig. 1.5. Length frequency of brown trout captured on Lough Nasnahida, 2015

Table 1.3. Mean (±S.E.) brown trout length (cm) at age for Lough Nasnahida, July 2015

	L_1	L_2	L_3	L_4	Growth Category
Mean (± S.E.)	6.0 (0.3)	11.5 (0.4)	14.7 (0.4)	18.3 (0.7)	Very slow
N	46	44	28	7	
Range	3.4-10.0	4.7-17.7	11.1-19.9	15.3-20.6	

1.3.4 Stomach and diet analysis

Feeding 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. 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).

The food items recorded in a subsample of trout captured during the survey were dominated by chironomids and cased caddis (Fig 1.6).
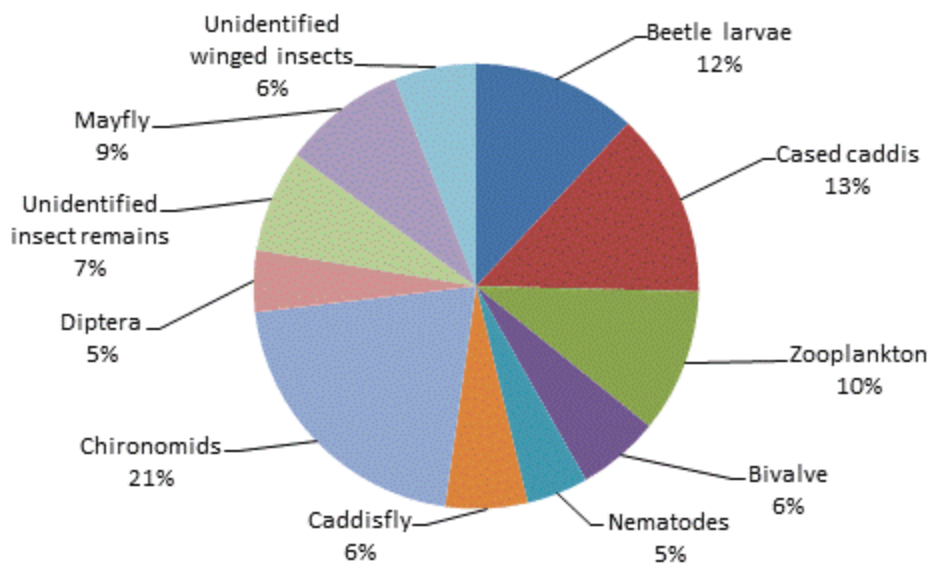
Fig. 1.8. Diet of brown trout captured on Lough Nasnahida 2015 (% occurrence) n=41

1.4 Summary and ecological status

Brown trout was the dominant species in terms of abundance (CPUE) and biomass (BPUE) captured in the survey gill nets during the 2015 survey.

The mean brown trout CPUE and BPUE fluctuated slightly over the three sampling years; however, these differences were not statistically significant. Brown trout ranged in age from 1+ to 4+, indicating reproductive success in four of the previous five years. The dominant age class was 3+. 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).

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
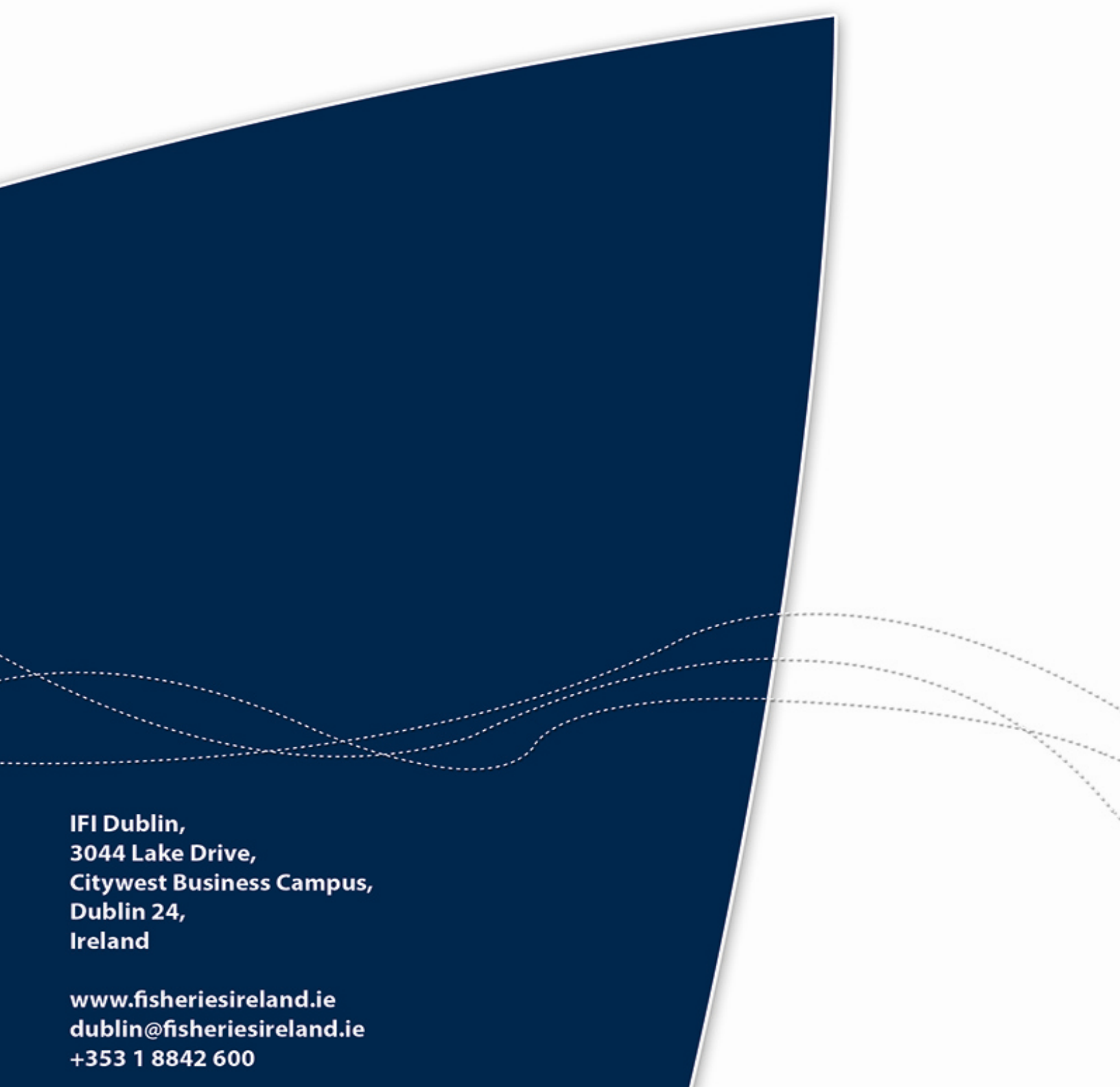
for each lake and associated confidence in classification (Kelly *et al*., 2012b). Using the FIL2 classification tool, Lough Nasnahida has been assigned an ecological status of Good for 2009, 2012 and 2015 based on the fish populations present.

In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Lough Nasnahida an overall draft ecological status of Good, based on all monitored physico-chemical and biological elements, including fish. This status classification will be revised during 2016.

1.5 References

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