

# National Research Survey Programme

*Lakes 2015*

## Dunglow Lough





Inland Fisheries Ireland

National Research Survey Programme

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

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

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## 1.1 Introduction

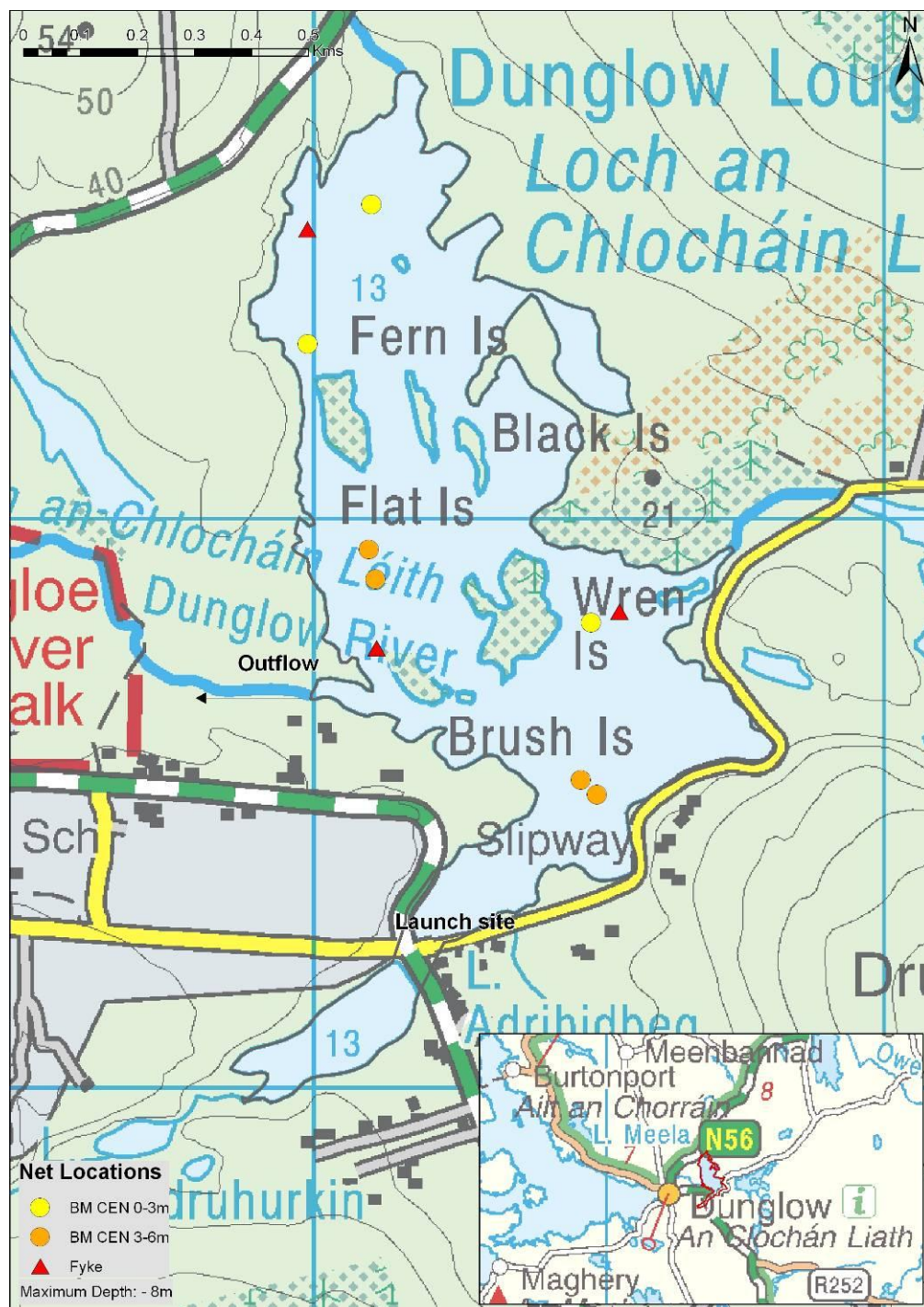
Dunglow Lough is located in the Rosses fishery, 1.3km from Dunglow town, Co. Donegal (Plate 1.1, Fig. 1.1). The Rosses fishery is composed of six salmon/sea trout/brown trout systems with isolated loughs interspersed throughout the fishery. Dunglow Lough is the furthest downstream of the lakes in the system. The lake is situated at an altitude of 17m a.s.l. It has a surface area of 61ha, a mean depth of 1.3m and a maximum depth of 7.5m. The lake is categorised as typology class 2 (as designated by the EPA for the purposes of the Water Framework Directive), i.e. shallow (<4m), greater than 50ha and low alkalinity (<20mg/l CaCO<sub>3</sub>). The lake has been classed as 2b (i.e. expected to meet good status by 2015) in the WFD characterization report (EPA, 2005). The geology of the area is predominantly granite, felsite and other intrusive rocks rich in silica.

The lake holds a good stock of small, wild brown trout which has historically been augmented by regularly stocking larger brown trout into the lake. There was also additional stocking of rainbow trout up to 680g in previous years (Cooke *et al.*, 1997). In an effort to regenerate the sea trout population, the Rosses Anglers Association discontinued their stocking policy in 2006 (Gerry McCafferty IFI, *pers. comm.*). The sea trout run into the lake starts in July (O' Reilly, 2007). Dunglow Lough was previously surveyed in 1996 (Cooke *et al.*, 1997). This lake was surveyed as part of the Water Framework Directive and was also surveyed in 2006 as part of the NSSHARE Fish in Lakes Project (Kelly *et al.*, 2007) and in 2009 and 2012 as part of the Water Framework Directive surveillance monitoring programme (Kelly *et al.*, 2010 and 2013). In all three years brown trout was found to be the dominant species, followed by eel and sea trout.



**Plate 1.1. Dunglow Lough**





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



## **1.2 Methods**

### ***1.2.2 Netting methods***

Dunglow Lough was surveyed over one night on the 22<sup>nd</sup> of July 2015. A total of three sets of Dutch fyke nets (fyke) and seven benthic monofilament multi-mesh (BM CEN) (12 panel, 5-55mm mesh knot to knot) CEN standard survey gill nets (3 @ 0-2.9m and 4 @ 3-5.9m) were deployed in the lake (10 sites). Nets were deployed in the same locations as were randomly selected in the previous surveys in 2006, 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 and sea 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

A total of two fish species (sea trout are included as a separate ‘variety’ of trout) were recorded in Dunglow Lough in July 2015, with 97 fish being captured. The number of each species captured by each gear type is shown in Table 1.1. Brown trout was the most abundant fish species recorded, followed by eels and sea trout. During the previous surveys in 2009 and 2012 the same species composition was recorded with the exception of salmon, which were only present during the 2012 survey (Kelly *et al.*, 2010 and 2013).

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

Scientific name	Common name	Number of fish captured		
		BM CEN	Fyke	Total
<i>Salmo trutta</i>	Brown trout	68	8	76
	Sea trout	3	0	3
<i>Anguilla anguilla</i>	European eel	4	14	18

### 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 increased slightly over the three sampling occasions, these differences were not statistically significant (Table 1.2; Fig 1.2 and 1.3).

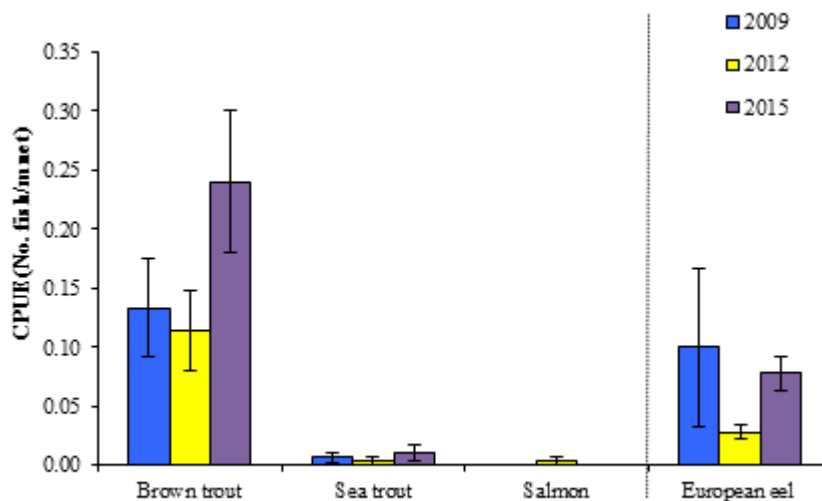


**Table 1.2. Mean (S.E.) CPUE and BPUE for all fish species captured on Dunglow Lough, 2009, 2012 and 2015**

Scientific name	Common name	2009	2012	2015
<b>Mean CPUE</b>				
<i>Salmo trutta</i>	Brown trout	0.133 (0.041)	0.113 (0.034)	0.240 (0.060)
	Sea trout	0.006 (0.004)	0.003 (0.003)	0.010 (0.007)
<i>Salmo salar</i>	Salmon	-	0.003 (0.003)	-
<i>Anguilla anguilla</i>	European eel	0.1 (0.067)	0.027 (0.005)	0.078 (0.015)
<b>Mean BPUE</b>				
<i>Salmo trutta</i>	Brown trout	4.758 (1.637)	7.311 (2.367)	12.981 (3.087)
	Sea trout	2.240 (1.509)	0.940 (0.940)	5.900 (2.307)
<i>Salmo salar</i>	Salmon	-	0.073 (0.073)	-
<i>Anguilla anguilla</i>	European eel	11.633 (7.619)	4.583 (1.534)	18.322 (4.990)

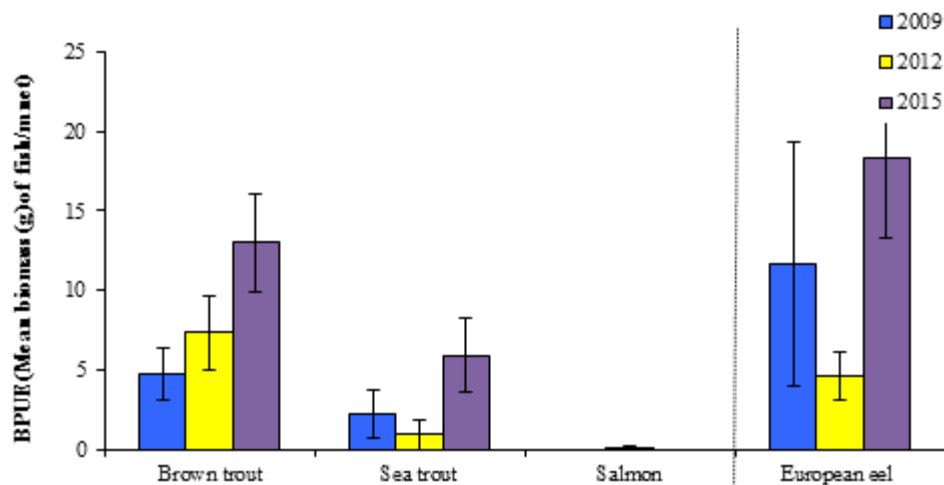
Note: On the rare occasion where biomass data was unavailable for an individual fish, this was determined from a length/weight regression for that species.

\*Eel CPUE and BPUE based on fyke nets only



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



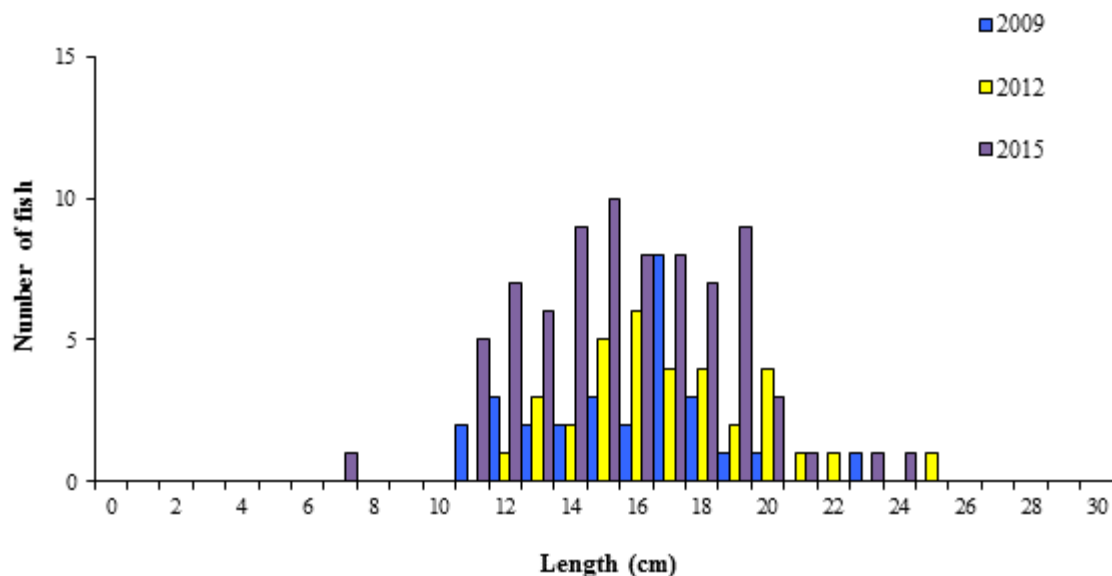


**Fig. 1.3. Mean ( $\pm$ S.E.) BPUE for all fish species captured in Dunglow Lough (Eel BPUE based on fyke nets only), 2009, 2012 and 2015**

### ***1.3.3 Length frequency distributions and growth***

Brown trout captured during the 2015 survey ranged in length from 7.2cm to 24.4cm (mean = 16.0cm) (Fig. 1.4). Four age classes were present, ranging from 1+ to 4+, with a mean L1 of 5.4cm (Table 1.3). The dominant age class was 3+ (Fig. 1.4). Mean brown trout L4 in 2015 was 23.3cm 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 to the 2015 survey, with 2009 exhibiting the smallest age class range (Fig.1.4).

Eels captured during the 2015 survey ranged in length from 29.0cm to 78.0cm. Three sea trout captured were aged 2.0+ to 2.1+ and ranged in length from 26.4cm to 37.5cm.



**Fig. 1.4. Length frequency of brown trout captured on Dunglow Lough, 2015**

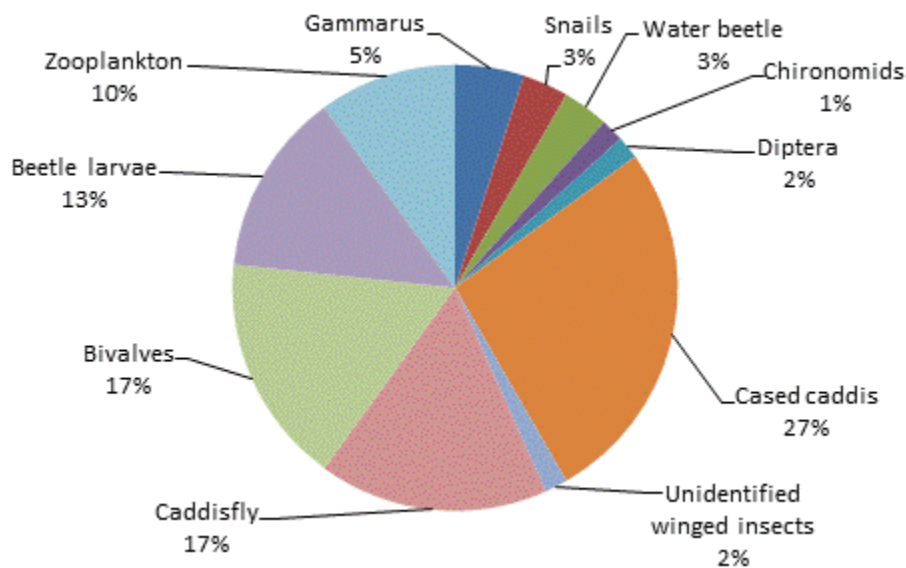
**Table 1.3. Mean ( $\pm$ S.E.) brown trout length (cm) at age for Dunglow Lough, July 2015**

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	Growth Category
Mean ( $\pm$ S.E.)	5.4	10.8	16.2	23.3	Very slow
N	31	28	16	1	
Range	4.7-6.5	8.8-12.5	14.1-19.2	23.3-23.3	

#### ***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 caddis, bivalves and beetle larvae (Fig 1.5).



**Fig 1.5. Diet of brown trout captured on Dunglow Lough 2015 (% occurrence) n=33**

#### 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 increased slightly over the three sampling occasions; 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, Dunglow Lough has been assigned an ecological status of High for 2006, 2009, 2012 and 2015 based on the fish populations present.


In the 2010 to 2012 surveillance monitoring reporting period, the EPA assigned Dunglow Lough 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

- Caffrey, J. (2010) *IFI Biosecurity Protocol for Field Survey Work*. Inland Fisheries Ireland.
- Cooke, D.J., Mathews, M.A. and Whelan, K.F. (1997) *A survey of the Trout and Eel Populations in the Rosses Fishery, Dunglow, Co. Donegal*. The Salmon Research Trust of Ireland, Newport, Co. Mayo.
- EPA (2005) *The Characterisation and Analysis of Ireland's River Basin Districts in accordance with section 7 (2&3) of the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003)*. National Summary Report (Ireland). 166pp.
- Kelly, F.L., Connor, L., and Champ, W.S.T. (2007) *A Survey of the Fish Populations in 46 lakes in the Northern Regional Fisheries Board, June to September 2005 and 2006*. Central Fisheries Board, unpublished report.
- Kelly, F.L., Harrison, A., Connor, L., Allen, M., Rosell, R. and Champ, T. (2008) *FISH IN LAKES Task 6.9: Classification tool for Fish in Lakes. FINAL REPORT*. Central Fisheries Board, NS Share project.
- Kelly, F., Harrison A., Connor, L., Matson, R., Morrissey, E., O'Callaghan, R., Wogerbauer, C., Feeney, R., Hanna, G. and Rocks, K. (2010) *Sampling Fish for the Water Framework Directive – Summary Report 2009*. The Central and Regional Fisheries Boards.
- Kelly, F.L., Harrison, A.J., Allen, M., Connor, L. and Rosell, R. (2012) Development and application of an ecological classification tool for fish in lakes in Ireland. *Ecological Indicators*, **18**, 608-619.
- Kelly, F., Connor, L., Matson, R., Feeney, R., Morrissey, E., Wogerbauer, C. and Rocks, K. (2013) *Sampling Fish for the Water Framework Directive – Summary Report 2012*. Inland Fisheries Ireland.
- Kennedy, M. and Fitzmaurice, P. (1971) Growth and Food of Brown Trout *Salmo Trutta* (L.) in Irish Waters. *Proceedings of the Royal Irish Academy*, **71 (B) (18)**, 269-352.
- O' Grady, M.F. (1981). A study of brown trout (*Salmo trutta* L.) populations in selected Irish lakes. Ph.D. Thesis, National University of Ireland.
- O' Reilly, P. (2007) *Loughs of Ireland - A Flyfisher's Guide*. 4<sup>th</sup> Edition. Merlin Unwin Books.



A large, dark blue geometric shape, resembling a stylized wave or a folded piece of paper, occupies the lower half of the page. It has a white dashed line running along its bottom edge, which curves and undulates. The shape is set against a white background.

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