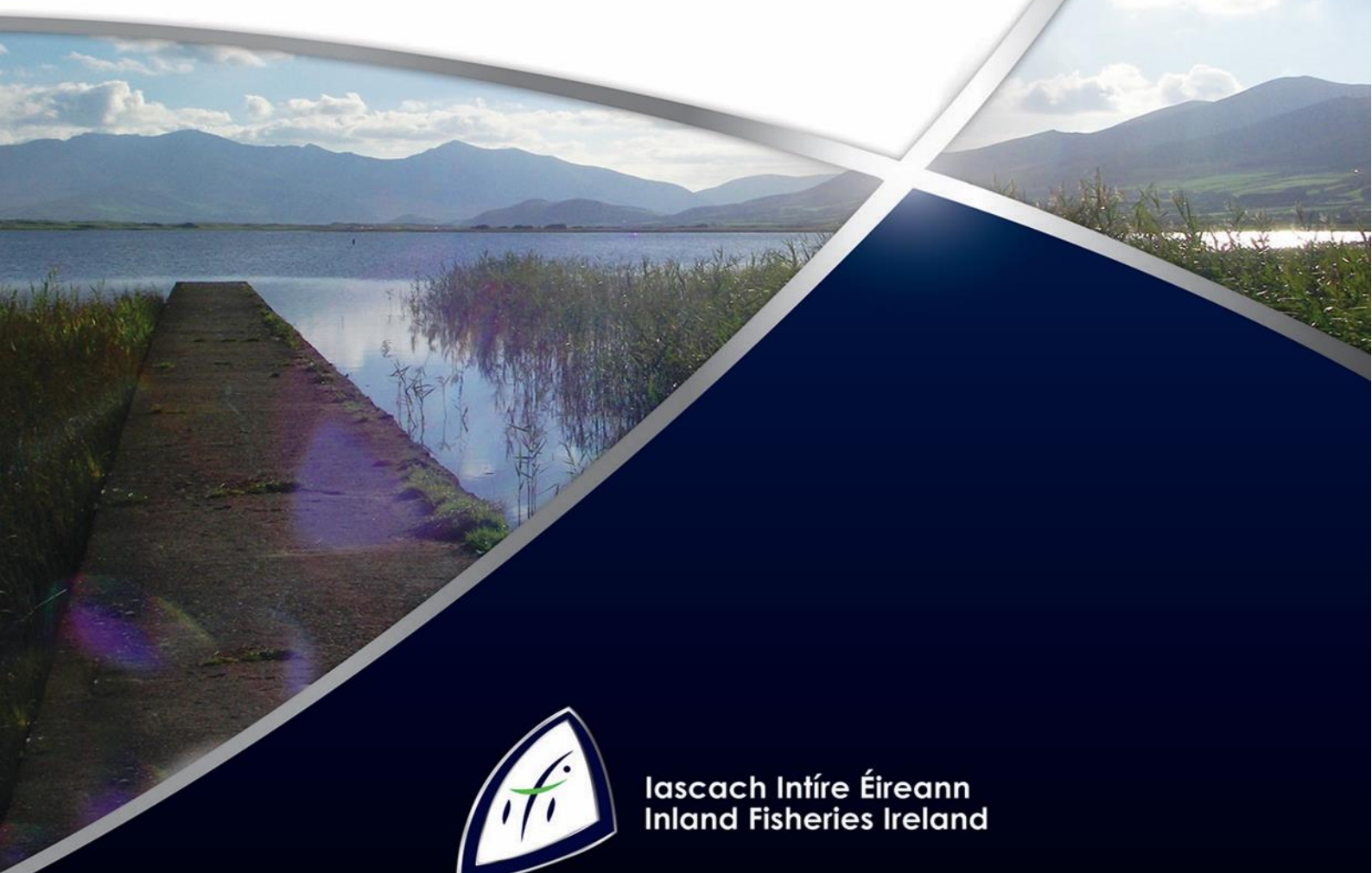


# **Fish Stock Survey of Transitional Waters in the Shannon River Basin District 2016 – Lough Gill**

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**Iascach Intíre Éireann  
Inland Fisheries Ireland**

Inland Fisheries Ireland

National Research Survey Programme

## **Fish Stock Survey of Transitional Waters in the Shannon River Basin District 2016 – Lough Gill**

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## **1. Introduction**

A fish stock survey was conducted on Lough Gill (Fig. 1.1) in the Shannon River Basin District (ShRBD) as part of the programme of fish monitoring for the Water Framework Directive (WFD), between the 26<sup>th</sup> and 28<sup>th</sup> of September 2016 by staff from Inland Fisheries Ireland.

The main objectives of the current survey are:

- To measure the ecological status of fish populations in the estuary complex as per the requirements of the European Water Framework Directive (WFD; 2000/60/EC).
- To inform on the role of this waterbody in relation to important marine recreational fish species.
- To provide scientific advice to support any potential fish conservation measures within the estuary.

According to the WFD, ecological status of waterbodies must be assessed by both a number of physical and chemical characteristics and a range of biological indicators. Fish populations are one of the key biological indicators of ecological status in transitional waters. Essentially they are assessed by comparing data collected from monitoring against reference (natural) conditions. This information will assist in identifying the objectives that must be set in the individual River Basin Management Plans. The Estuarine Multimetric Fish Index (EMFI) (Harrison and Kelly, 2013) has been developed for the island of Ireland (Ecoregion 1) using IFI and Northern Ireland Environment Agency (NIEA) data to assess fish populations in transitional waters. This is a multi-metric tool based on similar tools developed in South Africa and the UK (Harrison and Whitfield, 2004; Coates et al., 2007).

### ***Site characteristics***

Lough Gill covers an area of 1.4km<sup>2</sup> and is situated on Ireland's south-west coast, approximately 1km north-west of Castlegregory village, Co. Kerry (Fig. 1.2). The lough is classified as a large, natural sedimentary lagoon that drains into Tralee Bay through a

modified outlet and sluice gate (NPWS, 2004). Lough Gill is relatively shallow (<0.5m) and has a predominately firm sand substrate. It receives the waters of the Killiney River and another unnamed stream that flows from Stradbally Mountain, located approximately 3km to the south.

Lough Gill is situated within the Tralee Bay and Magharees Peninsula, West to Cloghane SAC. This is a large SAC containing a number of important bird species, as well as coastal habitats, including lagoon and fixed dunes, both of which are listed in Annex I of the EU Habitats Directive (NPWS, 2003).



**Fig. 1.1:** Aerial photo of Lough Gill looking north towards Brandon Bay. (Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])



**Fig 1.2:** Location map of Lough Gill showing sampling sites.

## 2. Methods

Current work in the UK and ROI indicates the need for a multi-method (beach seine, fyke net and beam trawl) approach (Harrison and Kelly, 2013) to sample fish in estuaries and these procedures are now standard IFI methodology for fish stock surveys in transitional waters for the WFD monitoring programme.

Beach seining is conducted using a 30m x 3m net (10mm mesh size) to capture fish in littoral areas. The bottom of the net has a weighted lead line to increase sediment disturbance and catch efficiency. Fyke nets (15m in length with a 0.8m diameter front hoop, joined by an 8m leader with a 10mm square mesh) are used to sample benthic fish in the littoral areas. Beam trawls are used for sampling benthic fish in the littoral and open waters, where bed type is suitable. The beam trawl measures 1.5m x 0.5m, with a 10mm mesh bag, decreasing to 5mm mesh in the cod end. The trawl is attached to a 20m tow rope and towed by a boat. Trawls are conducted along transects of 100 – 200m in length.

Sample sites are selected to represent the range of geographical and habitat ranges within the water body, based on such factors as exposure/orientation, shoreline slope, and substrate type. A handheld GPS is used to mark the precise location of each site.

All nets are processed on-site by identifying the species present and counting the total numbers caught in each. Length measurements are recorded for each species using a representative sub-sample of 30 fish, while scales are only collected for certain species, such as salmon and sea trout. Unidentified specimens were retained for subsequent identification in the laboratory.

A total of four beach seines, six fyke nets and three beam trawls were deployed in Lough Gill in September 2016 (Fig 1.2).

Fish status was assessed using the estuarine multi-metric fish index (EMFI) (Harrison and Kelly, 2013) to derive ecological status. As the Lough Gill lagoon is subject to repeat surveys every three years as part of a surveillance monitoring programme, any change in fish population structure and its derived EQR (Ecological Quality Rating) over time will be evident.

### **3. Results**

A total of seven fish species were recorded in Lough Gill in September 2016. Table 3.1 shows a comparison between the current survey and the previous one in 2013. Sea trout and thick-lipped grey mullet were newly recorded in 2016, while sand smelt and Golden grey mullet were absent. Like 2013, three-spined stickleback was the most abundant species and dominated the catch. Although there was a slight reduction in brown trout numbers, the lough still holds a notable population (Fig. 3.1).

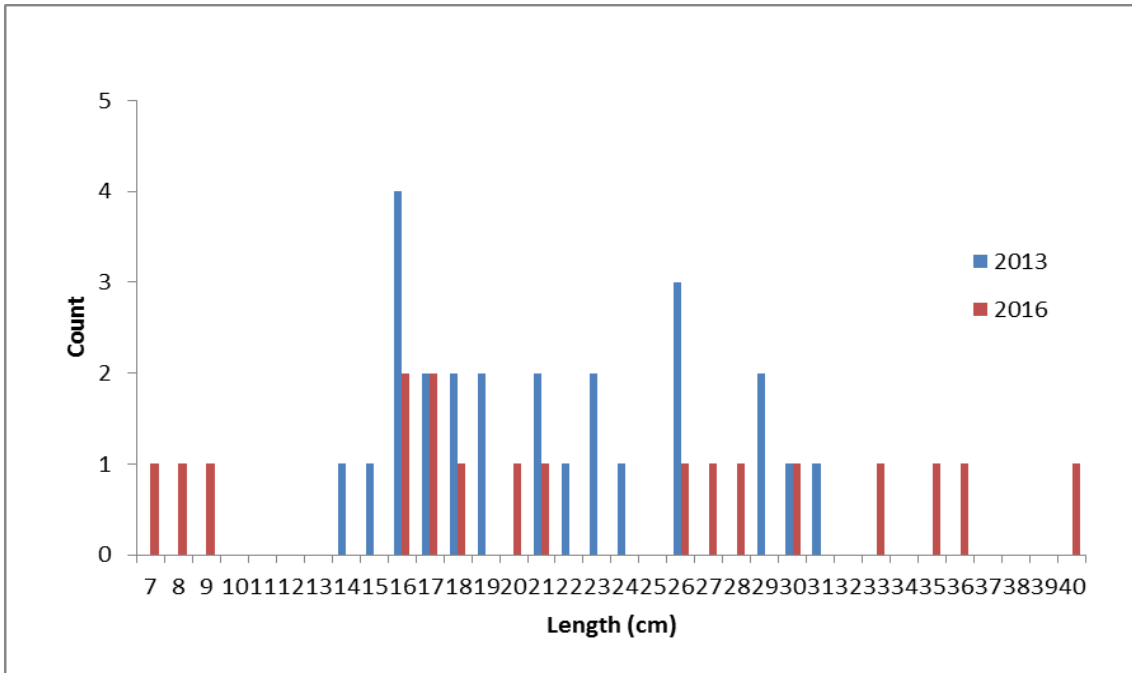
Eels which are listed as critically endangered in the Irish Red Data Book (King et al., 2011) were recorded in large numbers during this survey and were the second most abundant species. A broad range of lengths were also recorded (Fig. 3.2).



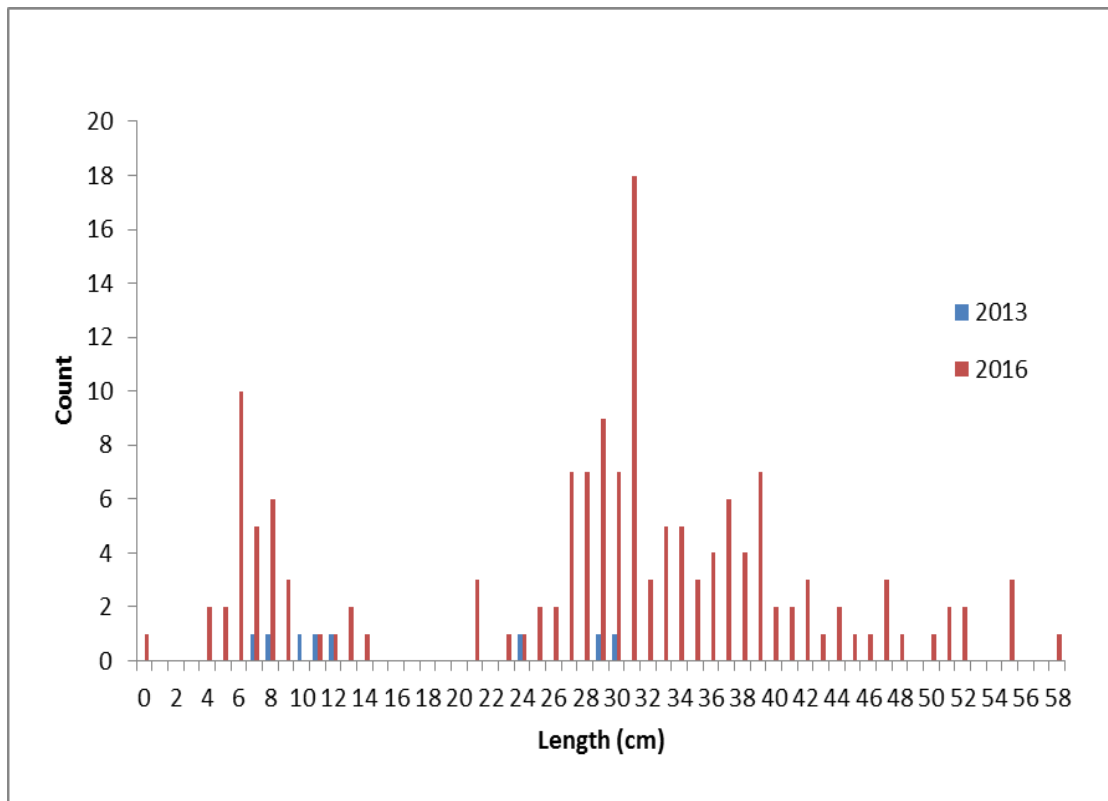
Salinity values taken at beach seine sites ranged from 0.6 to 1.1 ppt.

**Table 3.1:** Number of each fish species captured by each gear type in Lough Gill, September 2016 and comparison with the previous survey in 2013. Number of samples taken in brackets.

Species scientific name	Common name	Beach Seine		Beam Trawl		Fyke net		Total	
		2016(4)	2013(4)	2016(3)	2013(3)	2016(3)	2013(6)	2016	2013
<i>Salmo trutta</i>	Brown trout	8	8	0	0	10	17	18	25
<i>Pomatoschistus microps</i>	Common goby	4	0	0	0	0	0	4	0
<i>Anguilla anguilla</i>	European eel	34	1	1	4	125	3	160	8
<i>Platichthys flesus</i>	Flounder	0	1	1	0	33	13	34	14
<i>Liza aurata</i>	Golden grey mullet	0	0	0	0	0	1	0	1
<i>Pomatoschistus minutus</i>	Sand goby	0	107	0	106	0	0	0	213
<i>Atherina presbyter</i>	Sand smelt	0	2	0	0	0	0	0	2
<i>Salmo trutta</i>	Sea trout	0	0	0	0	2	0	2	0
<i>Chelon labrosus</i>	Thick-lipped grey mullet	0	0	0	0	2	0	2	0
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	978	196	1	160	1	5	980	361



**Fig. 3.1:** Length frequency distribution of a subsample of brown trout in Lough Gill, 2013 and 2015.



**Fig. 3.2:** Length frequency distribution of a subsample of European eels in Lough Gill, 2013 and 2015.

Lough Gill has been assigned an EMFI ecological status classification of “poor” (EQR=0.29) based on the fish populations present (Table 3.1). This denotes a reduction in status since its only previous survey in 2013 (Table 3.2).

**Table 3.2.** EMFI quality ratings for Lough Gill.

Name	Year	EMFI	EQR	Intercal Class
Lough Gill	2013	37	0.41	Moderate
Lough Gill	2016	30	0.29	Poor

#### 4. Discussion

The ‘poor’ ecological classification assigned to Lough Gill signals a downgrade in its status since it was surveyed in 2013. This status is largely due to a combination of low species richness (7 species) and a single species dominating the catch. Three spined stickleback made up over 80% of all individual fish caught over the course of the survey. Environmental stress in a habitat generally results in a change in relative abundance from ‘diverse’ communities consisting of many fish species in relatively low proportions to ‘simple’ assemblages dominated by a few species (Harrison and Kelly 2013).

A total of seven fish species were among 1201 fish recorded in Lough Gill in September 2016. Diversity and abundance were particularly low compared to other transitional water bodies around Ireland. However, the only marine access to this site is through a controlled sluice gate, so water exchange is extremely limited and likely influences species composition in the lagoon. This also means that salinities are particularly low (0.6-1.1 ppt) and would be unsuitable habitat for marine species. Sea water is generally around 35ppt. Three spined stickleback were also the most common catch in 2013. However, they did not dominate the catch to the same extent (less than 60% of catch). Otherwise, species richness remained the same as the previous survey and the composition was quite similar. The presence of large numbers of the critically endangered European eel is a notable result which may warrant further investigation in terms of eel ecology.

Lough Gill is a shallow natural lagoon which is part of the Tralee Bay and Magharees Peninsula, West to Cloghane SAC. As it is usually closed off from the sea, it is unlikely to serve any substantive function as a nursery or feeding area for recreational angling species. Mullet species and sea trout frequent Lough Gill and it is known as a brown trout fishery. All three mullet species (thick and thin lipped and golden grey) have been recorded in the lagoon. Thin lipped mullet were recorded previously in 2006 (Roche, 2007). Monitoring fish stocks will remain a key element of any assessment for WFD transitional waters reporting given its high conservation value and unfavourable status due to eutrophication impacts (NPWS 2013).

## 5. References

- Coates, S., Waugh A., Anwar A. & Robson M. (2007) Efficacy of a multi-metric fish index as an analysis tool for the transitional fish component of the Water Framework Directive. *Marine Pollution Bulletin*, **55**, 225-240.
- Harrison, T.D. and Kelly, F.L. (2013). Development of an estuarine multi-metric fish index and its application to Irish transitional waters. *Ecological Indicators*, **34**, 494-506.
- Harrison, T.D. and Whitfield, A.K. (2004) A multi-metric index to assess the environmental condition of estuaries. *Journal of Fish Biology*, **65**, 683-710.
- King, J., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J., Fitzpatrick, U., Gargan, P., Kelly, F., O' Grady, M., Poole, R., Roche, W. and Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles and Freshwater Fish*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- NPWS (2003) Tralee Bay and Magharees Peninsula, West to Cloghane. Site synopsis, site code: 002070. Available at:  
<http://www.npws.ie/media/npwsie/content/images/protectedsites/sitesynopsis/SY002070.pdf>.
- NPWS (2013) Tralee Bay and Magharees Peninsula, West to Cloghane (site code: 002070). Conservation objectives supporting document-Lagoons. Version 1.
- Roche, W. (2008) Report on a fish stock survey of Lough Gill, Castlegregory, Co. Kerry. CENTRAL FISHERIES BOARD/SOUTH WESTERN REGIONAL FISHERIES BOARD. 11 pp.