

Liffey Estuary



Sampling Fish for the Water Framework Directive - Transitional Waters 2008



The Central and Regional
Fisheries Boards

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the CEO Mr. Pat Doherty, the assistant CEO Mr. William Walsh and the staff of the Eastern Regional Fisheries Board. The authors would also like to gratefully acknowledge the help and cooperation from all their colleagues in the Central Fisheries Board and especially Dr. Jimmy King for his guidance with the transitional waters surveys.

We would also like to thank Dr. Martin O' Grady (CFB) and No. 3 Operational Wing, Irish Air Corps (Aer Chór na hÉireann) for the aerial photographs.

The authors would also like to acknowledge the funding provided for the project from the Department of Communications Energy and Natural Resources for 2008.

The report includes Ordnance Survey Ireland data reproduced under OSi Copyright Permit No. MP 007508.

*Unauthorised reproduction infringes Ordnance Survey Ireland and Government of Ireland copyright.
© Ordnance Survey Ireland, 2009*

INTRODUCTION

A fish stock survey was carried out at sites on the Liffey Estuary, as part of the programme of monitoring for the Water Framework Directive (WFD), between the 5th and the 10th of September 2008 by staff from the Central Fisheries Board (CFB) and the Eastern Regional Fisheries Board (ERFB).

The Liffey Estuary is situated in Dublin city and divides the city in two separating the south side from the north side (Plate 1). The Liffey Estuary is separated into two waterbodies for WFD sampling and reporting purposes; Upper (Fig. 1) and Lower (Fig. 2) estuaries. The Upper Liffey Estuary covers an area of 0.20 km² while the larger Lower Liffey Estuary covers an area of 4.80 km². The upper estuary begins at the Island Bridge weir and extends downstream to the Talbot Memorial Bridge near the Customs House (Fig. 1). The lower estuary begins at the Talbot Memorial Bridge and extends downstream past both the Bull Wall and Great South Wall (Fig. 2). The vast majority of riverbank, shoreline and channel in the estuary has been modified and manipulated over time to allow for urban development (channelisation of the river, building of retaining walls, dredging, construction of piers and platform structures) (Plate1).

The estuary receives the waters of the River Liffey which rises in the Wicklow mountains, and flows for approximately 125 kilometres through counties Wicklow, Kildare and Dublin before entering the Irish Sea at the mouth of Dublin Bay. The Liffey catchment has a wide variety of polluting inputs along its length, including agricultural runoff, storm-water runoff, a number of treated and untreated sewerage inputs, as well as litter (ERBD, 2005).



Plate 1: Ariel photo of the Lower Liffey Estuary looking towards the upper estuary. (Photo courtesy of CFB and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])

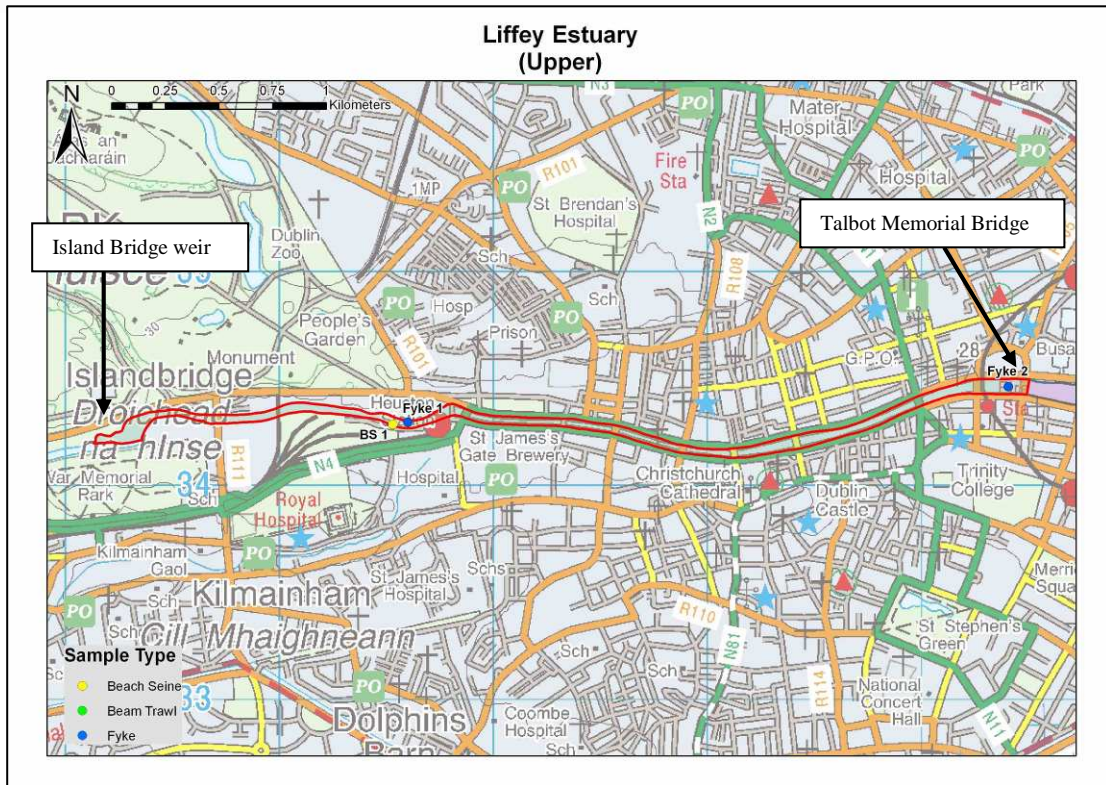


Fig. 1: Location map of the Upper Liffey Estuary indicating sampling sites, September 2008

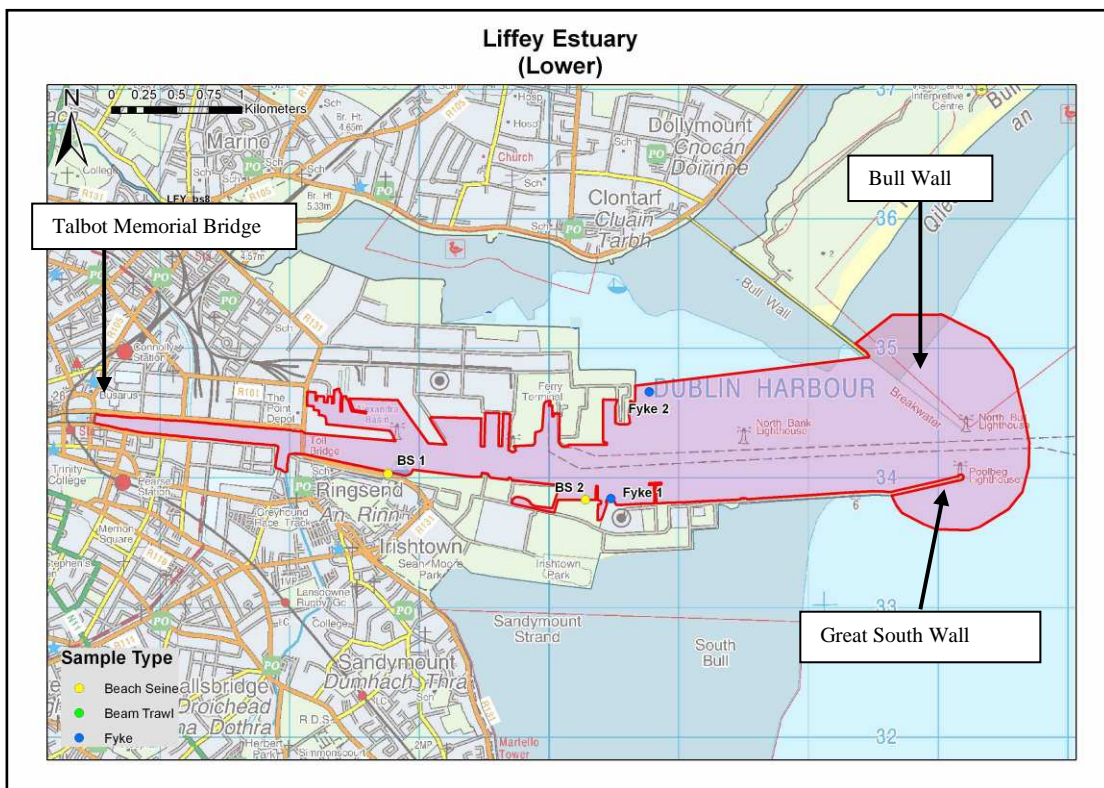


Fig. 2: Location map of the Lower Liffey Estuary indicating sampling sites, September 2008

METHODS

Current work in the UK indicates the need for a multi-method netting approach (seine nets, fyke nets and beam trawls) to sampling for fish in estuaries and these procedures are now the standard CFB methodology for fish stock surveys in transitional waters for the WFD monitoring programme. Two sampling methods were used during the Liffey Estuary survey (i.e. beach seines and fyke nets). However, due to a lack of sloped shores (Plate 2) it was not possible to carry out many hauls using the beach seine. Beam trawling was attempted, however the substrate was deemed to be too soft and this method was abandoned. Portable GPS instruments were used to mark the precise location of each sampling site (Figs. 1 and 2).



Plate 2: Upper Liffey estuary with O’Connell Bridge in the background

RESULTS

A total of seven fish species were captured in the Upper Liffey Estuary. A single beach seine site was selected for sampling in the upper estuary due to a lack of suitable sites. The seine haul was dominated with freshwater fish species; roach (267), three-spined stickleback (26), perch (2) and pike (1) (Table 1). High water flows at the time of sampling most likely influenced this haul. Two fyke nets were set in the upper estuary with flounder (10) being the most numerous species (Table 1).

A total of fourteen fish species were recorded in the Lower Liffey Estuary. Only two beach seine sites were selected for sampling in the lower estuary due to a lack of suitable sites. Sprat (212), sand goby (43), sand smelt (10) and three-spined stickleback (10) were present in both seine hauls (Table 1).

Two fykes were set in the lower estuary with cod (6), pollack (5) and eel (4) present in both nets (Table 1).

Salinity values taken at beach seine site ranged from 6.35ppt to 11.25ppt in the lower estuary and was 0.10ppt at the single beach seine site sampled in the upper estuary.

Table 1: List of fish species and abundances of each species by net type in the Upper & Lower Liffey Estuary, September 2008

| Scientific name | Common Name | Upper Liffey | | Lower Liffey | |
|-------------------------------|--------------------------|-----------------|--------------|-----------------|--------------|
| | | Beach seine (1) | Fyke net (2) | Beach seine (2) | Fyke net (2) |
| <i>Chelon labrosus</i> | Thick Lipped Grey Mullet | - | - | 5 | - |
| <i>Platichthys flesus</i> | Flounder | 29 | 10 | 2 | 1 |
| <i>Sprattus sprattus</i> | Sprat | - | - | 212 | - |
| <i>Pomatoschistus microps</i> | Common Goby | 1 | - | - | - |
| <i>Pleuronectes platessa</i> | Plaice | - | - | 1 | - |
| <i>Anguilla anguilla</i> | Eel | - | 4 | - | 4 |
| <i>Taurulus bubalis</i> | Long-Spined Sea-Scorpion | - | - | - | 2 |
| <i>Atherina prebyter</i> | Sand Smelt | - | - | 10 | - |
| <i>Pomatoschistus minutus</i> | Sand Goby | - | - | 43 | - |
| <i>Limanda limanda</i> | Dab | - | - | - | 1 |
| <i>Salmo salar</i> | Salmon | - | - | 1 | - |
| <i>Gasterosteus aculeatus</i> | 3-Spined Stickleback | 26 | 1 | 10 | - |
| <i>Rutilus rutilus</i> | Roach | 267 | - | - | - |
| <i>Perca fluviatilis</i> | Perch | 2 | - | - | - |
| <i>Esox lucius</i> | Pike | 1 | - | - | - |
| <i>Gadus morhua</i> | Cod | - | - | - | 6 |
| <i>Merlangus merlangus</i> | Whiting | - | - | - | 2 |
| <i>Pollachius pollachius</i> | Pollock | - | - | - | 5 |

DISCUSSION

An essential step in the WFD monitoring process is the classification of the status of transitional waters, which in turn will assist in identifying the objectives that must be set in the individual River Basin Management Plans.

The EPA have assigned the Liffey Estuary (upper and lower) an interim draft classification of “Moderate” status, i.e. must be improved to “Good” status by 2015, based on general physico-chemical elements, phytoplankton and macroalgal growths (ERBD, 2008).

A new WFD fish classification tool, Transitional Fish Classification Index or TFCI, has been developed for the island of Ireland (Ecoregion 1) using NIEA and CFB data. 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). The Upper and Lower Liffey waterbodies have been assigned a draft classification of “Moderate” (EQR=0.325) and “Good” (EQR=0.675) using the fish classification tool.

A final overall classification will be assigned to the estuary in December 2009 after the consultation and review period has been completed.

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.
- ERBD (2005) *Eastern River Basin District Project: Final Characterisation* (http://www.erbd.ie/Reports/CR/Final_cham_report.pdf)
- ERBD (2008) *Draft River Basin Management Plan for the Eastern River Basin District*.
- 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 (www.blackwell-synergy.com)

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

**Web: www.wfdfish.ie
www.cfb.ie
Email: info@cfb.ie
Tel: +353 1 8842600
Fax: +353 1 8360060**



**The Central and Regional
Fisheries Boards**