

Broadmeadow Water 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 Broadmeadow Water Estuary, as part of the programme of monitoring for the Water Framework Directive (WFD), between the 9th to the 11th of September 2008 by staff from the Central Fisheries Board (CFB) and the Eastern Regional Fisheries Board (ERFB).

The Broadmeadow Water Estuary is located just north of Malahide and to the east of Swords village, on Ireland's east coast, approximately 15km north of Dublin city (Fig. 1). The estuary covers an area of 3.33km². The eastern boundary of the estuary is a railway viaduct, built in the 1840s, which has led to the estuary becoming lagoonal in character and only partly tidal (Plate 1).

The Broadmeadow Estuary is of high importance for wintering waterfowl and supports a particularly good diversity of species. It has an internationally important population of Brent Goose and is popular place for local bird watching groups. The estuary receives the waters of the Broadmeadow and Ward rivers, both of which flow through intensive agricultural catchments, although the catchments are becoming increasingly urbanised.

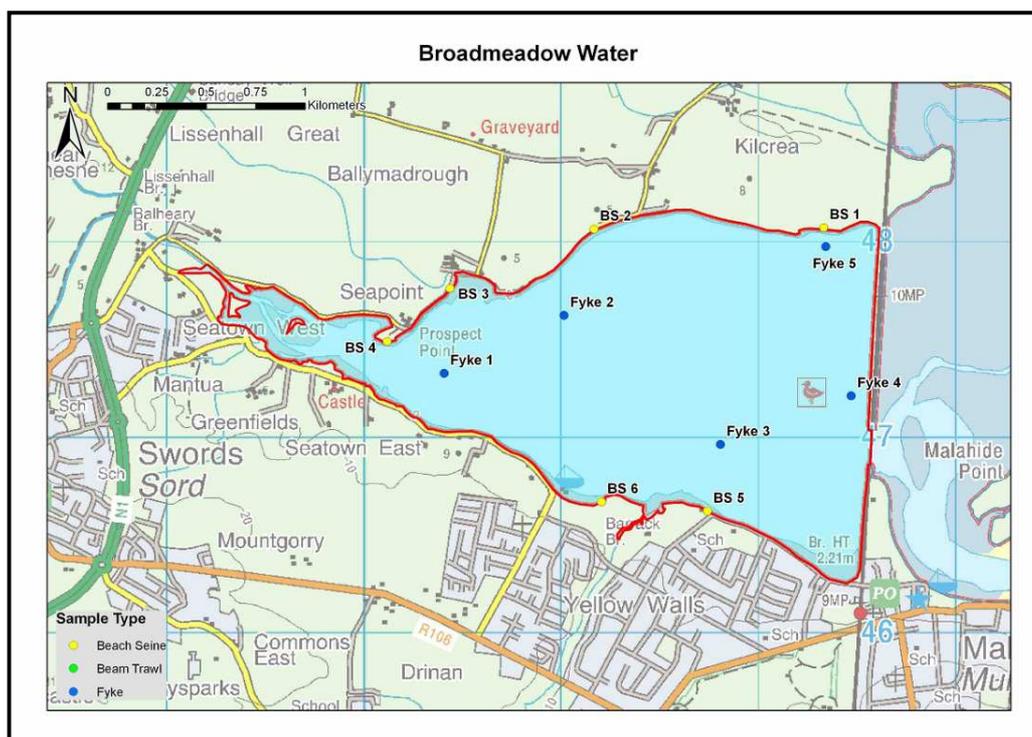


Fig. 1: Location map of Broadmeadow Water Estuary showing sampling sites, September 2008



Plate 1: Ariel photo of Broadmeadow Water Estuary (railway viaduct is visible on the left of the photograph). (Photo courtesy of CFB and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])

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 Broadmeadow Estuary survey (i.e. beach seines and fyke nets). Beam trawling was not deemed a viable option due to the predominately soft mud substrate and shallowness of the estuary. Portable GPS instruments were used to mark the precise location of each sampling site (Fig. 1).

RESULTS

A total of six beach seine sites were selected encompassing the majority of geographical and, where possible, habitat ranges of the estuary. Sand goby and thick-lipped grey mullet were captured at all beach seine sites (Table 1). Sprat and flounder were also widespread in the estuary being captured in five out of six sites (Table 1). Most of the mullet were juvenile fish indicating that the estuary is an important nursery area for them but older age-classes were also present (Fig. 2).

A total of five fyke nets were selected in the estuary. Seven fish species were captured. Flounder and eel were the most abundant species.

Two unusual species documented at beach seine sites and fyke nets sites were roach and perch as these species are not typically associated with estuarine waters. Roach and perch have not been documented in either the Broadmeadow or Ward rivers which on the western edge of the estuary. Further investigation is needed to determine the source of these fish.

Salinity values taken at beach seine sites ranged from 0.55ppt in the upper estuary to 17.05ppt in the lower estuary.

Table 1: List of fish species and abundances of each species by net type in Broadmeadow Water Estuary, September 2008

Scientific name	Common Name	Broadmeadow Water	
		Beach seine (6)	Fyke net (5)
<i>Chelon labrosus</i>	Thick Lipped Grey Mullet	78	-
<i>Platichthys flesus</i>	Flounder	113	7
<i>Dicentrarchus labrax</i>	Sea bass	4	1
<i>Sprattus sprattus</i>	Sprat	121	-
<i>Pleuronectes platessa</i>	Plaice	7	1
<i>Ammodytes tobianus</i>	Lesser Sandeel	1	-
<i>Anguilla anguilla</i>	Eel	7	6
<i>Pholis gunnellus</i>	Gunnel (Butterfish)	-	1
<i>Pomatoschistus minutus</i>	Sand Goby	2,104	-
<i>Gasterosteus aculeatus</i>	3-Spined Stickleback	6	-
<i>Rutilus rutilus</i>	Roach	11	-
<i>Perca fluviatilis</i>	Perch	-	1
<i>Myoxocephalus scorpius</i>	Short Spined Sea Scorpion	-	1

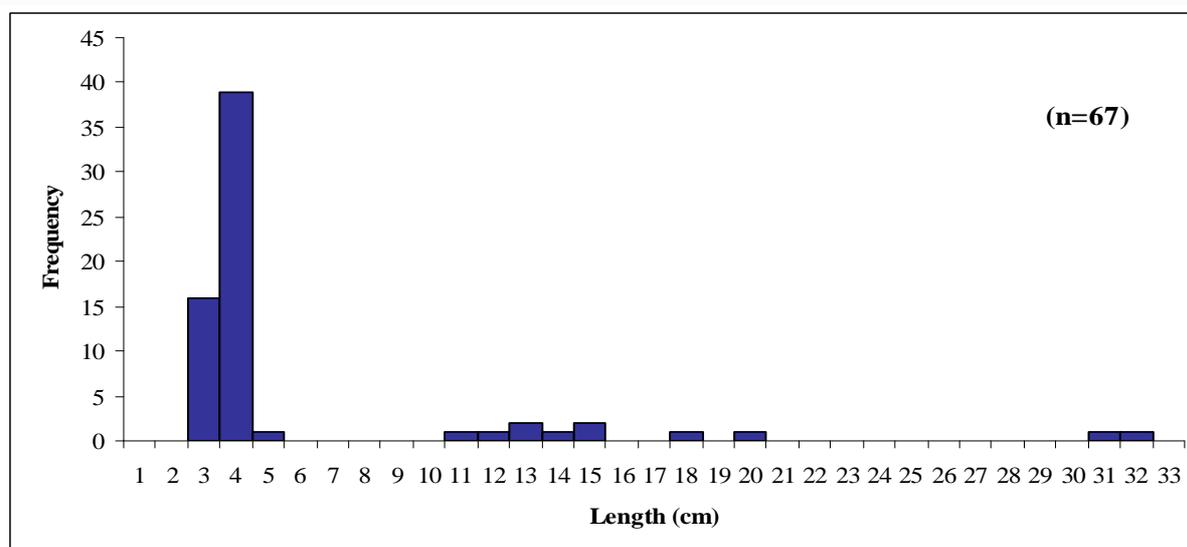


Fig. 2: Length frequency distribution of thick-lipped grey mullet, Broadmeadow Water Estuary September 2008

DISCUSSION

An essential step in the WFD monitoring process is the classification of the status of transitional waters, (Coates, S., Waugh A., Anwar A. & Robson M., 2007). Efficacy of a multi-metric fish index as an 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 Broadmeadow Water estuary 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 (Coats *et al.* 2007). The Broadmeadow Water Estuary has been classed as “Good” (EQR=0.70) (i.e. must prevent deterioration from “Good” status) using the fish classification tool.

A final overall classification will be assigned to the estuary in December 2009 after the RBD 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 (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**