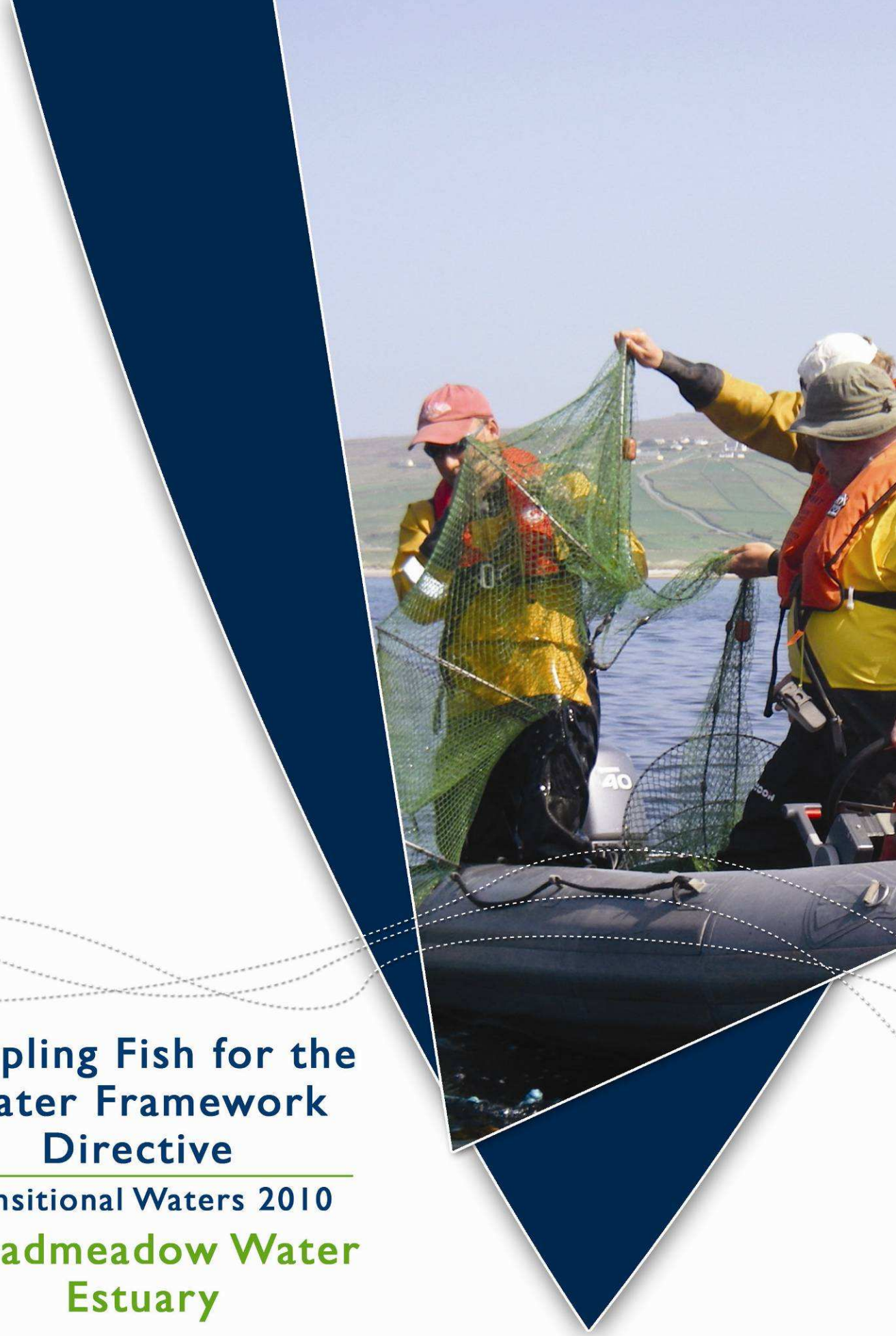

Sampling Fish for the Water Framework Directive

Transitional Waters 2010

Broadmeadow Water Estuary

Iascach Intíre Éireann
Inland Fisheries Ireland

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1. INTRODUCTION

A fish stock survey was conducted on the Broadmeadow Water Estuary in the Eastern River Basin District (ERBD) as part of the programme of fish monitoring for the Water Framework Directive (WFD), between the 7th and the 8th of October 2010 by staff from Inland Fisheries Ireland.

The Broadmeadow Water Estuary covers an area of 3.3km² and is located on Ireland's east coast, approximately 15km north of Dublin City (Fig. 1.1, Plate 1.1). The eastern boundary of the estuary is a railway viaduct (Plate 1.1) built in the 1840s, which has resulted in the estuary having lagoon characteristics, with limited tidal exchange (NPWS, 2004). The outer part of the estuary drains almost completely at low tide, while in the inner estuary, only the western-most section drains (NPWS, 2001) (Plate 1.1).

The Broadmeadow Water Estuary is situated within the Malahide Estuary SAC, encompassing a number of important wetland habitats, as well as plant and bird species (NPWS, 2001). The estuary receives freshwater from the Broadmeadow and Ward rivers, both of which flow through intensive agricultural catchments that are becoming increasingly urbanised.

The estuary was previously surveyed by Inland Fisheries Ireland (formerly the Central and Regional Fisheries Boards) in October 2008 (Kelly *et al*., 2009).

Fig. 1.1 Location map of Broadmeadow Water Estuary indicating sample sites, October 2010

Plate 1.1. Aerial photo of Broadmeadow Water Estuary (Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])

2. METHODS

Current work in the Republic of Ireland and United Kingdom indicates the need for a multi-method (beach seine, fyke net and beam trawl) approach to sampling fish in estuaries and these procedures are now the standard IFI methodology for fish stock surveys in transitional waters for the WFD monitoring program.

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 (Plate 2.1) 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 six beach seines, four fyke nets and six beam trawls were deployed in the Broadmeadow Water Estuary in October 2010.

Plate 2.1. Beam trawling on the Broadmeadow Water Estuary

3. RESULTS

A total of 12 fish species were recorded in the Broadmeadow Water Estuary in October 2010 (Table 3.1). Sand goby (1,755) was the most abundant species recorded, followed by sprat (139) and flounder (29). Species richness was slightly lower during this survey, than in the previous survey completed in 2008 (Kelly *et al*., 2009). Furthermore no beam trawl nets were deployed at that time.

Flounder was also the only species captured using all three netting methods, indicating its distribution throughout the whole water body. Flounder ranged in length from 6.5cm to 40.0cm (Fig. 3.1). Their length frequency distribution indicates the presence of a number of age classes, with juvenile age classes dominant (Fig. 3.1).

Brown trout, three-spined stickleback and eels (listed as critically endangered in the Irish Red Data Book (King *et al*., 2011)) were also captured during the survey (Table 3.1).

Salinity values taken at beach seine and beam trawl sites ranged from 1.73ppt to 26.2ppt.

Table 3.1. Number of each species captured by each gear type in the Broadmeadow Water Estuary, October 2010

Scientific name	Common name	Beach seine (6)	Fyke net (4)	Beam trawl (6)	Total
Pomatoschistus minutus	Sand goby	1683	-	72	1755
Sprattus sprattus	Sprat	138	1	-	139
Platichthys flesus	Flounder	5	20	4	29
Gasterosteus aculeatus	Three-spined stickleback	8	-	-	8
Anguilla anguilla	European eel	1	5	-	6
Atherina presbyter	Sand smelt	2	-	-	2
Chelon labrosus	Thick-lipped grey mullet	2	-	-	2
Limanda limanda	Dab	-	-	1	1
Pollachius pollachius	Pollack	-	1	-	1
Salmo trutta	Brown trout	-	1	-	1
Syngnathus acus	Greater pipefish	1	-	-	1
Taurulus bubalis	Long-spined sea scorpion	-	1	-	1

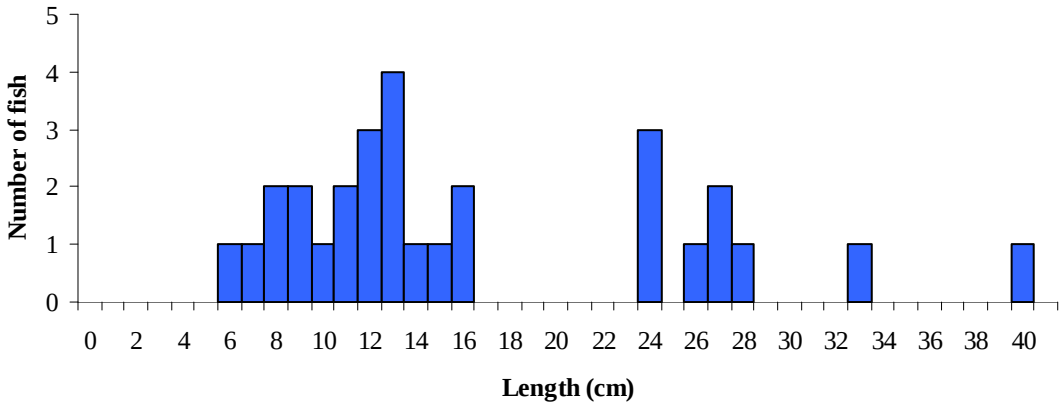

Fig. 3.1. Length frequency distribution of flounder in the Broadmeadow Water Estuary, October 2010 (n=29)

4. SUMMARY

A total of 12 fish species were recorded in the Broadmeadow Estuary which is similar to other transitional water bodies surveyed on the east coast during 2010. Although some freshwater species were present, marine varieties were dominant. This, as well as high salinity levels recorded, indicates that the sea exerts a greater influence on this water body than freshwater from the river. Other important species included brown trout and pollack. Species richness and distribution for selected species among all transitional water bodies surveyed can be seen in the 2010 WFD summary report (Kelly *et al*., 2011).

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

A new WFD fish classification tool, Transitional Fish Classification Index or TFCI, has been developed for the island of Ireland (Ecoregion 1) using IFI and Northern Ireland Environment Agency (NIEA) 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 TFCI is still undergoing further development in order to make it fully WFD compliant and to account for differences in estuary typologies; however, at this stage it has been used, along with expert opinion, to provide draft ecological status classifications for each transitional water body surveyed for the WFD.

Using this approach, the Broadmeadow Water Estuary has been assigned a draft ecological status classification of “Good” based on the fish populations present. This shows an improvement from the previous survey in 2008, when this water body was assigned a classification of “Moderate” status based on the fish populations (Kelly *et al*., 2009).

The EPA have assigned the Broadmeadow Water Estuary an overall interim draft classification of “Moderate” status, based on general physico-chemical elements, fish, phytoplankton and macroalgal growths.

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