

# Avoca Estuary



## Sampling Fish for the Water Framework Directive - Transitional Waters 2008



The Central and Regional  
Fisheries Boards

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## **INTRODUCTION**

A fish stock survey was carried out at sites on the Avoca Estuary, as part of the programme of monitoring for the Water Framework Directive (WFD), between the 3<sup>rd</sup> and 4<sup>th</sup> of September 2008 by staff from the Central Fisheries Board (CFB) and the Eastern Regional Fisheries Board (ERFB).

The Avoca Estuary divides the town of Arklow, Co. Wicklow and is located approximately 73 kilometres south of Dublin city. It is a relatively small, narrow estuary with a high degree of modification to the lower two thirds (i.e. area below the bridge). Physical modifications primarily consist of sea walls, boat moorings and piers (Plate 1). The estuary above the bridge has steep banks and is heavily wooded with large trees on both banks (Plate 2). The estuary covers an area of 0.17km<sup>2</sup>.

The Avoca catchment contains some of the most polluted stretches of river in Ireland, with acid mine drainage having a profound impact on the lower 15 kilometres of river. The mines leach high levels of lead, copper and zinc. The Avoca catchment has a wide variety of other polluting inputs along its length, including pharmaceutical, chemical and light engineering operations and a number of treated and untreated sewerage inputs. Agriculture and forestry also contribute to diffuse pollution loads.



**Plate 1: Seine netting in the lower Avoca Estuary, September 2008**





Plate 2: Upper Avoca Estuary

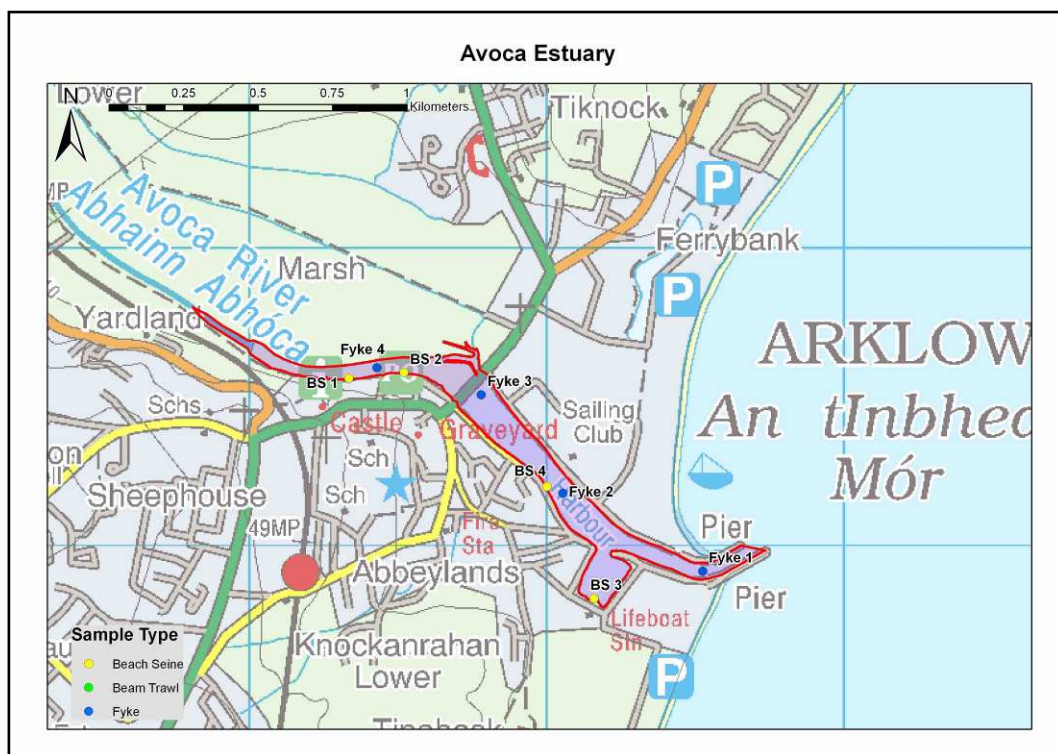


Fig. 1: Location map of the Avoca Estuary indicating sampling sites, September 2008

## METHODS

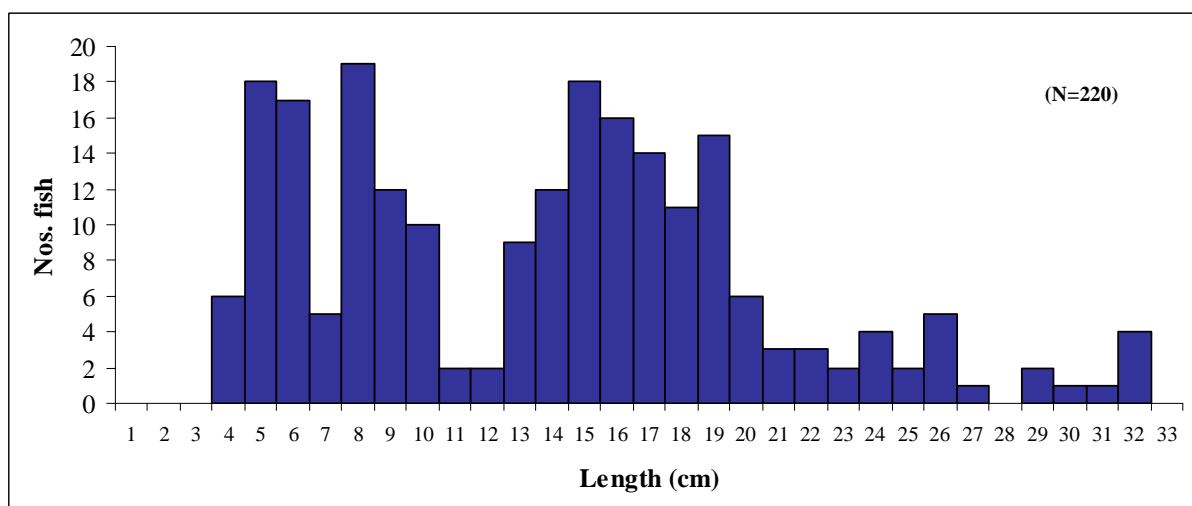
Current work in the UK indicates the need for a multi-method netting approach (seine nets, fyke nets and beam trawls) to sampling for fish in estuaries and these procedures are now the standard CFB methodology for fish stock surveys in transitional waters for the WFD monitoring programme. Two sampling methods were used during the Avoca Estuary survey (i.e. beach seines and fyke nets). Beam trawling was not considered a viable sampling option due to the presence of numerous boat moorings in the lower estuary and the shallowness of the upper estuary. Portable GPS instruments were used to mark the precise location of each sampling site (Fig. 1).

A total of four beach seine sites were selected encompassing the majority of geographical and, where possible, habitat ranges of the estuary. Four fyke nets were set however one disappeared and was presumed stolen.

## RESULTS

Overall eleven species of fish and sea trout were recorded in the Avoca estuary. Flounder were captured in each seine and fyke net. Several age classes of flounder were recorded during the survey (Fig. 2) and were the most common fish species (225) recorded, followed by thick lipped grey mullet (36) and eel (20) (Table 1). The most significant find of the survey was the presence of several adult river lamprey (Plate 3). (The EU Habitats Directive legally protects river lampreys in designated Special Areas of Conservation)

Salinity values taken at beach seine sites ranged from 0.30ppt in the upper channel to 1.00ppt in the lower estuary.



**Fig. 2: Length frequency distribution of flounder, Avoca Estuary September 2008**

**Table 1: List of fish species and abundances of each species captured by net type in the Avoca Estuary, September 2008**

Scientific name	Common Name	Avoca Estuary	
		Beach seine (4)	Fyke net(3)
<i>Chelon labrosus</i>	Thick Lipped Grey Mullet	36	-
<i>Platichthys flesus</i>	Flounder	62	163
<i>Sprattus sprattus</i>	Sprat	1	-
<i>Anguilla anguilla</i>	Eel	-	20
<i>Pomatoschistus minutus</i>	Sand Goby	1	-
<i>Ciliata mustela</i>	5-Bearded Rockling	-	6
<i>Salmo trutta</i>	Brown Trout	1	-
<i>Salmo trutta</i>	Sea Trout*	2	-
<i>Salmo salar</i>	Salmon	1	-
<i>Gasterosteus aculeatus</i>	3-Spined Stickleback	5	-
<i>Merlangus merlangus</i>	Whiting	-	2
<i>Lampetra fluviatilis</i>	River Lamprey	-	5

\*sea trout are included as a separate “variety” of trout



**Plate 3: Adult river lamprey captured in the Avoca Estuary, September 2008**



## 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 has assigned the Avoca Estuary an interim draft classification of “Moderate” status, i.e. must be restored to “Good” status by 2015. The Avoca River has been classified as “Poor” status partly on the basis of the mine discharges (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 Avoca Estuary has been classed as “Moderate” status (EQR=0.55) using the fish classification tool which agrees with the draft classification assigned by the EPA (ERBD, 2008). A final classification will be assigned to the estuary in December 2009 after the consultation and review period has been completed.

## REFERENCE

- Coates, S., Waugh A., Anwar A. and 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.
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- 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](http://www.blackwell-synergy.com))

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