

Bandon Estuary



Sampling Fish for the Water Framework Directive - Transitional Waters 2009



The Central and Regional
Fisheries Boards

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1. INTRODUCTION

Fish stock surveys were conducted on the Bandon Estuary (Table 1.1, Fig. 1.1, Plate 1.1), as part of the programme of monitoring for the Water Framework Directive (WFD), between the 19th and the 23rd of October 2009 by staff from the Central Fisheries Board (CFB) and the South Western Regional Fisheries Board (SWRFB)

The Bandon Estuary is situated on Ireland's south-west coast, with the mouth of the estuary located directly south-east of Kinsale town, Co. Cork (Fig. 1.1). The estuary extends as far inland as the town of Inishannon (approximately 19km) and the harbour area around Kinsale is a traditional commercial port. For the purposes of WFD monitoring and reporting, this estuary system has been split into two separate water bodies (Table 1.1), further details of which are given in each individual results section.

Table 1.1. Transitional water bodies surveyed for the WFD fish surveillance monitoring programme, September 2010 (FT=freshwater tidal, TW=transitional)

Transitional Water body	MS Code	Easting	Northing	Type	Area (km ²)
Bandon Estuary, Upper	SW_080_0300	155716	55871	FT	35.05
Bandon Estuary, Lower	SW_080_0100	158029	51623	TW	678.54

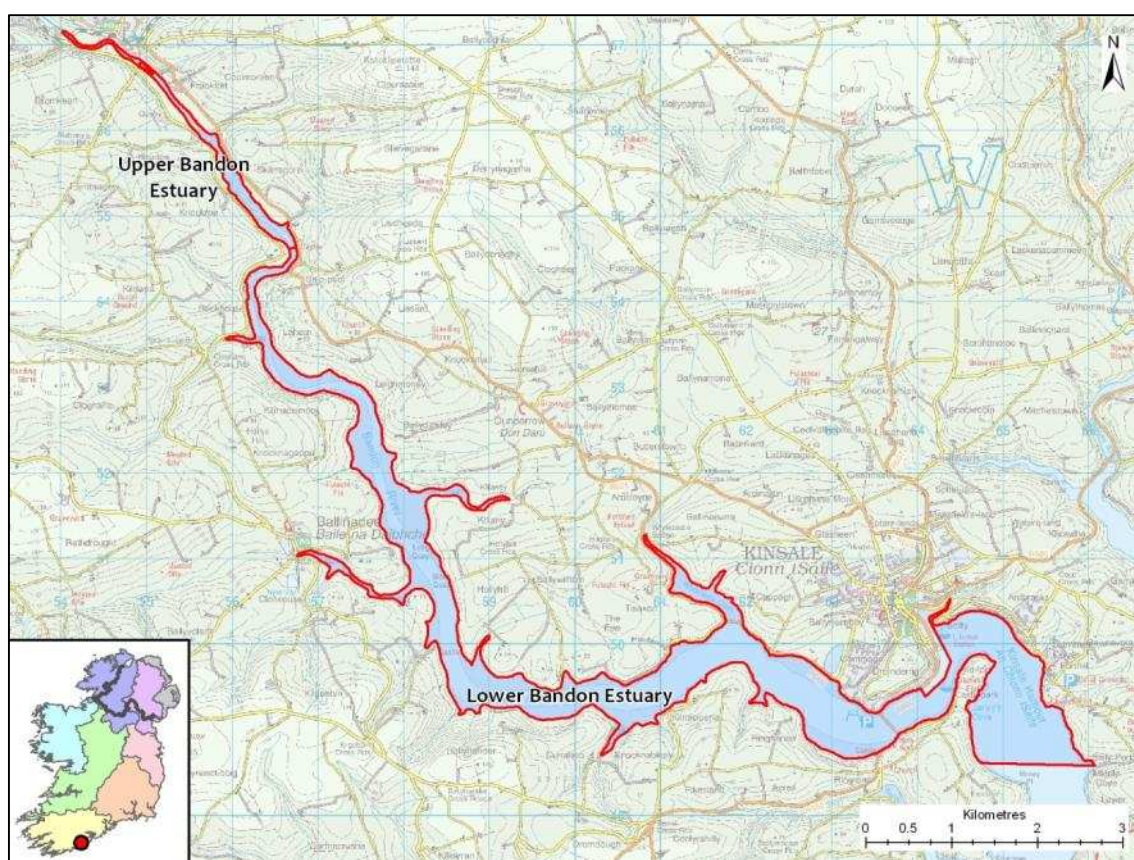


Fig. 1.1. Location map of the two transitional water bodies on the Bandon Estuary system surveyed for WFD fish monitoring, October 2009



Plate 1.1. Beach seining in the Upper Bandon Estuary, October 2009

2. METHODS

Current work in the UK and ROI 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 CFB 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 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.

3. RESULTS

3.1 Upper Bandon Estuary

The Upper Bandon Estuary (Fig. 3.1) covers an area of 0.35km² and is relatively narrow and riverine in character. It receives freshwater from the Bandon River which rises in the Shehy Mountains and flows southwards, draining agricultural land in west Cork.

A total of two beach seines, three beam trawls and two fyke nets were deployed in the Upper Bandon Estuary in October 2009.

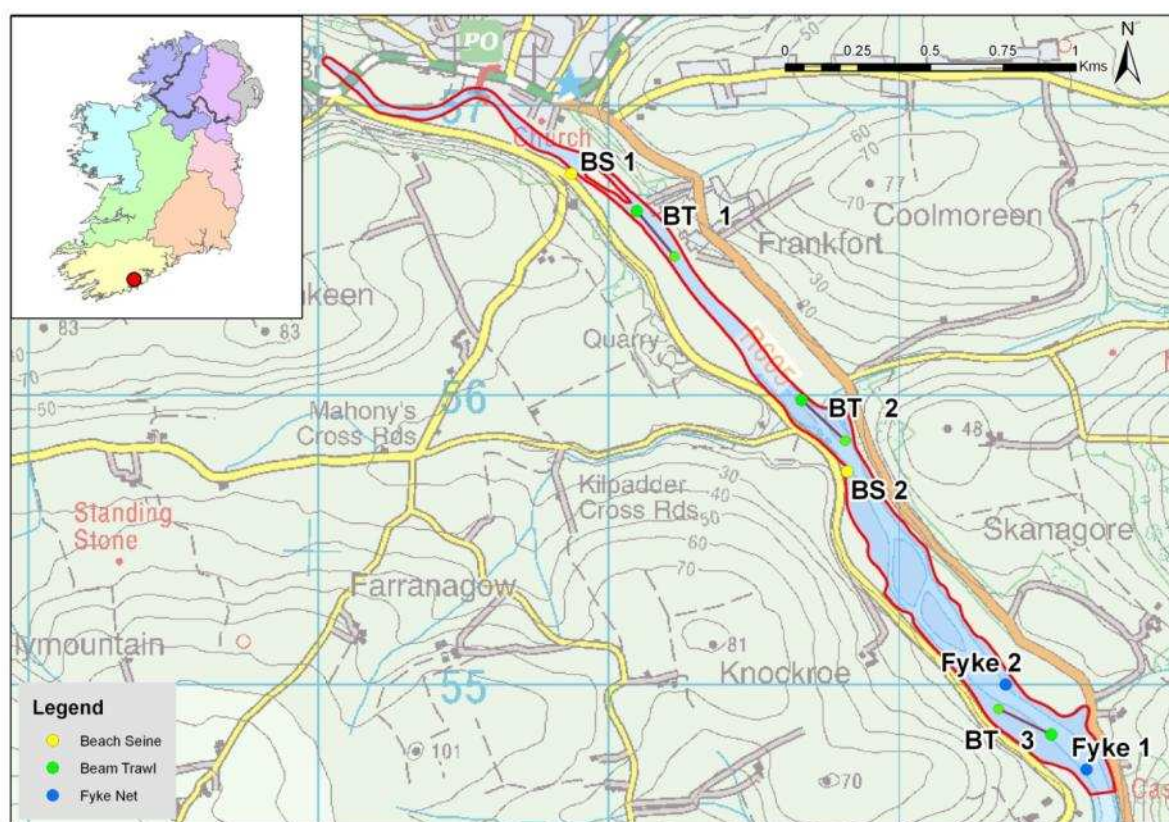


Fig 3.1. Location map of the Upper Bandon Estuary indicating sample sites, October 2009

A total of five fish species were recorded in the Upper Bandon Estuary in October 2009 (Table 3.1). Flounder was the most abundant species, followed by sand goby, three-spined stickleback, eel and brown trout.

Flounder was the only species captured using all three methods, whereas eels and brown trout were only recorded in fyke nets. Flounder ranged in length from 3.0cm to 23.4cm in length and their length frequency distribution indicates that the sample was composed mainly of juvenile fish (0+ age class)

(Fig. 3.2). The presence of brown trout indicates the strong influence of freshwater on this more riverine part of the Bandon Estuary.

Salinity values taken at beach seine sites ranged from 0.134 to 0.920ppt.

Table 3.1. Number of each species captured by each gear type in the Upper Bandon Estuary, October 2009

Scientific name	Common Name	Beach seine (2)	Fyke net (2)	Beam trawl (3)	Total
<i>Platichthys flesus</i>	Flounder	148	28	70	246
<i>Pomatoschistus minutus</i>	Sand goby	9	-	6	15
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	12	-	2	14
<i>Anguilla anguilla</i>	Eel	-	6	-	6
<i>Salmo trutta</i>	Brown trout	-	2	-	2

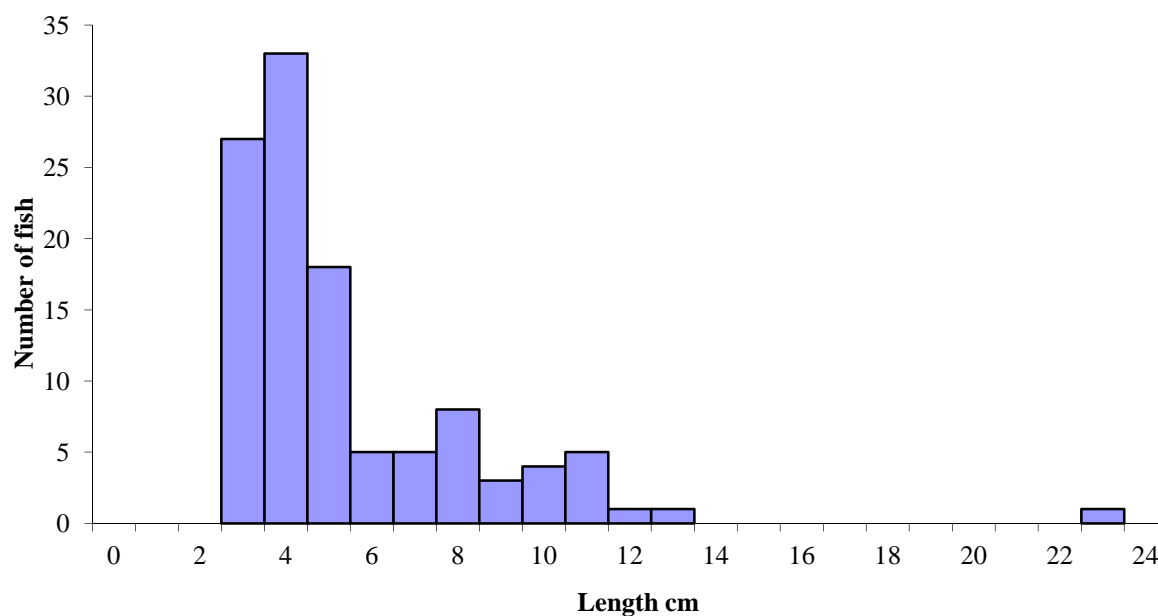


Fig. 3.2. Length frequency distribution of a sub-sample of flounder captured in the Upper Bandon Estuary, October 2009 (n = 111)

3.2 Lower Bandon Estuary

The Lower Bandon Estuary is much larger than the Upper Estuary, covering an area of 6.79km². It starts approximately 3km south-east of Inishannon and continues for approximately 16km, joining the sea at Kinsale (Fig. 3.3).

A total of 13 beach seines, ten beam trawls and six fyke nets were deployed in the Lower Bandon Estuary in 2009.

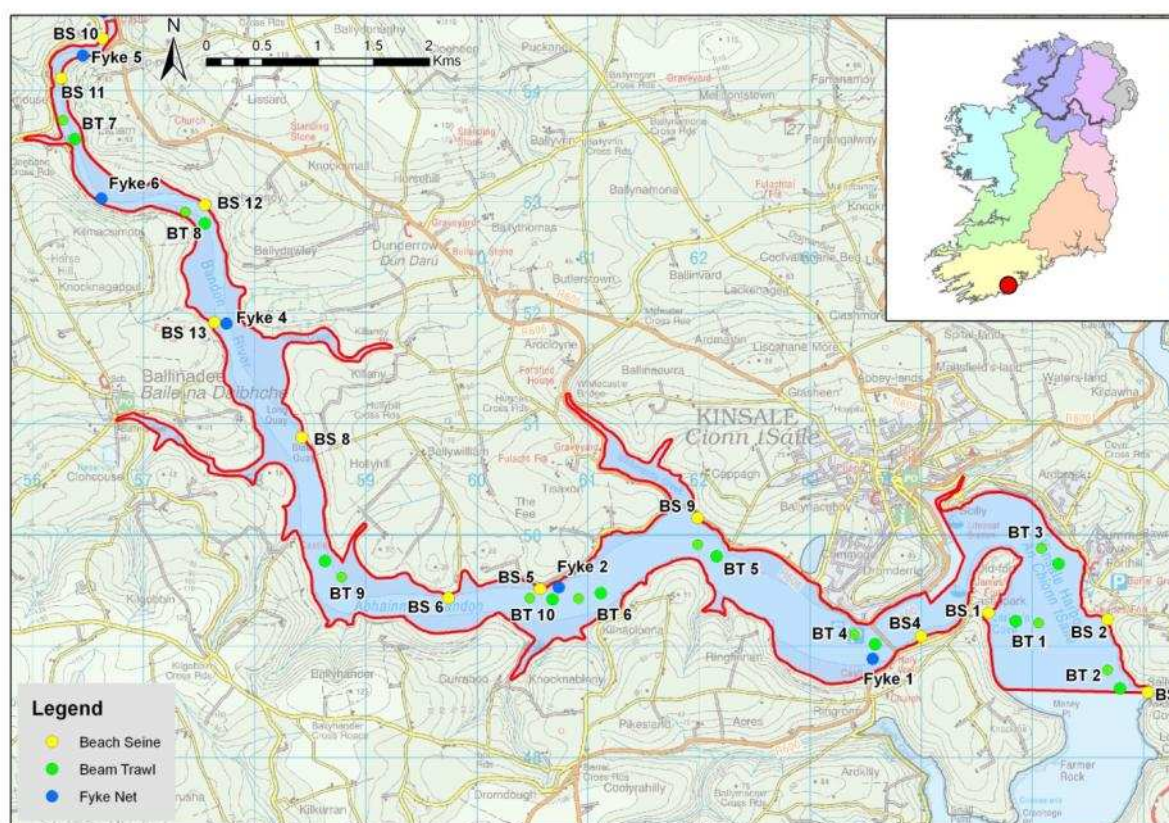


Fig 3.3. Location map of the Lower Bandon Estuary indicating sample sites, October 2009

A total of 28 fish species were recorded in the Lower Bandon Estuary in October 2009 (Table 3.2). Sand goby was the most abundant species, followed by flounder, thick-lipped grey mullet, dab, plaice, lesser sandeel and sand smelt. Four types of gobies, two types of sea scorpion and two pipefish species were also present. Other species of interest recorded during the survey included salmon (listed as vulnerable in the Irish Red Data list (King *et al.*, 2011) and also listed in Annex II and V of the EU Habitats Directive (92/43/EEC)), three-spined stickleback, eels (listed as critically endangered in the Irish Red Data Book (King *et al.*, 2011) and flounder. The Lower Bandon Estuary was the only WFD transitional water body surveyed in 2009 in which red gurnard and snake pipefish were recorded. Furthermore, greater numbers of seven other species, including thick-lipped grey mullet, were

captured in the Lower Bandon Estuary than in any other WFD transitional water body surveyed in 2009.

Flounder was the only species captured using all three methods. Flounder ranged in length from 4.0cm to 26.2cm in length, and their length frequency distribution indicated that the sample was composed predominantly of juvenile individuals (Fig. 3.4). Thick-lipped grey mullet ranged from 1.7cm to 34.0cm in length, and their length frequency distribution also indicated that the sample was predominantly composed of juveniles in the 0+ age class but that adult cohorts were also present (Fig. 3.5).

Salinity values taken at beach seine sites ranged from 0.162 to 27.2ppt in the lower estuary.

Table 3.2. Number of each species captured by each gear type in the Lower Bandon Estuary, October 2009

Scientific name	Common Name	Beach seine (13)	Fyke net (6)	Beam trawl (10)	Total
<i>Pomatoschistus minutus</i>	Sand goby	318	-	51	369
<i>Platichthys flesus</i>	Flounder	98	7	98	203
<i>Chelon labrosus</i>	Thick-lipped grey mullet	199	-	-	199
<i>Limanda limanda</i>	Dab	2	-	27	29
<i>Pleuronectes platessa</i>	Plaice	2	-	27	29
<i>Ammodytes tobianus</i>	Lesser sandeel	20	-	-	20
<i>Atherina presbyter</i>	Sand smelt	18	-	-	18
<i>Gobiusculus flavescens</i>	Two-spotted goby	16	-	2	18
<i>Agonus cataphractus</i>	Pogge	-	-	15	15
<i>Callionymus lyra</i>	Common dragonet	-	-	15	15
<i>Sprattus sprattus</i>	Sprat	14	-	-	14
<i>Taurulus bubalis</i>	Long-spined sea scorpion	9	-	3	12
<i>Gadus morhua</i>	Cod	-	8	3	11
<i>Spinachia spinachia</i>	Fifteen-spined stickleback	5	-	4	9
<i>Gobius paganellus</i>	Rock goby	2	-	7	9
<i>Syngnathus acus</i>	Greater pipefish	3	-	5	8
<i>Pomatoschistus pictus</i>	Painted goby	8	-	-	8
<i>Merlangius merlangus</i>	Whiting	-	4	2	6
<i>Entelurus aequoreus</i>	Snake pipefish	-	-	6	6
<i>Ciliata mustela</i>	Five-bearded rockling	2	3	-	5
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	2	-	2	4
<i>Salmo salar</i>	Salmon	2	-	2	4
<i>Myoxocephalus scorpius</i>	Short-spined sea scorpion	1	-	2	3
<i>Anguilla anguilla</i>	Eel	-	2	-	2
<i>Pholis gunnellus</i>	Gunnel (Butterfish)	2	-	-	2
<i>Trisopterus luscus</i>	Bib	-	2	-	2
<i>Syngnathus typhle</i>	Deep-snouted pipefish	-	-	2	2
<i>Aspitrigla cuculus</i>	Red gurnard	-	-	1	1

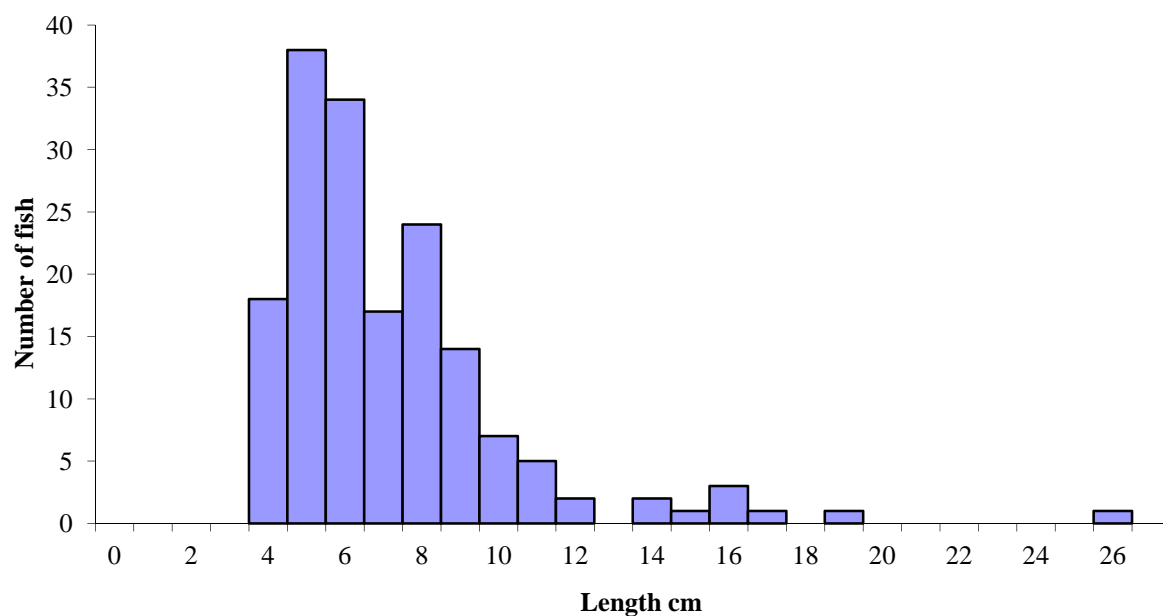


Fig. 3.4. Length frequency distribution of a sub-sample of flounder captured in the Lower Bandon Estuary, October 2009 (n = 168)

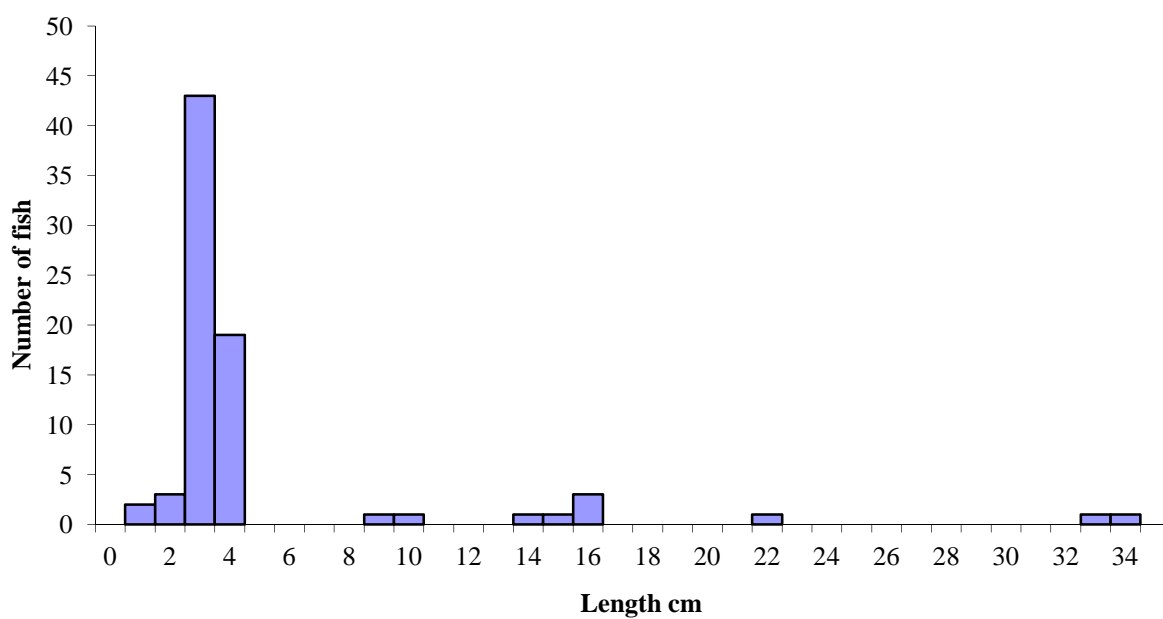


Fig. 3.5. Length frequency distribution of a sub-sample of thick-lipped grey mullet captured in the Lower Bandon Estuary, October 2009 (n = 77)

4. SUMMARY

A total of five and 28 fish species were recorded in the Upper and Lower Bandon Estuaries, respectively. These two water bodies were the only WFD transitional sites surveyed in the SWRFB during 2009. Species richness and distribution among all transitional water bodies surveyed during 2009 can be found in the 2009 WFD summary report (Kelly *et al.*, 2010).

With 28 species recorded, the Lower Bandon Estuary had the second highest species richness of all WFD transitional water bodies surveyed in 2009, second only to the Swilly Estuary. The high proportion of freshwater species and lower species diversity of the Upper Bandon reflects the riverine conditions and the influence of freshwater on this water body. In contrast, the Lower Bandon had a much greater salinity gradient and greater variety of habitat from its upper reaches to more open conditions closer to the sea, and this is reflected by the greater species diversity in this water body. The two water bodies contained a number of commercially important species, including cod, plaice and whiting, as well as other species of angling importance, including brown trout, flounder and thick-lipped grey mullet.

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.

A new WFD fish classification tool, Transitional Fish Classification Index or TFCI, has been developed for the island of Ireland (Ecoregion 1) using Northern Ireland Environment Agency (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 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 Upper Bandon Estuary has been assigned a draft ecological status classification of “High” and the Lower Bandon Estuary has been assigned a draft ecological status classification of “Moderate” based on the fish populations present.

The EPA have assigned both the Upper and Lower Bandon Estuaries an overall interim draft classification of “Moderate” status, based on general physico-chemical elements, phytoplankton, fish and macroalgal growths.

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