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Sampling Fish for the Water Framework Directive

Transitional Waters 2011

South Western River Basin District

Iascach Intíre Éireann
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Water Framework Directive Fish Stock Survey of Transitional Waters in the South Western River Basin District

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Cover photo: Fiona seine netting © Inland Fisheries Ireland

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1. INTRODUCTION

Fish stock surveys were conducted in Castlemaine Harbour, as part of the programme of monitoring for the Water Framework Directive (WFD), between the 18th and 26th of October 2011 by staff from Inland Fisheries Ireland (IFI) (Fig. 1.1). Castlemaine Harbour is a large shallow estuary occupying the innermost part of Dingle Bay, Co. Kerry, on the southern side of the Dingle Peninsula, close to the town of Killorglin and the smaller communities of Castlemaine, Milltown, Cromane and Glenbeigh. Five large rivers (Rivers Laune, Maine, Behy, Emlagh and Caragh) and several small streams discharge into the harbour (Fig. 1.1). The estuary is sheltered from the open sea by three sand spits which protrude into the estuary; Rosbehy and Cromane both extend northwards while Inch extends southwards from the Dingle Peninsula (Fig. 1.1). Much of the area consists of intertidal sand and mudflats supporting beds of eel grass in some places (NPWS, 2010).

The two transitional waterbodies surveyed are located within Castlemaine Harbour candidate SAC which is designated for a range of marine, coastal and terrestrial habitats including estuaries, alluvial wet woodlands, saltmarsh, vegetated shingle and sand dunes (NPWS, 2006). The cSAC is also selected for a number of species listed on Annex II of the EU Habitats Directive (i.e. sea lamprey, river lamprey, Atlantic salmon, Otter, liverwort and petalwort). In addition the Natterjack toad, a species listed in the Irish Red Data Book as endangered (King *et al*., 2011) and on Annex IV of the EU Habitats Directive, naturally occurs in the vicinity of Castlemaine Harbour. Castlemaine Harbour SPA, designated under the EU Birds Directive, also occupies part of the site (NPWS, 2010). The SPA is one of the most important sites for waterfowl in the southwest of Ireland (NPWS, 2010).

A commercial salmon fishery was reopened in Castlemaine Harbour (inside the Rivers Laune, Maine and Caragh) in 2011 (IFI, 2011). A large proportion of the estuary was designated as a shellfish area (Name: Cromane Shellfish Area) in 1994 under the European Communities (Quality of Shellfish Waters Regulations) 2004 (Anon, 2009). One of the largest natural mussel beds in Ireland is located within the Cromane estuary waterbody. Mussels have been exploited within the site since the late 1800s and the fishery is managed by a local co-operative society. More recently oysters and clams are being cultivated within the site (Marine Institute, 2011).

For the purposes of WFD monitoring and reporting, this transitional water has been split into two separate water bodies, Castlemaine Harbour and Cromane Estuary, further details of which are given in each individual results section (Table 1.1).

This report summarises the results of the 2011 fish stock survey carried out on the estuary, as part of the Water Framework Directive surveillance monitoring programme.

Table 1.1. Transitional water bodies surveyed for the WFD fish surveillance monitoring programme, October 2011 (TW=transitional)

Transitional Waterbody	MS Code	Easting	Northing	Type	Area (km^2)
Castlemaine Harbour	SW_230_0200	076494	100820	TW	6.36
Cromane Estuary	SW_230_0100	067394	095673	TW	50.87

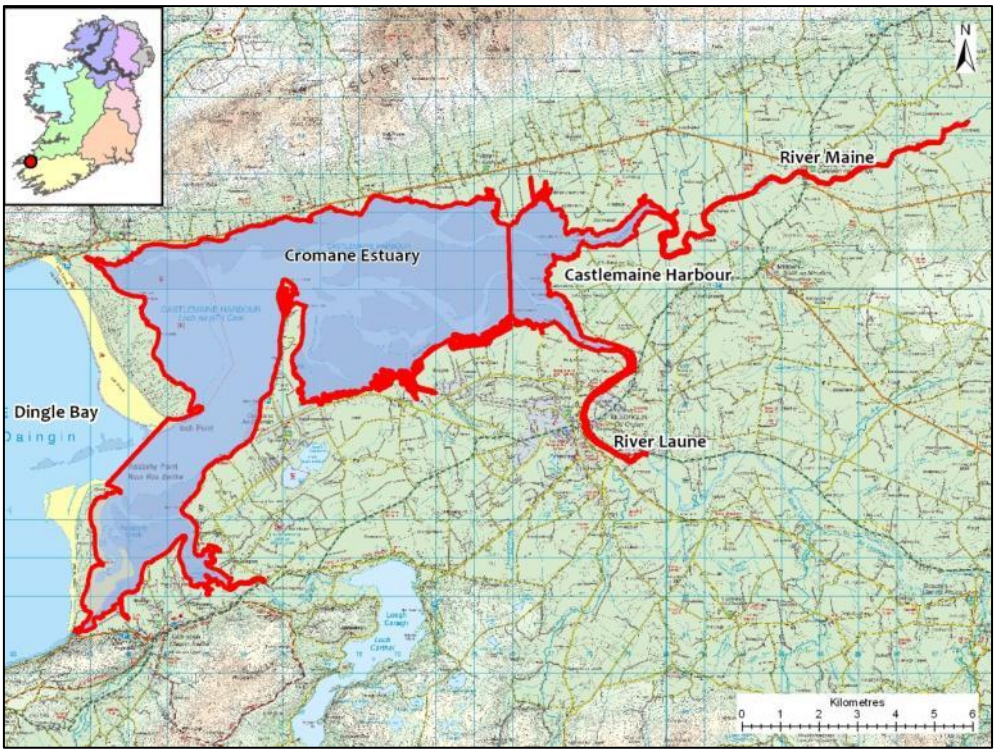

Fig. 1.1. Location map of the two transitional water bodies on the Dingle Bay estuary system surveyed for WFD fish monitoring, October 2011

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 programme.

Beach seining is conducted using a 30m x 3m net (10mm mesh size) to capture fish in littoral areas (Plate 2.1). 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. Salinity values are taken at various points around the water body (Plate 2.2).

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.

Plate 2.1. Beach seine netting near Ballykissane Pier, Castlemaine Harbour, October 2011

Plate 2.2. Measuring salinity in Cromane waterbody, October 2011

3. RESULTS

3.1 Castlemaine Harbour waterbody

Castlemaine Harbour transitional water body is located just north of Kilorglin in Co. Kerry (Fig. 3.1, Plate 3.1). It is a medium sized water body, covering an area of approximately 6.36 km². It extends upstream into the tidal sections of both the River Maine (approx 5km upstream of Castlemaine) (Plate 3.2) and River Laune (approx 1.8km u/s Killorglin) (Plate 3.1) and it extends outwards to Roscullen Island on the north and Reennacannana Point on the south. The water body is well sheltered from the open sea with large areas of mud flats becoming exposed at low tide.

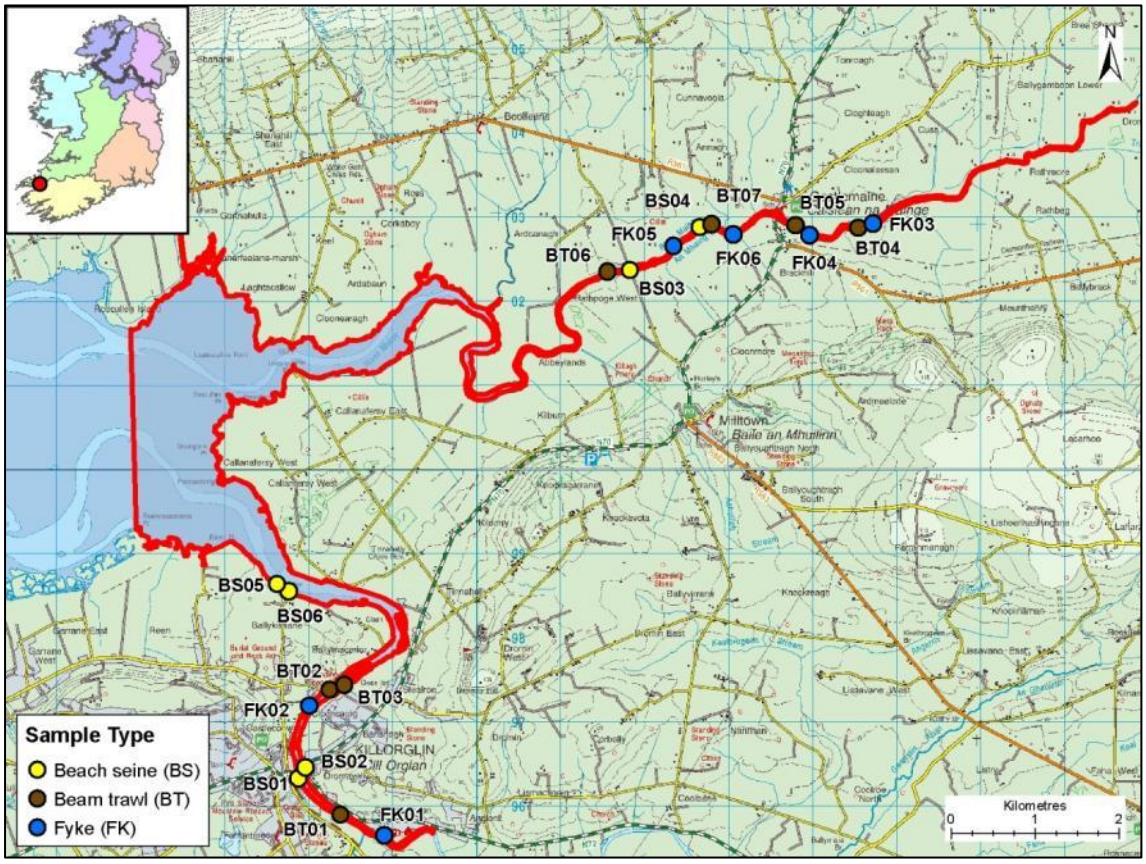

Fig. 3.1. Location map of the Castlemaine Harbour transitional waterbody indicating sample sites, October 2011

A total of six beach seines, six fyke nets and seven beam trawl nets were deployed in the Castlemaine Harbour waterbody in October 2011.

Plate 3.1. Castlemaine Harbour waterbody: (A) River Laune at high tide, Laune Bridge, Kilorglin (B) River Laune downstream of Killorglin, (C) River Laune near Ballykissane Point and (D) River Maine d/s Castlemaine village

A total of 12 fish species were recorded in Castlemaine Harbour waterbody in October 2011 (Table 3.1). Flounder was the most abundant species, followed by common goby and three-spined stickleback. Flounder and salmon were the only species captured using all three netting methods, although salmon were caught in relatively low numbers. Furthermore, salmon was the only species recorded in this water body that is listed in Annex II of the EU Habitats Directive.

Brown trout ranged in length from 11.4cm to 33.9cm (Fig. 3.2), flounder ranged from 3.2cm to 31.5cm (Fig. 3.3) and salmon from 4.8cm to 15.2cm (Fig. 3.4). Two sea trout were also recorded measuring 31.9cm and 33.3cm.

Salinity values taken at various points around the water body ranged from 0.04ppt to 1.34ppt, which reflect the strong freshwater influence on this waterbody.

Table 3.1. Number of each species captured by each gear type in Castlemaine Harbour, October 2011

Scientific name	Common name	Beach seine (6)	Fyke net (6)	Beam trawl (7)	Total fish
Platichthys flesus	Flounder	20	129	441	590
Pomatoschistus microps	Common goby	379	-	1	380
Gasterosteus aculeatus	Three-spined stickleback	38	-	1	39
Chelon labrosus	Thick-lipped grey mullet	26	-	-	26
Salmo trutta	Brown trout	-	22	-	22
Salmo salar	Salmon	9	7	4	20
Pleuronectes platessa	Plaice	-	6	-	6
Anguilla anguilla	European eel	-	5	-	5
Phoxinus phoxinus	Minnow	4	-	-	4
Pungitius pungitius	Nine-spined stickleback	3	-	-	3
Salmo trutta	Sea trout	-	2	-	2
Psetta maxima	Turbot	1	-	-	1

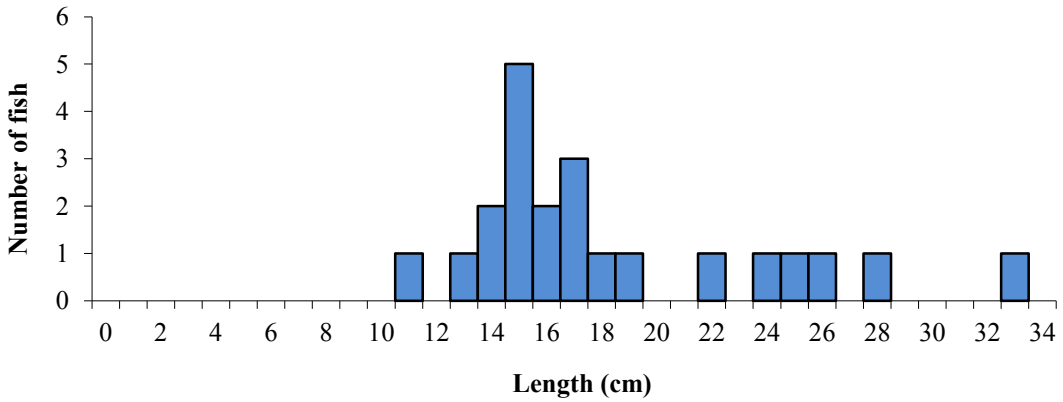

Fig. 3.2. Length frequency distribution of brown trout in Castlemaine Harbour waterbody, October 2011 (n=22)

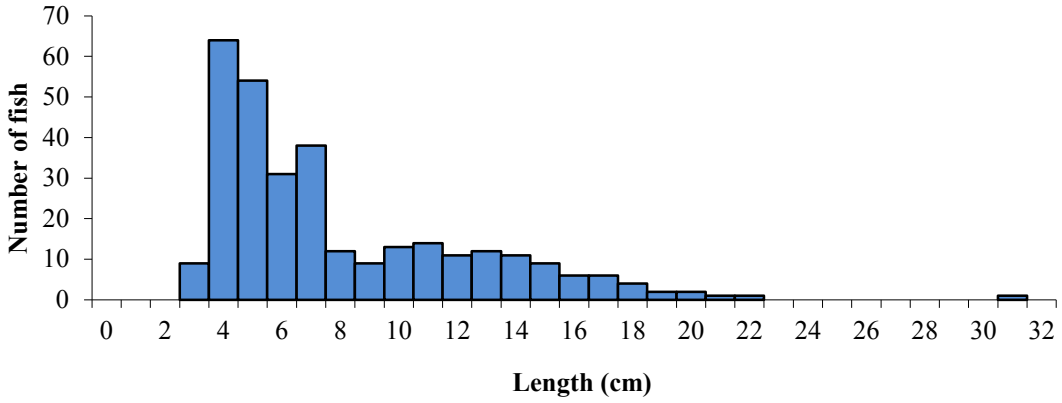

Fig. 3.3. Length frequency distribution of a sub-sample of flounder in Castlemaine Harbour waterbody, October 2011 (n=310)

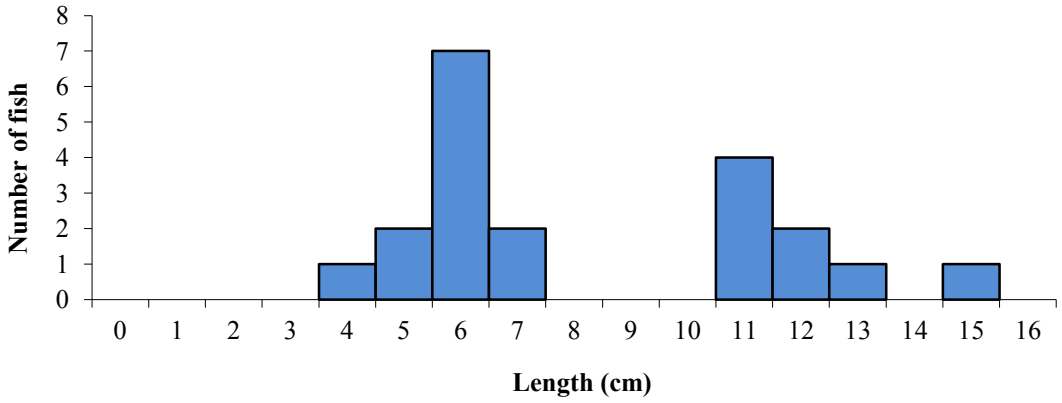

Fig. 3.4. Length frequency distribution of salmon in Castlemaine Harbour waterbody, October 2011 (n=20)

3.2 The Cromane Estuary waterbody

The Cromane Estuary waterbody is a relatively large transitional water body, covering a total area of 50.87km² (Fig. 3.5, Plate 3.2). This water body extends westward from the limit of the Castlemaine Harbour waterbody at Roscullen Island/ReennacannanaPoint to Rosbehy Point. Three sand spits, underlain by shingle protrude into the estuary; Rosbehy and Cromane both extend northwards while Inch extends southwards from the Dingle Peninsula. Much of the waterbody consists of intertidal sand and mudflats.

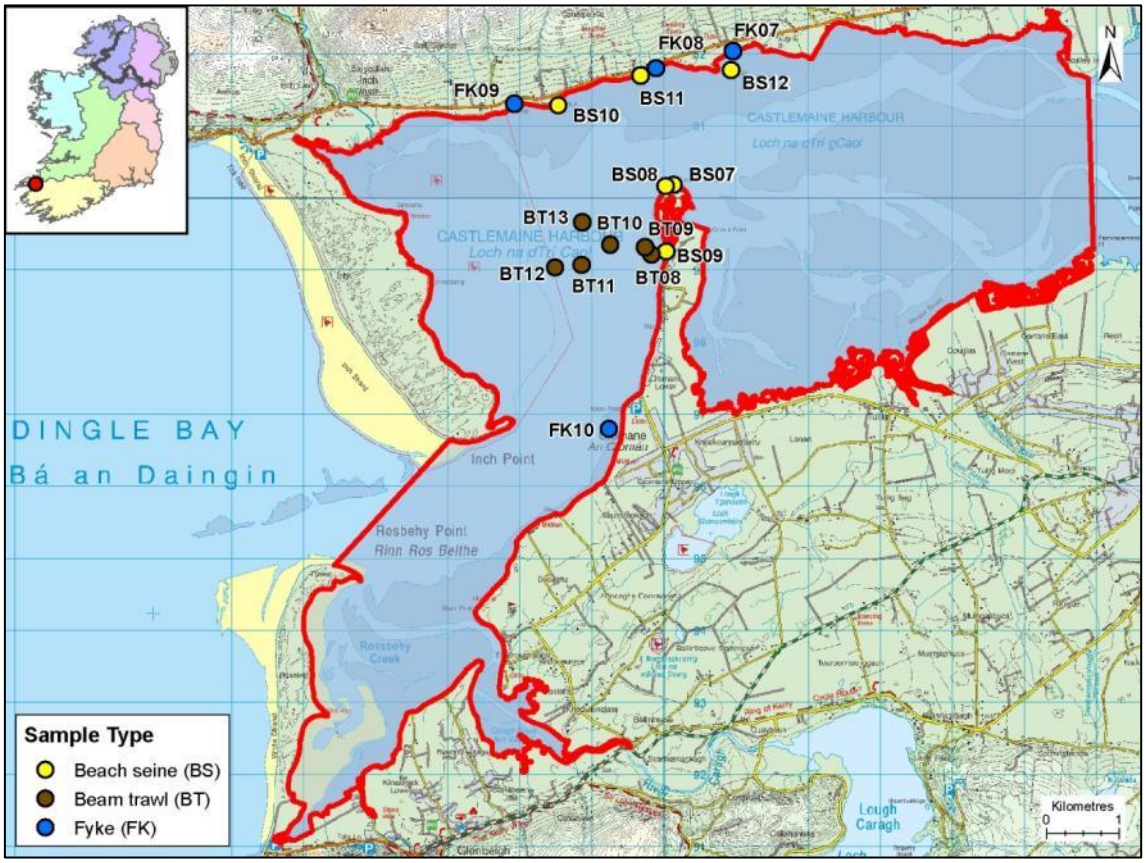

Fig. 3.5. Location map of Cromane Estuary indicating sample sites, October 2011

A total of six beach seines, six fyke nets and seven beam trawls were deployed in Cromane Estuary in October 2011.

Plate 3.2. Seine netting at Cromane Point, Cromane Estuary waterbody, October 2011

A total of 22 fish species were recorded in Cromane Estuary waterbody in October 2011 (Table 3.2). Sprat was the most abundant species, followed by two-spotted goby and common goby. Plaice was the only species captured using all three netting methods, although they were caught in low numbers.

Five-bearded rockling ranged in length from 12.1cm to 20.5cm (Fig. 3.6).

Salinity values taken at beach seine and beam trawl sites ranged from 25.6ppt to 316.2ppt, which reflect a stronger influence of saltwater on this water body.

Table 3.2. Number of each species captured by each gear type in Cromane Estuary, October 2011

Scientific name	Common name	Beach seine (6)	Fyke net (6)	Beam trawl (7)	Total fish
Sprattus sprattus	Sprat	2124	-	-	2124
Gobiusculus flavescens	Two-spotted goby	52	-	-	52
Pomatoschistus microps	Common goby	35	-	-	35
Atherina presbyter	Sand smelt	27	2	-	29
Ciliata mustela	Five-bearded rockling	-	27	-	27
Pomatoschistus minutus	Sand goby	16	-	4	20
Pollachius pollachius	Pollack	-	12	-	12
Ammodytes tobianus	Lesser sandeel	11	-	-	11
Spinachia spinachia	Fifteen-spined stickleback	9	-	-	9
Agonus cataphractus	Pogge	-	8	-	8
Crenilabrus melops	Corkwing wrasse	1	6	-	7
Platichthys flesus	Flounder	-	7	-	7
Pleuronectes platessa	Plaice	1	3	1	5
Dicentrarchus labrax	European seabass	-	3	-	3
Pomatoschistus pictus	Painted goby	-	-	3	3
Scyliorhinus canicula	Lesser spotted dogfish	-	2	-	2
Anguilla anguilla	European eel	-	1	-	1
Syngnathus acus	Greater pipefish	-	-	1	1
Gasterosteus aculeatus	Three-spined stickleback	1	-	-	1

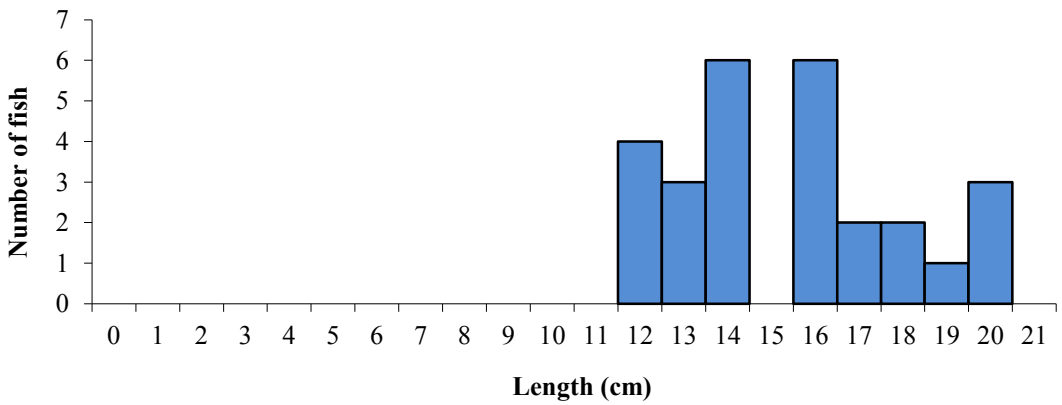

Fig. 3.6. Length frequency distribution of five-bearded rockling in the Cromane Estuary waterbody, October 2011 (n=27)

4. SUMMARY

As expected, fewer fish species were recorded in Castlemaine Harbour waterbody, in comparison to the Cromane Estuary waterbody. A higher number of euryhaline, amphihaline and freshwater migrant fish species were present in the Castlemaine waterbody than in the Cromane estuary waterbody. This follows a similar trend observed in other WFD transitional water fish stock surveys over the past few years (Kelly *et al*., 2009, 2010 and 2011), where there was a transition from a euryhaline/freshwater dominated fish fauna in the less saline upper estuaries to one with a greater number of marine or stenohaline species in the lower, more saline sections. Research in the UK and Europe has shown that salinity is one of the main factors that controls the distribution of fish in estuaries, particularly in the attraction of larvae, post-larvae and juveniles into an estuary (Costa *et al*., 2002).

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 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 has been successfully intercalibrated in a Europe-wide exercise, however it is undergoing further development to account for differences in typologies, 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, Castlemaine Harbour and Cromane Estuary waterbodies have been individually assigned draft ecological status classifications of Moderate or an overall status of Good when both waterbodies are combined, based on the fish populations present.

In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Castlemaine Harbour and Cromane Estuary waterbodies an overall ecological status of good and moderate respectively based on all monitored physico-chemical and biological elements. This status classification will be revised at the end of 2012.

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