

Inner Dundalk Bay and Castletown Estuary



**Sampling Fish for the
Water Framework Directive -
Transitional Waters 2009**



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 like to thank the landowners and angling clubs that granted us access to their land and respective fisheries.

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.

PROJECT STAFF

Project Director/Senior Research officer:	Dr. Fiona Kelly
Project Manager:	Dr. Andrew Harrison
Research Officer:	Dr. Ronan Matson
Research Officer:	Ms. Lynda Connor
Technician:	Ms. Róisín O'Callaghan
Technician	Ms. Gráinne Hanna
Technician	Mr. Rory Feeney
Technician:	Mrs. Ciara Wögerbauer
Technician:	Ms. Emma Morrissey
GIS Officer:	Mr. Kieran Rocks

The authors would also like to acknowledge the funding provided for the project from the Department of Communications Energy and Natural Resources for 2009.

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*

TABLE OF CONTENTS

1. INTRODUCTION	4
2. METHODS	5
3. RESULTS.....	6
3.1 Castletown Estuary	6
3.2 Inner Dundalk Bay	9
4. SUMMARY.....	13
5. REFERENCES	14

1. INTRODUCTION

Fish stock surveys were conducted on two Dundalk Bay transitional water bodies, as part of the fish monitoring programme for the Water Framework Directive (WFD), between the 31st of August and 3rd of September 2009 by staff from the Central Fisheries Board (CFB) and the Eastern Regional Fisheries Board (ERFB) (Table 1.1, Fig. 1.1).

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 2009 (TW=transitional)

Transitional Water body	MS Code	Easting	Northing	Type	Area (km ²)
Castletown Estuary	NB_040_0200	307493	308320	TW	1.88
Dundalk Bay, Inner	NB_040_0100	311060	304506	TW	33.35

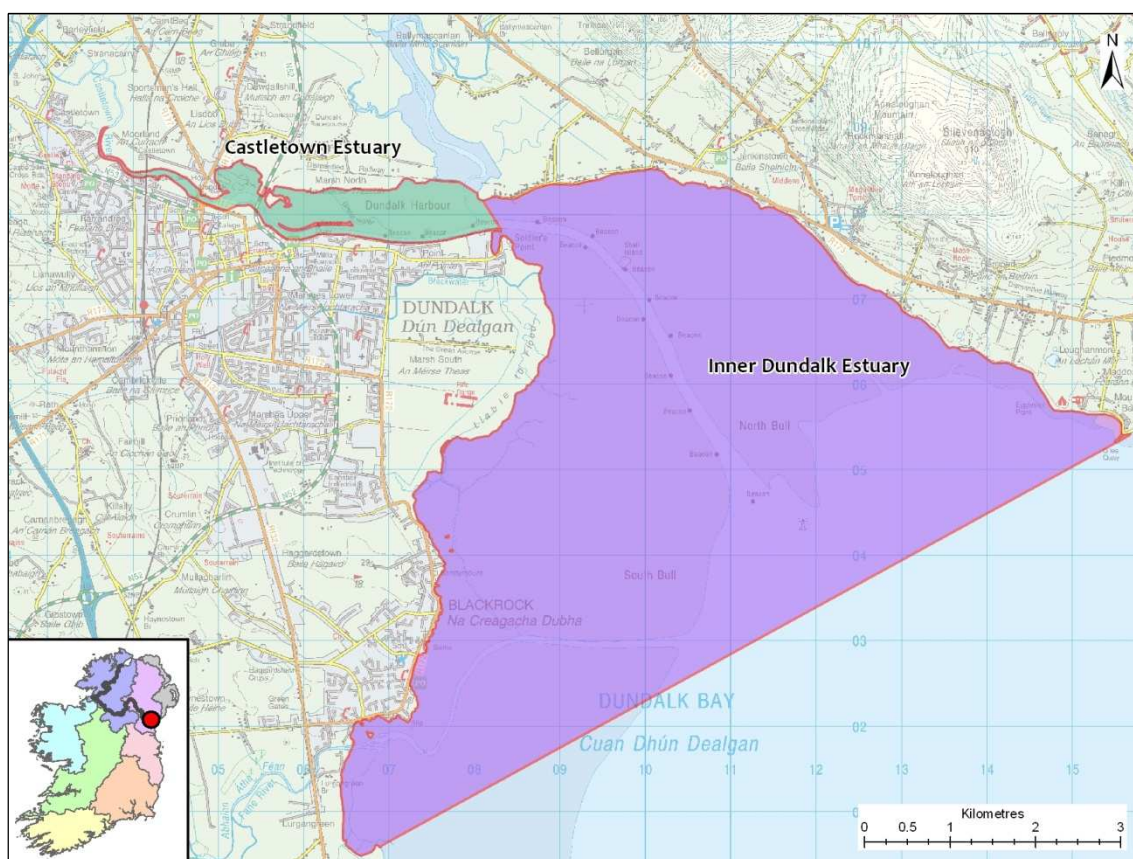


Fig. 1.1. Location map of the two transitional water bodies on the Dundalk Bay system surveyed for WFD fish monitoring, August–September 2009

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 Castletown Estuary

Castletown Estuary is situated on Ireland's east coast, adjacent to the town of Dundalk, Co. Louth and covers an area of 1.88 km² (Fig. 3.1, Plate 3.1). The estuary exhibits anthropogenic impacts in terms of channelisation, urban and shipping pressures. The main channel is regularly dredged to create suitable navigation conditions for shipping, with steep reinforced banks along the southern shore. The estuary receives leachate from the Newry Road landfill, located in the upper reaches (Marine Institute, 1999).

Castletown Estuary is situated within Dundalk Bay SAC, which is important for a number of habitats listed in the EU Habitats Directive, such as stony banks, tidal mudflats, salt marshes, mudflats and estuaries. These extensive mud and sand flats have a rich fauna that provide the main food source to the tens of thousands of waterfowl, inhabiting the Bay (NPWS, 2001). The Castletown River flows into the estuary and is known to have a run of salmon and an excellent run of sea trout (O'Reilly, 2002).

A total of five beach seines, four fyke nets and one beam trawl were deployed in Castletown Estuary in September 2009.

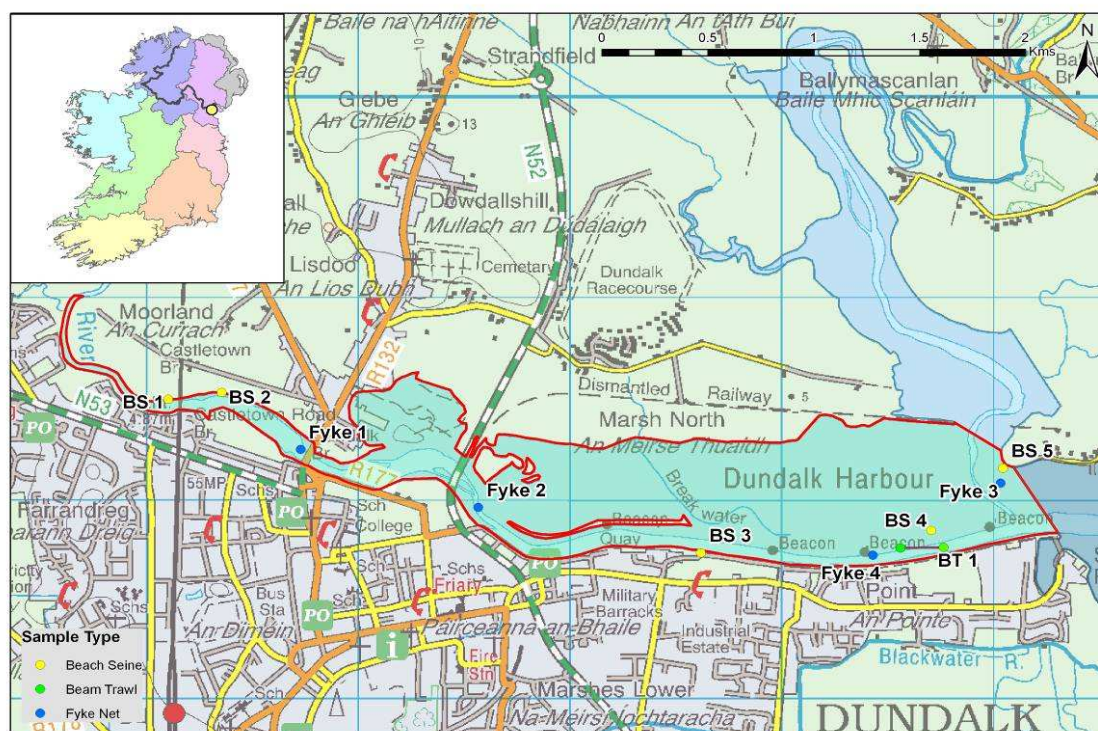


Fig. 3.1. Location map of the Castletown Estuary indicating sample sites, September 2009



Plate 3.1. Aerial photograph of the Castletown Estuary flowing into Inner Dundalk Bay (Photo courtesy of CFB and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])

A total of 11 fish species (sea trout are included as a separate ‘variety’ of trout) were recorded in Castletown Estuary in September 2009 (Table 3.1). Flounder was the most abundant species captured, followed by sprat and sand goby (Table 3.1). Other species of interest included sea trout, three-spined stickleback, eels (listed as critically endangered in the Irish Red Data Book (King *et al.*, 2011)) and flounder. Greater numbers of flounder were captured in Castletown Estuary than in any other WFD transitional water body surveyed in 2009.

Table 3.1. Number of each species captured by each gear type in Castletown Estuary, September 2009

Scientific name	Common Name	Beach seine (5)	Fyke net (4)	Beam trawl (1)	Total
<i>Platichthys flesus</i>	Flounder	2200	203	21	2424
<i>Sprattus sprattus</i>	Sprat	1963	-	-	1963
<i>Pomatoschistus minutus</i>	Sand goby	119	-	2	121
<i>Anguilla anguilla</i>	Eel	-	18	-	18
<i>Pleuronectes platessa</i>	Plaice	8	-	5	13
<i>Gadus morhua</i>	Cod	1	12	-	13
<i>Clupea harengus</i>	Herring	11	-	-	11
<i>Chelon labrosus</i>	Thick-lipped grey mullet	1	4	-	5
<i>Salmo trutta</i>	Sea trout	1	1	-	2
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	2	-	-	2
<i>Ciliata mustela</i>	Five-bearded rockling	-	1	-	1

A subsample of flounder ranged in length from 2.5cm to 25.6cm and the length frequency analysis revealed that a number of different age classes were present in the sample, with the majority of individuals being juveniles (Fig. 3.2).

Salinity values taken at beach seine sites ranged from 0.156ppt in the upper estuary to 6.96ppt in the lower estuary.

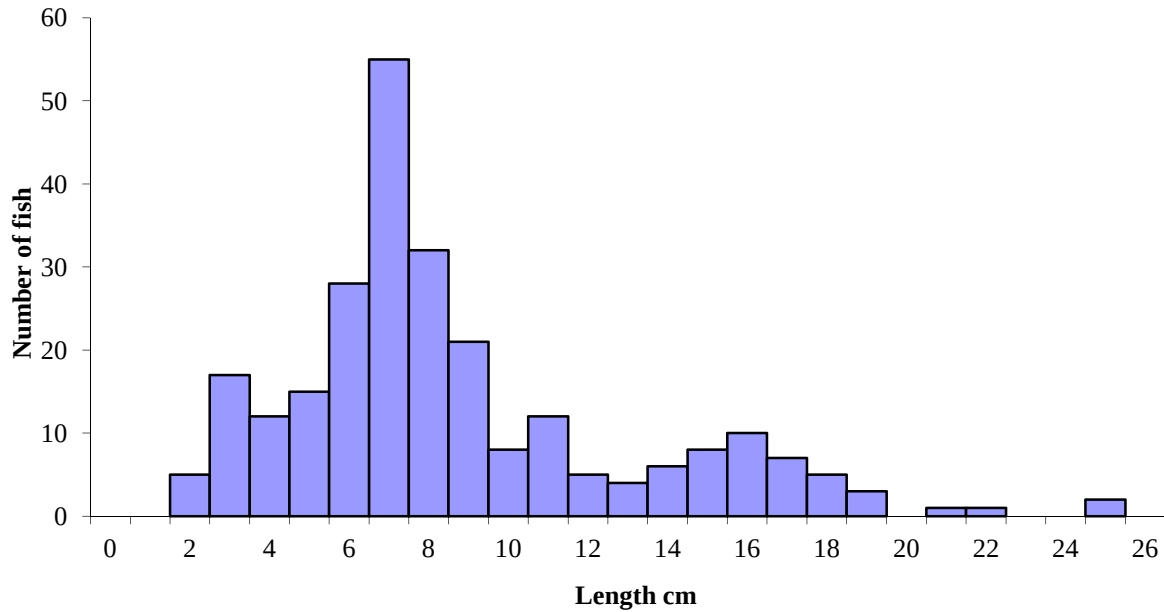


Fig. 3.2. Length frequency distribution of a sub-sample of flounder captured in Castletown Estuary, September 2009 (n = 257)

3.2 Inner Dundalk Bay

Inner Dundalk Bay is situated on Ireland's east coast, adjacent to the town of Dundalk, Co. Louth and covers an area of 33.35km² (Fig.3.3, Plate 3.2). At low tide approximately 70% of the estuary is exposed tidal mudflats. Inner Dundalk Bay is made up of alluvial mud, gradually progressing to sand beyond the buoyed channel. The estuary is promoted by the ERFB as an angling venue for dogfish, tope, bull huss, mackerel, codling, spurdog, flounder, whiting, coalfish, ling, gurnard, wrasse and pollack.

Inner Dundalk Bay is also situated within Dundalk Bay SAC, which is described in Section 3.1. The estuary receives the waters from the Castletown, Flurry, and Fane rivers which drain predominately agricultural land.

A total of two beach seines, two fyke nets and four beam trawls were deployed in Inner Dundalk Bay in September 2009.

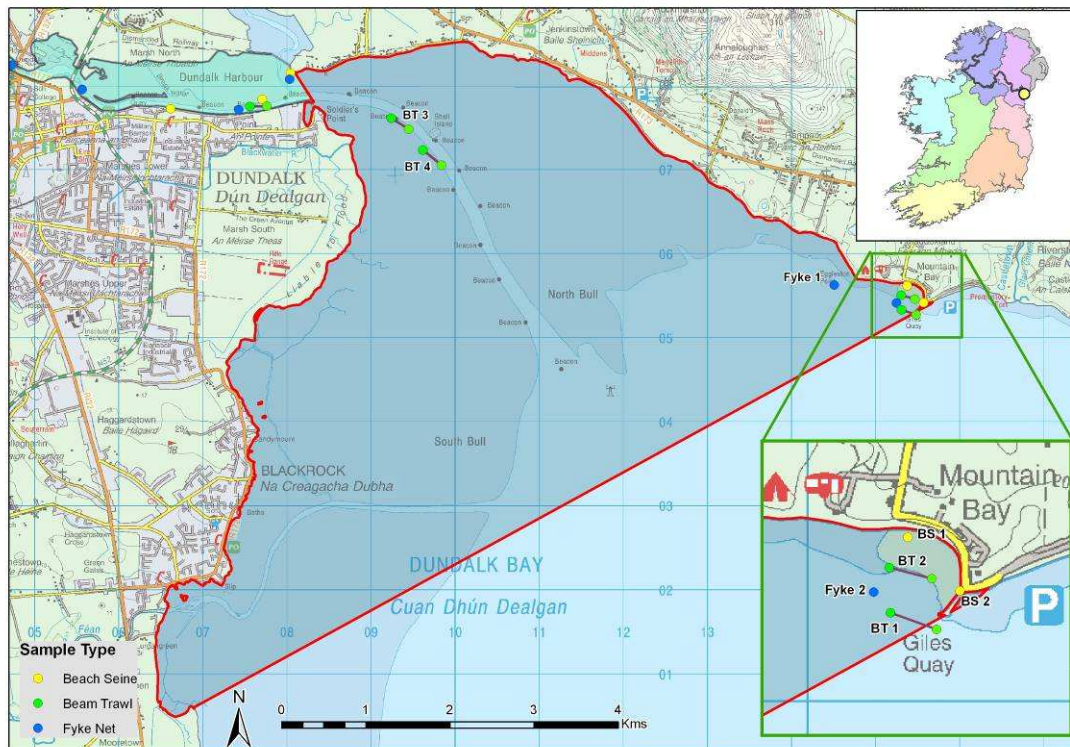


Fig 3.3. Location map of Inner Dundalk Bay indicating sample sites, September 2009



Plate 3.2. Aerial view of Inner Dundalk Bay, showing Castletown Estuary flowing from the north west and Ballymascanlon Estuary from the North east (Photo courtesy of IFI and No. 3 Operational Wing, Irish Air Corps [Aer Chór na hÉireann])

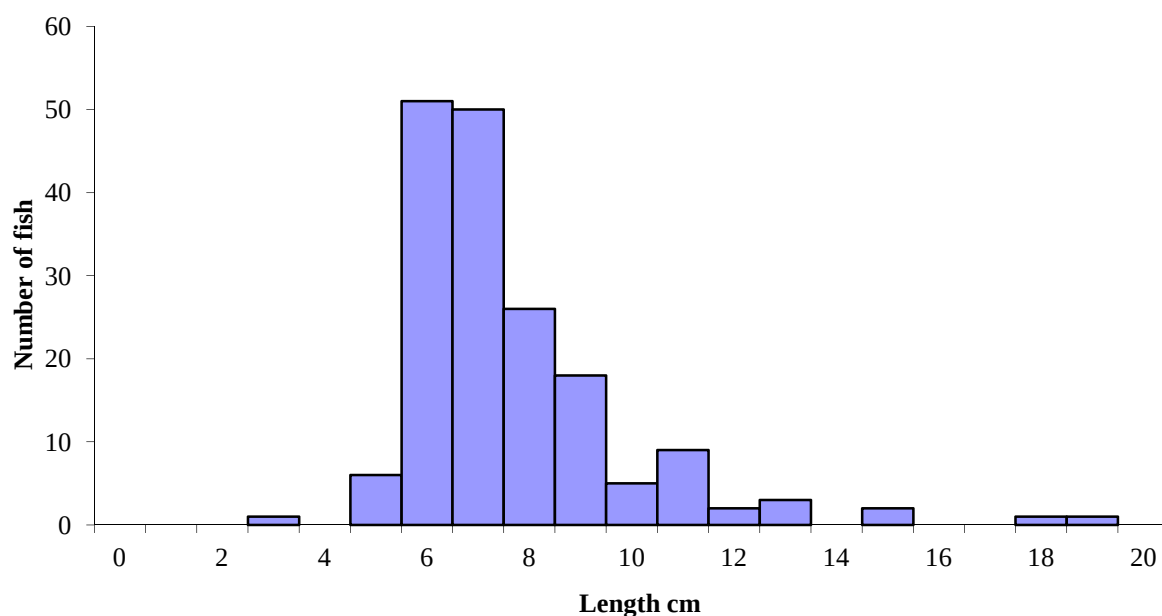
A total of 16 fish species were recorded in Inner Dundalk Bay in September 2009 (Table 3.2). Sprat was the most abundant species captured, followed by cod, plaice and flounder. Greater numbers of cod, plaice and whiting were captured in Inner Dundalk Bay than in any other WFD transitional water body surveyed in 2009. Inner Dundalk Bay was the only WFD transitional water body surveyed in 2009 in which smooth hound was recorded.

Plaice ranged in length from 3.5cm to 19.5cm and the length frequency distribution shows that the sampled population was composed mostly of juveniles (Fig. 3.4). Cod ranged in length from 7.0cm to 19.5cm, and their length frequency distribution also indicates that the sampled population was dominated by juveniles (Fig. 3.5).

Salinity values taken at beach seine sites ranged from 21.9ppt in the upper estuary to 22.2ppt in the lower estuary.

Table 3.2. Number of each species captured by each gear type in Inner Dundalk Bay, September 2009

Scientific name	Common Name	Beach seine (2)	Fyke net (2)	Beam trawl (4)	Total
<i>Sprattus sprattus</i>	Sprat	805	-	2	807
<i>Gadus morhua</i>	Cod	1	247	3	251
<i>Pleuronectes platessa</i>	Plaice	37	37	150	224
<i>Platichthys flesus</i>	Flounder	3	14	16	33
<i>Ciliata mustela</i>	Five-bearded rockling	-	27	-	27
<i>Limanda limanda</i>	Dab	-	21	1	22
<i>Pomatoschistus minutus</i>	Sand goby	1	-	15	16
<i>Merlangius merlangus</i>	Whiting	-	12	2	14
<i>Lipophrys pholis</i>	Blenny	2	-	-	2
<i>Trisopterus luscus</i>	Bib	-	2	-	2
<i>Solea solea</i>	Common sole	-	-	1	1
<i>Scyliorhinus canicula</i>	Lesser spotted dogfish	-	1	-	1
<i>Mustelus mustelus</i>	Smooth hound	-	1	-	1
<i>Anguilla anguilla</i>	Eel	-	1	-	1
<i>Taurulus bubalis</i>	Long-spined sea scorpion	1	-	-	1
<i>Syngnathus acus</i>	Greater pipefish	-	-	1	1

**Fig. 3.4. Length frequency distribution of a sub-sample of plaice captured in Inner Dundalk Bay, September 2009 (n = 175)**

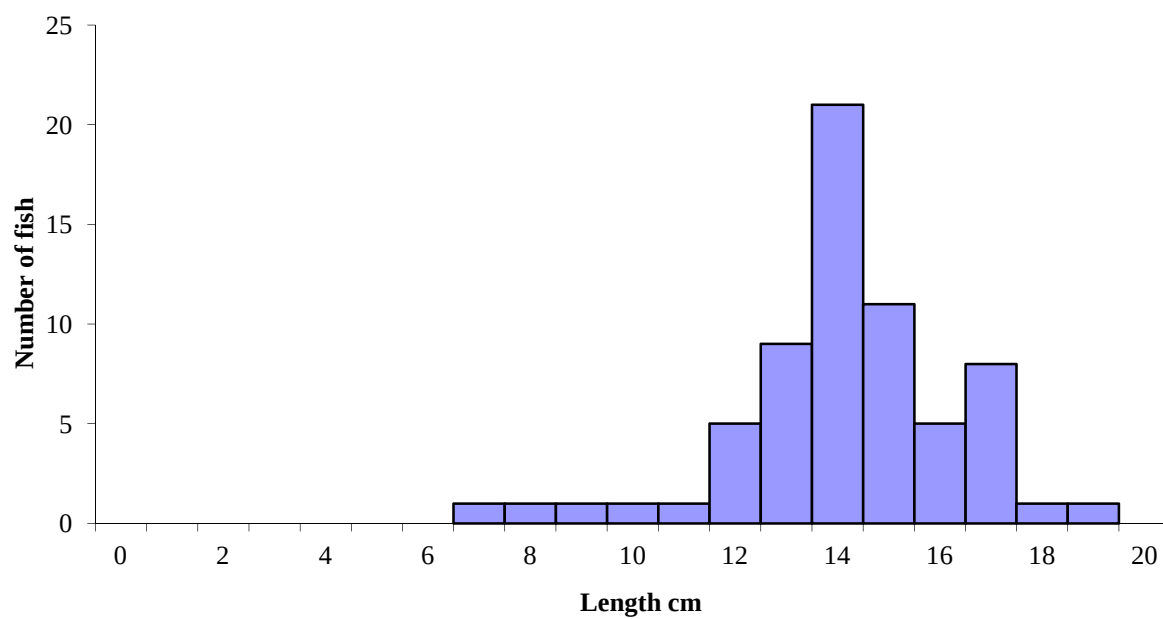


Fig. 3.5. Length frequency distribution of a sub-sample of cod captured in Inner Dundalk Bay, September 2009 (n = 66)

4. SUMMARY

Castletown Estuary and Inner Dundalk Bay contained a total of 11 and 16 fish species respectively (sea trout are included as a separate ‘variety’ of trout), which is similar to other transitional water bodies surveyed in the ERFB during 2009. The higher proportion of freshwater tolerant species in the Castletown Estuary reflects the more sheltered and riverine conditions within this water body, when compared with Inner Dundalk Bay, which is more open and exposed to the sea. Juveniles of several important commercial or angling species, including flounder, plaice, cod and sprat, were recorded in Castletown Estuary and Inner Dundalk Bay. Species richness and distribution among all transitional water bodies surveyed during 2009 can be seen in the 2009 WFD summary report (Kelly *et al.*, 2010).

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, both Castletown Estuary and Inner Dundalk Bay have both been assigned draft ecological status classifications of “Moderate” based on the fish populations present.

The EPA have assigned both Inner Dundalk Estuary and Castletown Estuary an overall interim draft classification of “Moderate” status, based on general physico-chemical elements, phytoplankton and macroalgal growths.

5. REFERENCES

- 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.
- 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
- Kelly, F., Harrison, A., Connor, L., Matson, R., Wightman, G., Morrissey, E., O'Callaghan, R., Feeney, R., Hanna, G., Wögerbauer, C. and Rocks, K. (2010) *Sampling Fish for the Water Framework Directive – Summary Report 2009*. Central and Regional Fisheries Boards.
- King, J.J., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., Fitzpatrick, Ú., Gargan, P.G., Kelly, F.L., O' Grady, M.F., Poole, R., Roche, W.K. and Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles and Freshwater Fish*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Marine Institute (2009) *The Stock Book*. Marine Institute, Galway.
- NPWS (2001) *Dundalk Bay. Site synopsis, site Code: 004026*. Available at:
<http://www.npws.ie/media/npwsie/content/images/protectedsites/sitesynopsis/SY000455.pdf>
- O'Reilly, P. (2002) *Rivers of Ireland; A Flyfisher's Guide*. 5th Edition. Merlin Unwin Books, Shropshire, U.K. pp.272-274.

**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**