Inner Donegal Bay

Sampling Fish for the Water Framework Directive - Transitional Waters 2009

The Central and Regional Fisheries Boards

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1. INTRODUCTION

A fish stock survey was conducted on Inner Donegal Bay as part of the fish monitoring programme for the Water Framework Directive (WFD), between the 30th of September and the 1st of October 2009 by staff from the Central Fisheries Board (CFB) and the Northern Regional Fisheries Board (NRFB).

Inner Donegal Bay covers an area of 8.12km² and is located on Ireland's north-west coast, with the town of Donegal situated on the north-east corner of the estuary (Fig. 1.1). Adjacent land bordering the rest of the estuary is largely undeveloped.

This water body lies within the Donegal Bay (Murvagh) SAC, which is important for habitats listed in Annex I of the EU Habitats Directive, including sand dunes and fixed dunes. Annex II listed species present include the common seal (NPWS, 2000).

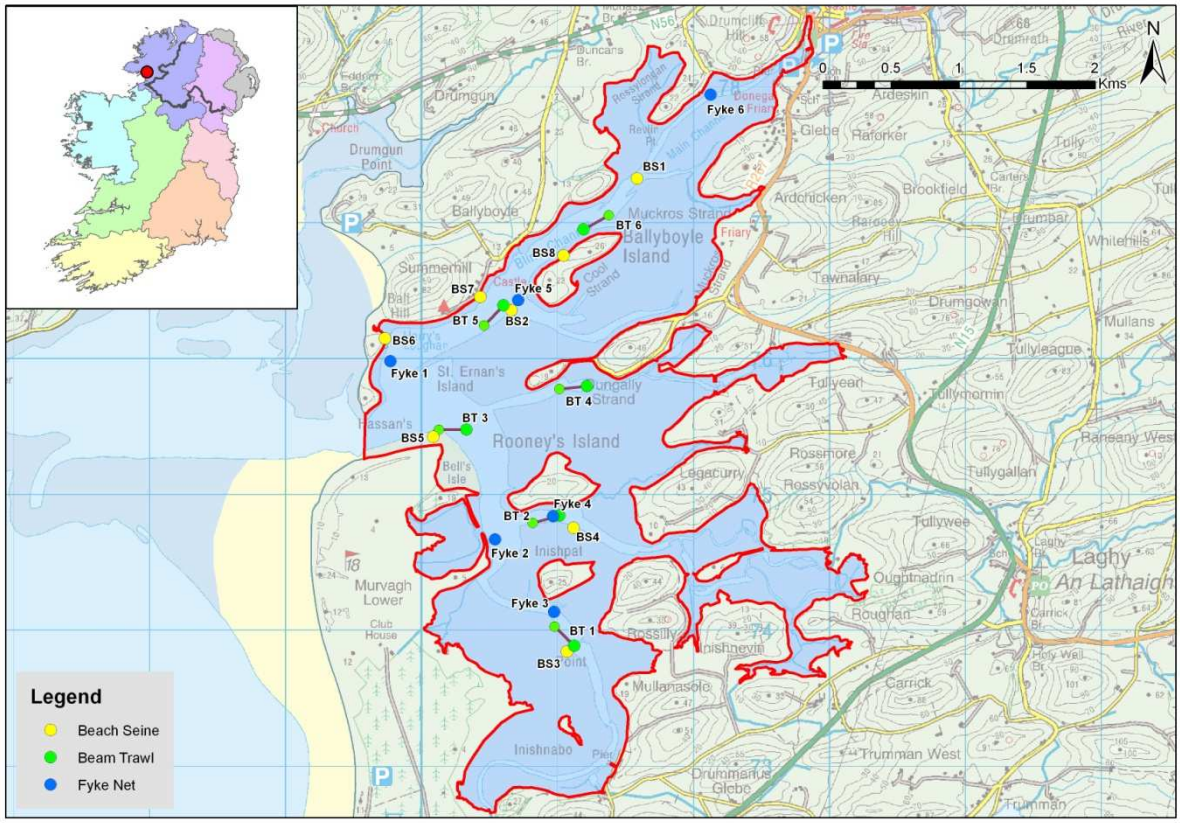

Fig 1.1. Location map of Inner Donegal Bay indicating sample sites, September–October 2009

Plate 1.1. Beach seining in Inner Donegal Bay, September–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.

A total of eight beach seines, six beam trawls and six fyke nets were deployed in Donegal Bay in September–October 2009.

3. RESULTS

A total of 21 fish species (sea trout are included as a separate 'variety' of trout) were recorded in Inner Donegal Bay in October 2009 (Table 3.1). Lesser sandeel was the most abundant species captured, followed by sand goby, plaice, sprat, cod, poor cod and Pollack. Other species of interest included sea trout and flounder. Inner Donegal Bay was the only WFD transitional water body surveyed in 2009 in which greater sandeel was recorded.

Greater numbers of three gadoid species, coalfish, pollack and poor cod, were captured in Inner Donegal Bay than in any other WFD transitional water body surveyed in 2009. Length frequencies of a representative sample of four gadoid species (coalfish, cod, pollack and poor cod) are shown in Figure 3.1. The length frequency distributions indicate that the recorded populations of cod, pollack and poor cod are composed predominantly of a cohort of juvenile fish, which indicates that these gadoid species utilise Inner Donegal Bay as a nursery area for juveniles.

Salinity values taken at beach seine site ranged from 0.341ppt in the upper estuary to 26.7ppt in the lower estuary.

Table 3.1. Number of each species captured by each gear type in Inner Donegal Bay, September–October 2009

Scientific name	Common Name	Beach seine (8)	Fyke net (6)	Beam trawl (6)	Total
Ammodytes tobianus	Lesser sandeel	172	-	-	172
Pomatoschistus minutus	Sand goby	86	-	37	123
Pleuronectes platessa	Plaice	12	3	96	111
Sprattus sprattus	Sprat	90	-	-	90
Gadus morhua	Cod	1	78	-	79
Trisopterus minutus	Poor cod	-	76	-	76
Pollachius pollachius	Pollack	24	52	-	76
Ciliata mustela	Five-bearded rockling	-	39	-	39
Pollachius virens	Coalfish (Saithe)	2	36	-	38
Taurulus bubalis	Long-spined sea scorpion	4	2	7	13
Platichthys flesus	Flounder	1	1	4	6
Agonus cataphractus	Pogge	2	-	4	6
Spinachia spinachia	Fifteen-spined stickleback	2	1	-	3
Syngnathus acus	Greater pipefish	2	-	-	2
Salmo trutta	Sea trout	1	-	-	1
Hyperoplus lanceolatus	Greater sandeel	1	-	-	1
Pholis gunnellus	Gunnel (Butterfish)	1	-	-	1
Gobius paganellus	Rock goby	-	1	-	1
Scophthalmus rhombus	Brill	1	-	-	1
Myoxocephalus scorpius	Short-spined sea scorpion	-	1	-	1
Syngnathus typhle	Deep-snouted pipefish	-	1	-	1

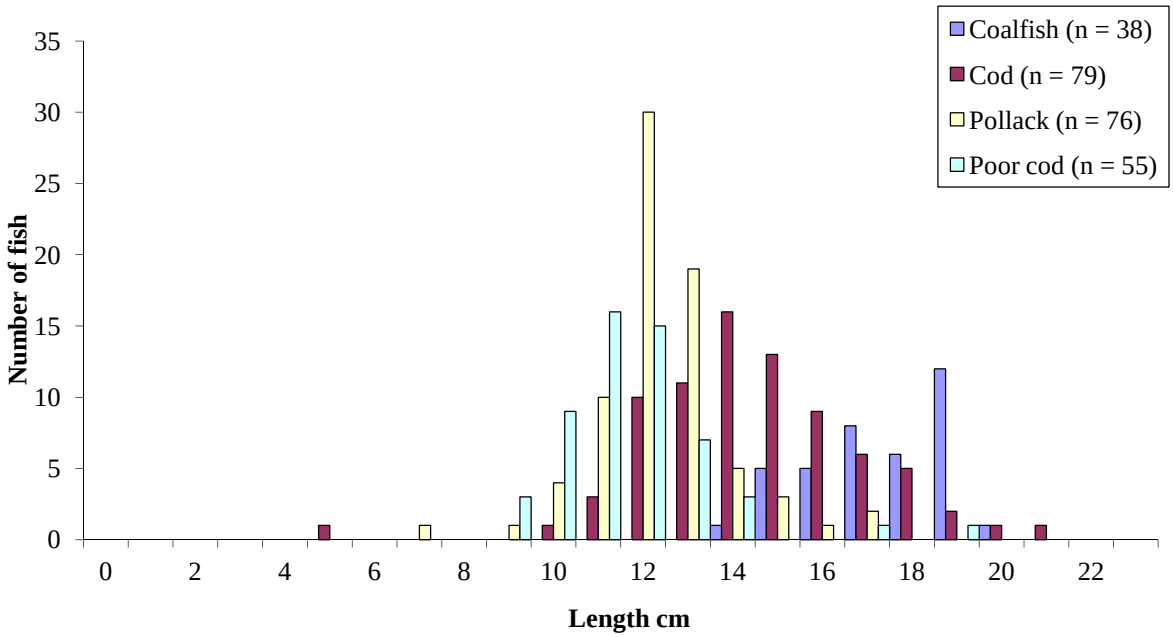

Fig. 3.1. Length frequency distribution of a sub-sample of gadoids captured in Inner Donegal Bay, September–October 2009

4. SUMMARY

A total of 21 fish species (sea trout are included as a separate 'variety' of trout) were recorded in Inner Donegal Bay, which is the second highest species richness of all WFD transitional water bodies surveyed in the NRFB in 2009. The species recorded in Inner Donegal Bay were dominated by marine fish, which indicates that the sea exerts a great influence on species composition in this water body compared with the more freshwater conditions in the upper reaches of many estuaries. Juveniles of a number of commercially important fish species were present, including cod, plaice, coalfish and pollack, as well as other species of angling importance, such as flounder and sea trout. Information on 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, Inner Donegal Bay has been assigned a draft ecological status classification of "Good" based on the fish populations present.

The EPA have assigned Inner Donegal Bay an interim draft classification of "High" status, based on general physico-chemical elements, phytoplankton, fish 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.

NPWS (2000) Donegal Bay (Murvagh). *Site Synopsis, site code: 000133.* Available at: http://www.npws.ie/media/npwsie/content/images/protectedsites/sitesynopsis/SY000133.pdf

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