Camus Bay and Lough an Aibhnin

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 Camus Bay and Loch an Aibhnín transitional waters, as part of the programme of fish monitoring for the Water Framework Directive (WFD), between the 15th and 23rd of October 2009 by staff from the Central Fisheries Board (CFB) and the Western Regional Fisheries Board (WRFB).

Camus Bay is located in Connemara, Co. Galway, on Irelands west coast. Loch an Aibhnín joins Camus Bay at its southern end (Fig. 1.1, Plate 1.1 and 1.2). 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, October 2009 (L=lagoon)

Transitional Water body	MS Code	Easting	Northing	Type	Area (km^2)
Camus Bay	WE_200_0200	94485	233785	L	10.75
Loch an Aibhnín	WE_200_0700	94702	231553	L	0.54

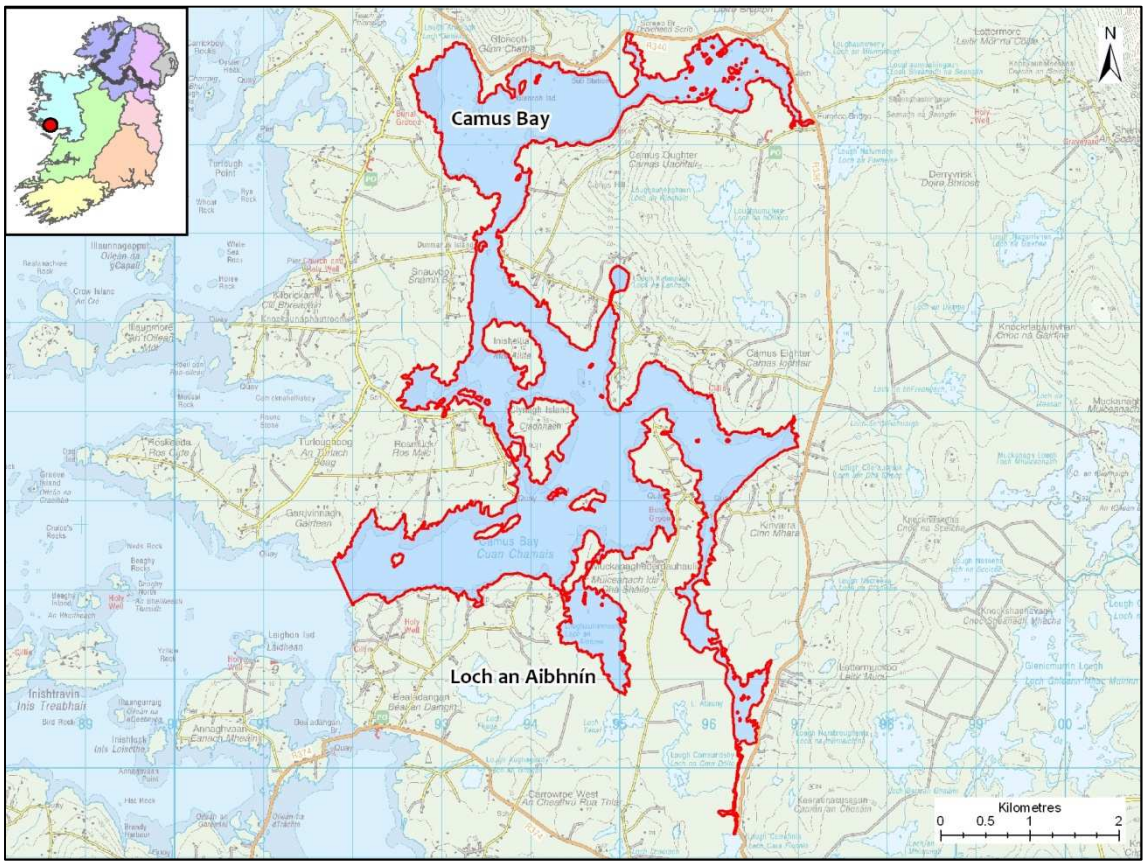

Fig. 1.1. Location map of the two transitional water bodies on the Camus Bay system surveyed for WFD fish monitoring, October 2009

Plate 1.1. Photo showing the rocky shoreline of Camus Bay, October 2009

Plate 1.2. Hauling a seine net in Loch an Aibhnín, 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 Camus Bay

Camus Bay covers an area of 10.75km² and is located on Ireland's west coast, approximately 36km north-west of Galway city. It is situated within a sparsely populated area of Connemara, with no large towns nearby (Fig. 3.1, 3.2). Camus Bay is a complicated network of wide open water areas, linked by a series of narrow channels that can flow rapidly on rising and falling tides. It has a rocky shoreline, which in most places gives way to mud in shallow water. The intertidal zone is small with steep rocky shores in many places. Freshwater inputs from various lakes and small rivers flow into the estuary, most notably the Screeb River.

This water body is located in the Kilkieran Bay and Islands SAC, which is important for a number of habitats listed in Annex I of the EU Habitats Directive, including lagoons and saltmarsh. Annex II listed species present include the otter (NPWS, 2006).

A total of nine beach seines, 12 fyke nets and seven beam trawls were deployed in Camus Bay in October 2009.

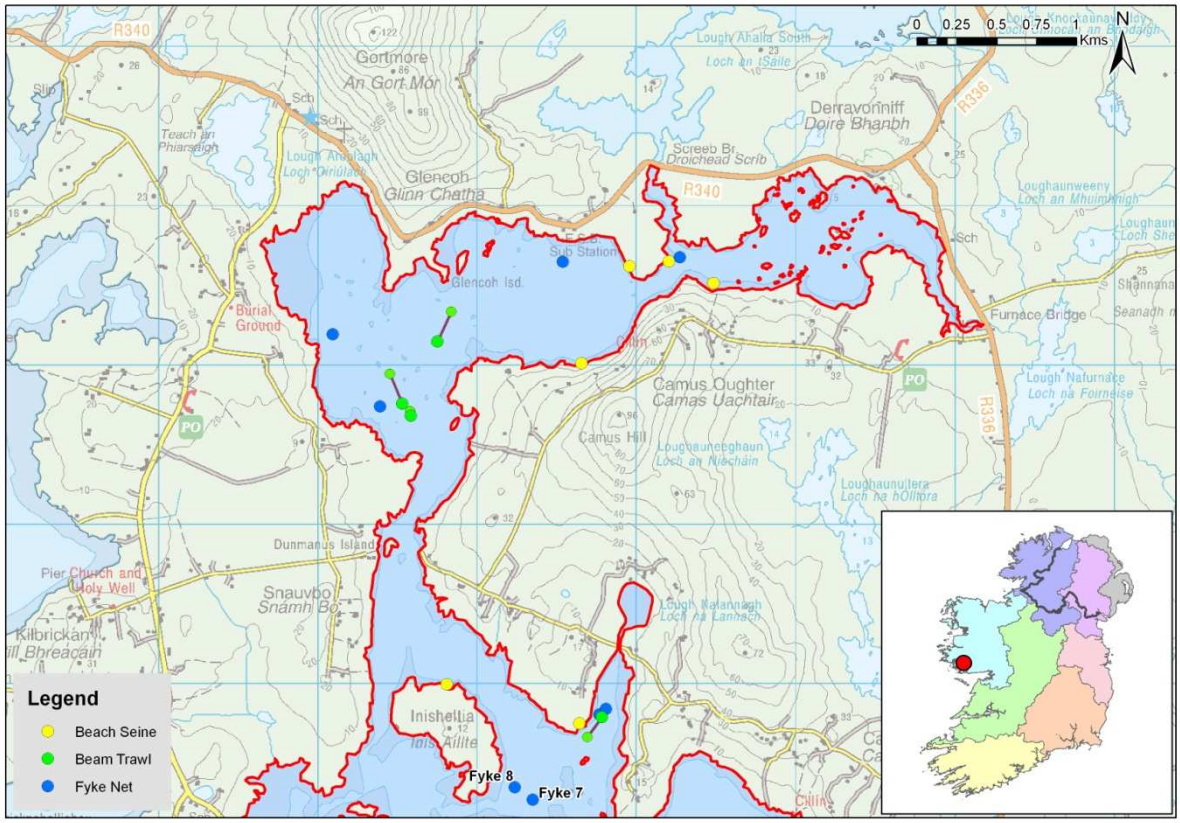

Fig 3.1. Location map of North Camus Bay indicating sample sites, October 2009

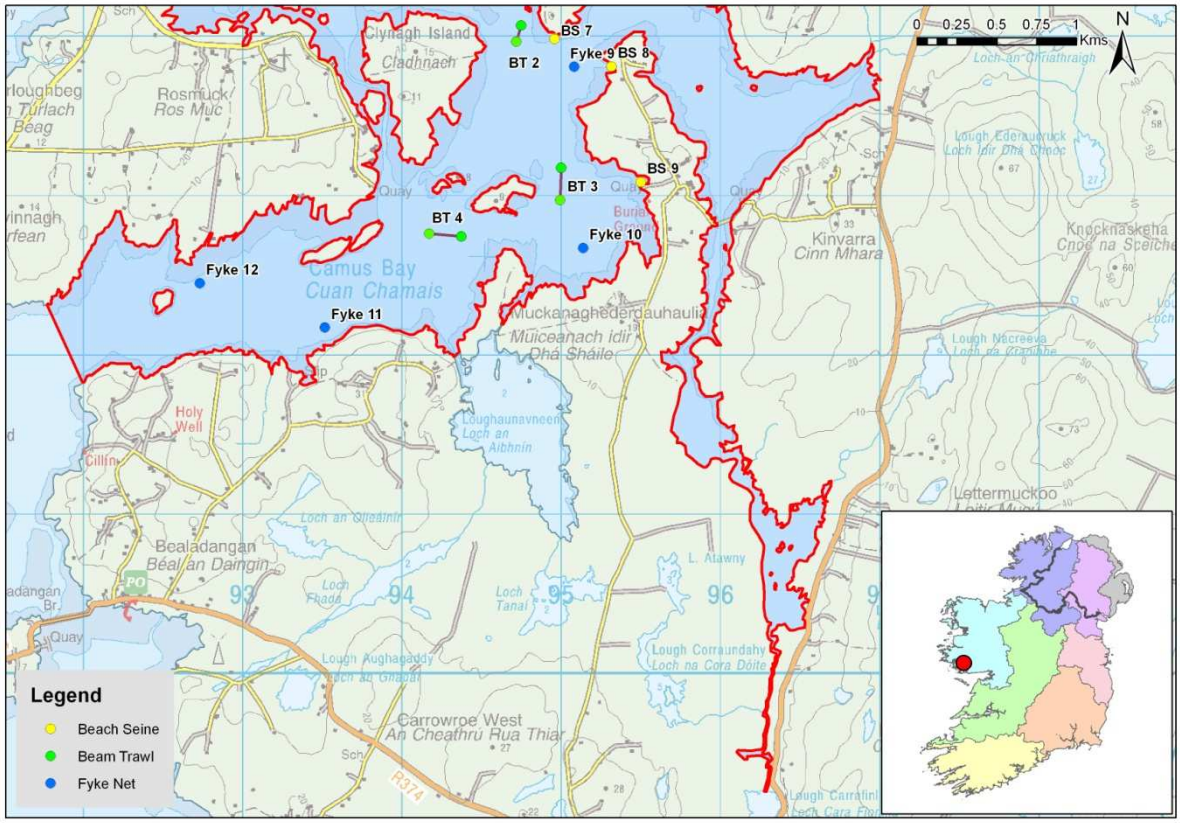

Fig 3.2. Location map of South Camus Bay indicating sample sites, October 2009

A total of 27 fish species were recorded in Camus Bay during October 2009 (Table 3.1). Three-spined stickleback was the most abundant species, followed by sand smelt, sand goby and black goby (Table 3.1). Camus Bay was the only WFD transitional water body surveyed in 2009 in which goldsinny wrasse was recorded. Furthermore, greater numbers of six species, including bull huss, were captured in Camus Bay than in any other WFD transitional water body surveyed in 2009.

The vast majority of three-spined stickleback as well as most of the eels were more abundant in the uppermost sites, whereas rock cook wrasse and bull huss were more abundant at the lower sites closer to the sea. Only two species of flatfish were recorded in Camus Bay, probably due to the rocky nature of the substrate. In contrast, sand smelt were recorded throughout the water body and ranged in length from 3.5cm to 9.3cm (Fig. 3.3).

Salinity values taken at beach seine sites ranged from 21.3ppt in the upper estuary to 25.5ppt in the lower estuary.

Table 3.1. Number of each species captured by each gear type in Camus Bay, October 2009

Scientific name	Common Name	Beach seine (9)	Fyke net (12)	Beam trawl (7)	Total
Gasterosteus aculeatus	Three-spined stickleback	817	-	-	817
Atherina presbyter	Sand smelt	84	-	-	84
Pomatoschistus minutus	Sand goby	58	-	1	59
Gobius niger	Black goby	34	11	-	45
Scyliorhinus stellaris	Bull huss	-	27	-	27
Spinachia spinachia	Fifteen-spined stickleback	25	-	-	25
Syngnathus typhle	Deep-snouted pipefish	25	-	-	25
Anguilla anguilla	Eel	6	11	-	17
Chelon labrosus	Thick-lipped grey mullet	10	-	-	10
Pomatoschistus microps	Common goby	8	-	1	9
Centrolabrus exoletus	Rock cook wrasse	-	9	-	9
Pollachius pollachius	Pollack	1	7	-	8
Gobius paganellus	Rock goby	4	-	-	4
Myoxocephalus scorpius	Short-spined sea scorpion	2	1	1	4
Labrus bergylta	Ballan wrasse	-	3	1	4
Lipophrys pholis	Blenny	-	-	3	3
Merlangius merlangus	Whiting	-	3	-	3
Gadus morhua	Cod	-	3	-	3
Pomatoschistus pictus	Painted goby	-	-	2	2
Taurulus bubalis	Long-spined sea scorpion	1	1	-	2
Salmo trutta	Brown trout	2	-	-	2
Trisopterus minutus	Poor cod	-	2	-	2
Ctenolabrus rupestris	Goldsinny wrasse	-	2	-	2
Pleuronectes platessa	Plaice	1	-	-	1
Trisopterus luscus	Bib	-	1	-	1
Raja clavata	Thornback ray	-	1	-	1
Callionymus lyra	Common dragonet	-	-	1	1

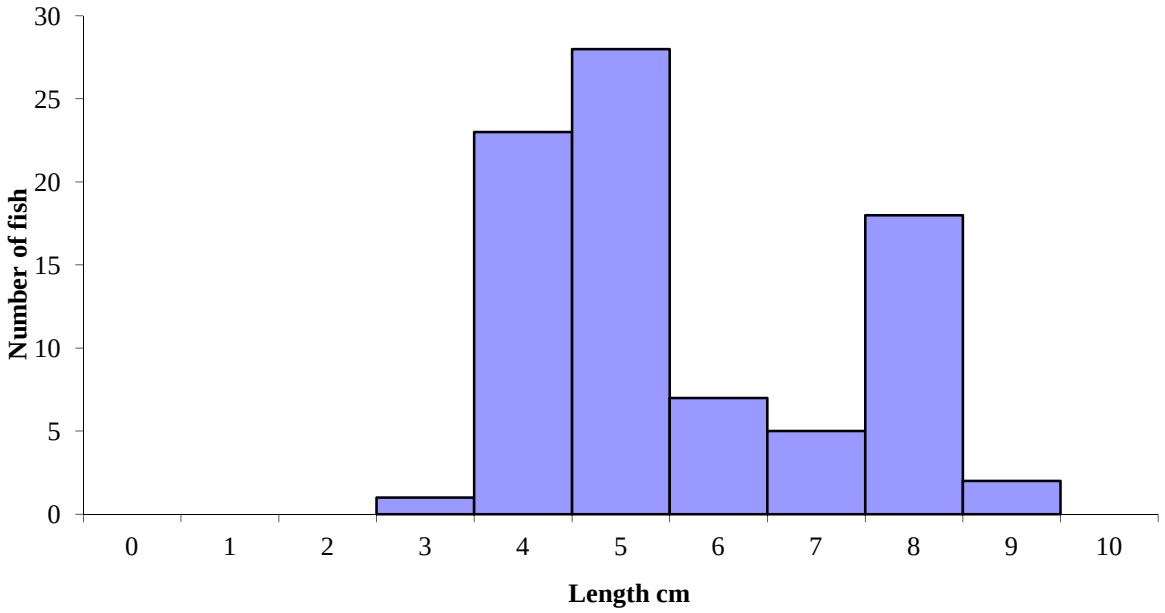

Fig. 3.3. Length frequency distribution of sand smelt captured in Camus Bay, October 2009 (n = 84)

3.2 Loch an Aibhnín

Loch an Aibhnín is located on the southern edge of Camus Bay in Connemara, County Galway, approximately 36km north-west of Galway city (Fig. 3.4, Plate 3.2). It is a relatively small water body, approximately 1.2km long with a maximum width of 800m, and covers an area of 0.54km². It receives freshwater from several small unnamed streams that drain a number of small lakes on the western and southern shores.

This water body is also located in the Kilkieran Bay and Islands SAC (NPWS, 2006), which is described in Section 3.1.

A total of four beach seines and four fyke nets were deployed in Loch an Aibhnín in October 2009. Beam trawls could not be used due to the rocky substrate of the lagoon.

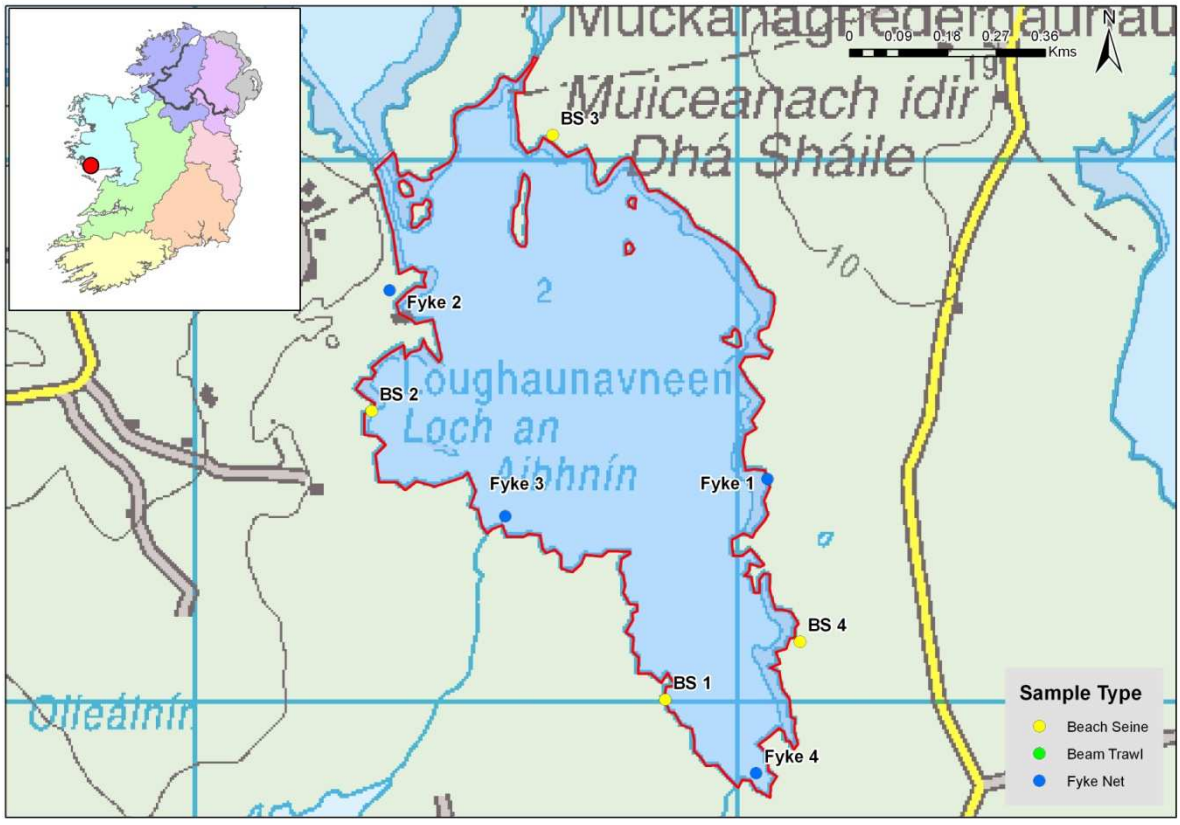

Fig 3.4. Location map of Loch an Aibhnín indicating sample sites, October 2009

A total of nine fish species were recorded in Loch an Aibhnín in October 2009 (Table 3.2). Three-spined stickleback was the most abundant species, followed by deep-snouted pipefish, eel, sand smelt and black goby (Table 3.2).

Greater numbers of deep-snouted pipefish were captured in Loch an Aibhnín than in any other WFD transitional water body surveyed in 2009. This relatively high abundance of deep-snouted pipefish recorded in Loch an Aibhnín may be explained by this species' preference for habitat that contains the seagrass *Zostera sp.*, which occurs in a number of areas in Kilkieran Bay (NPWS, 2006). Deep-snouted pipefish ranged in length from 8.5cm to 21.6cm (Fig. 3.5).

Salinity values taken at beach seine sites ranged from 14.0ppt to 25.3ppt.

Table 3.2. Number of each species captured by each gear type in Loch an Aibhnín, October 2009

Scientific name	Common Name	Beach seine (4)	Fyke net (4)	Beam trawl (0)	Total
Gasterosteus aculeatus	Three-spined stickleback	871	-	-	871
Syngnathus typhle	Deep-snouted pipefish	116	-	-	116
Anguilla anguilla	Eel	-	26	-	26
Atherina presbyter	Sand smelt	12	-	-	12
Gobius niger	Black goby	4	6	-	10
Chelon labrosus	Thick-lipped grey mullet	2	-	-	2
Platichthys flesus	Flounder	1	-	-	1
Pomatoschistus minutus	Sand goby	1	-	-	1
Centrolabrus exoletus	Rock cook wrasse	-	1	-	1

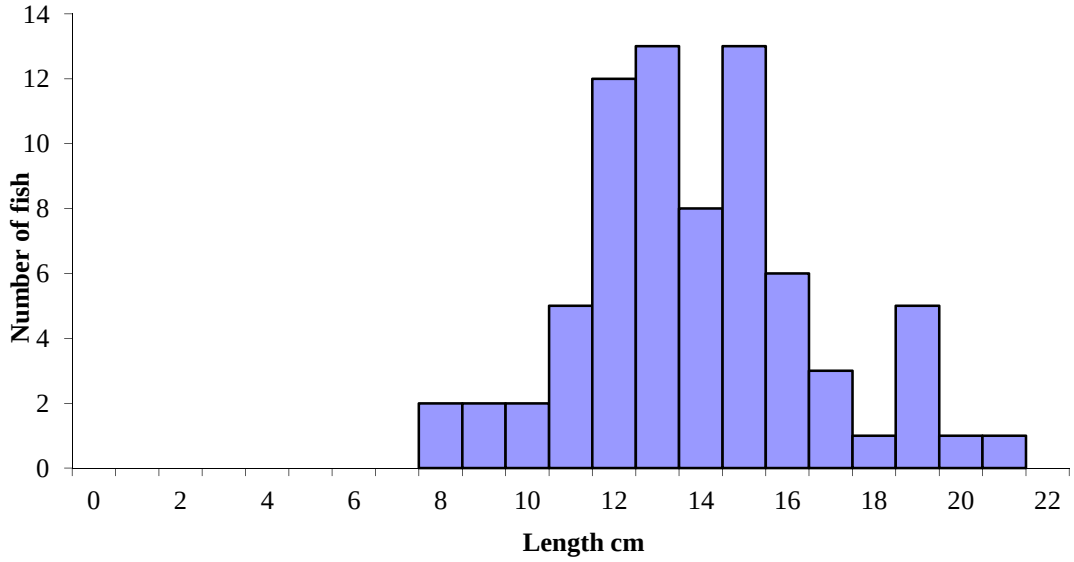

Fig. 3.5. Length frequency distribution of a sub-sample of deep-snouted pipefish captured in Loch an Aibhnín, October 2009 (n = 74)

4. SUMMARY

A total of 27 and 9 fish species were recorded in Camus Bay and Loch an Aibhnín, respectively. Camus Bay had the highest species richness of all WFD transitional water sites surveyed in the WRFB in 2009. A number of species of angling importance were present, including bull huss, brown trout, thick-lipped grey mullet, pollack and cod. 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).

Camus Bay contained a relatively high number of fish species, with a composition typical of a marine environment with high salinities. The rocky substrate in the intertidal area, however, was an unsuitable habitat for flatfish species, such as plaice; this was reflected in the relatively low abundance of flatfish species in this estuary. Loch an Aibhnín had a relatively large range of species for its size. Some species captured, such as wrasse, are representative of the marine environment, indicating a good connectivity of Loch an Aibhnín with the sea.

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, Camus Bay has been assigned a draft ecological status classification of “Good” and Loch an Aibhnín has been assigned a draft ecological status classification of “Moderate” based on the fish populations present.

The EPA have assigned Camus Bay Estuary an overall interim draft classification of “High” status, based on general physico-chemical elements, phytoplankton and macroalgal growths.

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