



Sampling Fish for the Water Framework Directive

Rivers 2011

**Eastern River
Basin District**



Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Rivers in the Eastern River Basin District, 2011

Fiona L. Kelly, Ronan Matson, Lynda Connor, Rory Feeney, Emma Morrissey, Ciara Wogerbauer
and Kieran Rocks

Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin

CITATION: Kelly, F.L., Matson, R., Connor, L., Feeney, R., Morrissey, E., Wogerbauer, C. and Rocks, K. (2012) Water Framework Directive Fish Stock Survey of Rivers in the Eastern River Basin District. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland.

Cover photo: Ronan and Karen electric-fishing © Inland Fisheries Ireland

ACKNOWLEDGEMENTS

The authors wish to gratefully acknowledge the help and co-operation of the regional director Mr. William Walsh and staff from IFI Blackrock as well as various other offices throughout the region. The authors also gratefully acknowledge the help and cooperation of colleagues in IFI Swords.

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

Furthermore, the authors would like to acknowledge the funding provided for the project from the Department of Communications, Energy and Natural Resources for 2011.

PROJECT STAFF

Project Director/Senior Research Officer:	Dr. Fiona Kelly
Project Manager:	Ms. Lynda Connor
Research Officer:	Dr. Ronan Matson
Technician	Mr. Rory Feeney
Technician:	Ms. Emma Morrissey
Technician:	Mrs. Ciara Wögerbauer
GIS Officer:	Mr. Kieran Rocks
Project Manager:	Dr. Andrew Harrison (until Dec 2012)
Fisheries Assistant:	Mr. Michael Behan (Jul 2011 – Oct 2011)
Fisheries Assistant:	Ms. Karen Kelly (Jul 2011 – Nov 2011)
Fisheries Assistant:	Ms. Sinead O'Reilly (Jul 2011 – Nov 2011)
Fisheries Assistant:	Ms. Patricia Wilson (Jul 2011 – Nov 2011)

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, 2011.

TABLE OF CONTENTS

1. INTRODUCTION.....	3
2. STUDY AREA.....	3
3. METHODS	6
4. RESULTS	7
4.1 River surveys.....	7
4.1.1 The Avoca River – Woodenbridge	7
4.1.2 The Brittas River - upstream of Brittas village.....	9
4.1.3. The Broadmeadow Water, Ratoath Stream and Ward River.....	12
4.1.4. The Camac River (Riverside and Moneenalion)	21
4.1.5. The River Dodder (Beaver Row, Mount Carmel, Bohernabreena and Piperstown)	25
4.1.6. The Griffeen River (Griffeen Avenue and Grange Castle).....	34
4.1.7 The Mayne River (Wellfield bridge)	38
4.1.8 The Owendoher River (Cruagh Road Br.)	41
4.1.9 The Rye Water, Lyreen River and Baltracey River	44
4.1.10 The Tolka River and Pinkeen River	55
4.2 Species distribution.....	60
4.3 Age and growth.....	61
4.3 Ecological status.....	63
5. DISCUSSION	65
6. REFERENCES.....	66
APPENDIX 1.....	67
APPENDIX 1 continued	68
APPENDIX 2.....	69
APPENDIX 3.....	69

1. INTRODUCTION

Fish stock surveys were undertaken in 65 river sites throughout Ireland during the summer of 2011 as part of the programme of sampling fish for the Water Framework Directive (WFD). These surveys are required by both national and European law, with Annex V of the WFD stipulating that rivers are included within the monitoring programme and that the composition, abundance and age structure of fish fauna are examined (Council of the European Communities, 2000). Twenty-one of these surveys were carried out at river sites in the Eastern River Basin District (ERBD) between July and September 2011 by staff from Inland Fisheries Ireland (Table 2.1, 2.2 and Fig. 2.1).

Although fish survey work has been carried out in Ireland in the past, no project to date has been as extensive as the current on-going monitoring programme in providing data appropriate for WFD compliance. Continued surveying of these and additional river sites will provide a useful baseline and time-series dataset for future monitoring of water quality. This in turn will provide information for River Basin District (RBD) managers to compile and implement programmes of measures to improve degraded water bodies. As 2011 is the fourth year of the rivers sampling programme, many of the sites surveyed this year are repeat surveys of those carried out in 2008. As a result, data from 2011 can be compared to the previous year's survey to determine if any change in status has occurred.

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

2. STUDY AREA

Twenty-one river sites were surveyed in five river catchments or three hydrometric areas within the ERBD during 2011: the Avoca, Broadmeadow, Liffey, Tolka and Mayne catchments (Table 2.1). The sites ranged in surface area from 80m² for the Mayne River to 626m² for the River Dodder (Beaver Row). All sites were wadeable and were surveyed using bank-based electric fishing units. Summary details of each site's location and physical characteristics are given in Tables 2.1 and 2.2, and the distribution of sites throughout the ERBD is shown in Figure 2.1.

Table 2.1. Description of wadeable river sites surveyed for WFD surveillance monitoring, ERBD 2011

River	Site name	Catchment	Site Code	Waterbody code
Avoca	1km N of Woodenbridge	Avoca	10A030800	EA_10_1477
Broadmeadow Water	Lispopple Br.	Broadmeadow	08B020700	EA_08_295
Ratoath	Br. in Ratoath	Broadmeadow	08R010150	EA_08_240
Ward	Br. d/s of Scotchstone Br.	Broadmeadow	08W010620	EA_08_670
Brittas	Br. just off R114	Brittas - Liffey	09B020100	EA_09_465
Camac	Riverside Estate Br.	Camac - Liffey	09C020310	EA_09_1872
Camac	Moneenalion Commons Br.	Camac - Liffey	09C020250	EA_09_12
Dodder	Footbridge, Beaver Row	Dodder - Liffey	09D010900	EA_09_587
Dodder	Mount Carmel Hospital	Dodder - Liffey	09D010680	EA_09_587
Dodder	Bohernabreena	Dodder - Liffey	09D010100	EA_09_1656
Piperstown	Tributary at Corrageen	Dodder - Liffey	09P030200	EA_09_1656
Owendoher	Cruagh Road Br.	Dodder - Liffey	09O011100	EA_09_1867
Griffeen	Griffeen Avenue Br.	Griffeen - Liffey	09G050300	EA_09_242
Griffeen	Grange Castle	Griffeen - Liffey	09G050200	EA_09_242
Lyreen	Lyreen Angling Centre	Rye Water - Liffey	09L020100	EA_09_611
Baltracey	Fraynes Br.	Rye Water - Liffey	09C030600	EA_09_1129
Rye Water	Kildare Br.	Rye Water - Liffey	09R010400	EA_09_246
Rye Water	Balfeaghan Br.	Rye Water - Liffey	09R010100	EA_09_608
Tolka	Violet Hill Drive	Tolka	09T011100	EA_09_1868
Pinkeen	Br. S. of Calliaghwee	Tolka	09P020500	EA_09_1538
Mayne	Wellfield Br.	Mayne	09M030500	EA_09_1428

Table 2.2. Details of wadeable river sites surveyed for WFD surveillance monitoring, ERBD 2011

River	Upstream catchment area (km ²)	Wetted width (m)	Surface area (m ²)	Mean depth (m)	Max depth (m)
Avoca (1km N of Woodenbridge)	386.34	13.50	567	0.40	0.50
Broadmeadow Water (Lispopple Br.)	93.91	9.12	410	0.10	0.31
Ratoath (Br. in Ratoath)	14.45	2.98	107	0.09	0.17
Ward (Br. d/s of Scotchstone Br.)	61.79	3.60	180	0.14	0.28
Brittas (Br. just off R114)	9.21	2.70	227	0.13	0.28
Camac (Riverside)	32.86	3.98	151	0.23	0.67
Camac (Moneenalion)	21.19	4.08	155	0.11	0.25
Dodder (Beaver Row)	104.58	13.32	626	0.21	0.48
Dodder (Mount Carmel)	93.22	11.62	407	0.24	0.40
Dodder (Bohernabreena)	31.82	6.37	274	0.16	0.43
Piperstown (Tributary at Corrageen)	2.64	1.82	85	0.06	0.21
Owendoher (Cruagh Road Br.)	3.24	3.65	164	0.21	0.46
Griffeen (Griffeen Avenue Br.)	27.04	3.72	164	0.09	0.18
Griffeen (Grange Castle)	21.40	1.90	80	0.18	0.27
Lyreen (Lyreen Angling Centre)	87.97	4.28	171	0.08	0.15
Baltracey (Fraynes Br.)	21.26	3.13	138	0.15	0.35
Rye Water (Kildare Br.)	179.40	6.87	288	0.27	0.48
Rye Water (Balfeaghan Br.)	36.71	3.38	152	0.18	0.47
Tolka (Violet Hill Drive)	136.29	8.72	340	0.35	0.67
Pinkeen (Br. S. of Calliaghwee)	13.72	3.08	123	0.18	0.40
Mayne (Wellfield Br.)	15.03	1.90	80	0.24	0.45

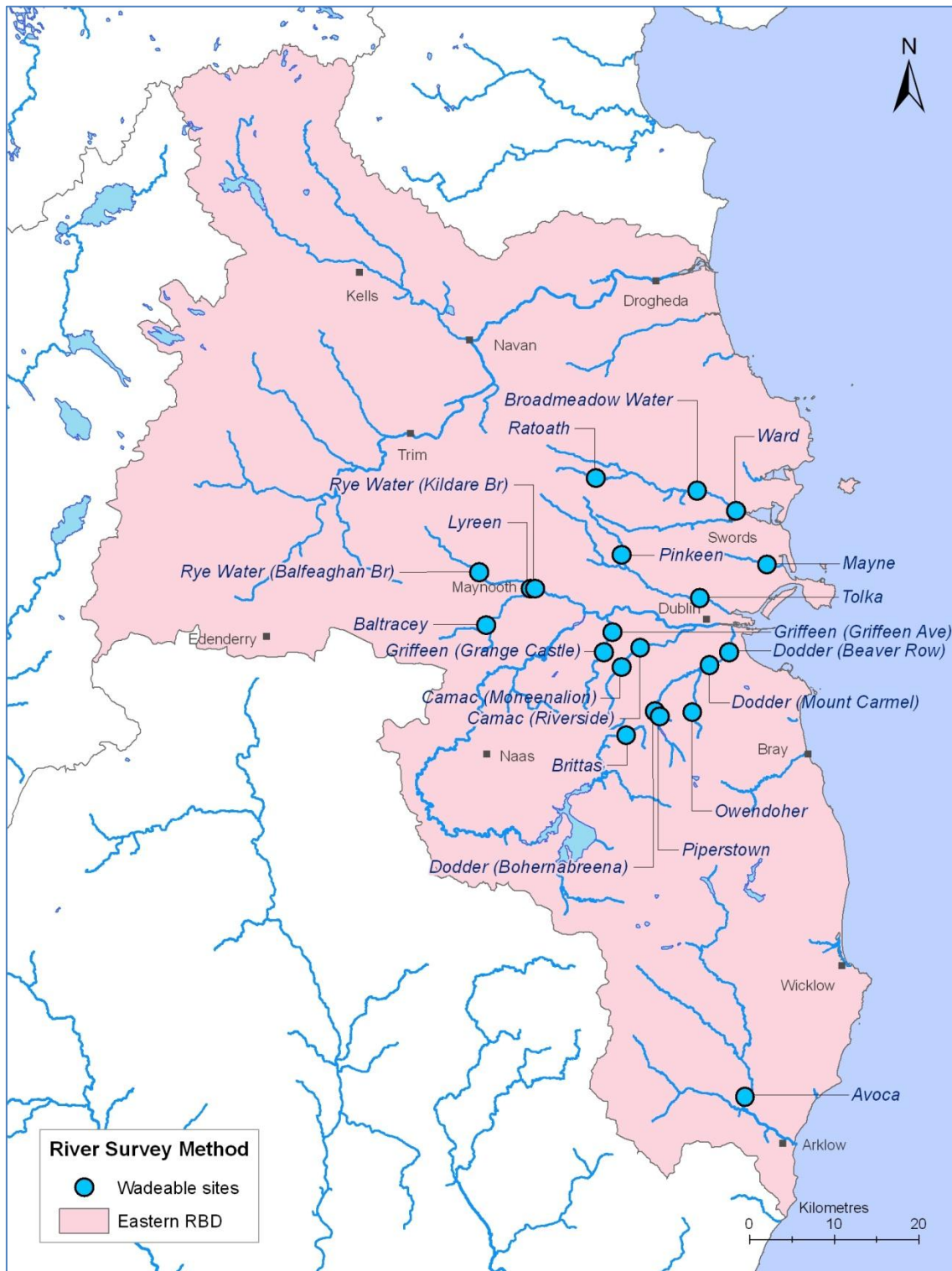


Fig. 2.1. Location map of river sites surveyed throughout the ERBD for WFD fish surveillance monitoring, 2011

3. METHODS

Electric-fishing is the method of choice for surveillance monitoring of fish in rivers to obtain a representative sample of the fish assemblage at each sampling site. This technique complies with European Committee for Standardisation (CEN) guidelines for fish stock assessment in wadeable rivers (CEN, 2003). At each site, the stretch sampled was isolated, where possible, using stop nets, and one to three fishings were carried out using bank-based electric fishing units (hand-sets). Each site ideally contained all habitat types, including riffle, glide and pool. A suite of physical and chemical parameters were also recorded at each site, and in some cases also, a macrophyte survey and two-minute multi-habitat kick sample of benthic macroinvertebrates.

Fish from each pass were sorted and processed separately. During processing, the species of each fish was identified and its length and weight were measured; sub-samples were measured when large numbers of fish were present. For the purpose of species identification, juvenile river lamprey (*Lampetra fluviatilis*), brook lamprey (*Lampetra planeri*) and sea lamprey (*Petromyzon marinus*) were recorded as 'Lamprey sp.'. Sea trout and brown trout were listed separately. For ageing analyses, scales were taken from fish greater than 8.0cm for salmonids and most non-native fish species. These fish were held in a large bin of oxygenated water after processing until they were fully recovered and were then returned to the water. Opercular bones were taken from perch for ageing.

For various reasons, including river width and the practicalities of using stop-nets, three fishing passes were not possible or practical at all sites. Therefore, in order to draw comparisons between sites, fish densities were calculated using data from the first fishing pass only. The number captured in the first pass was divided by the total area surveyed to give a density for each species.

A subsample of the dominant fish species were aged (five fish from each 1cm size class). Fish scales were aged using a microfiche reader, and opercular bones were aged using an Olympus SZX10 microscope/digital camera system. Growth was determined by back-calculating lengths at the end of each winter (e.g. L1 is the mean length at the end of the first winter, L2 is the mean length at the end of the second winter, etc.).

4. RESULTS

4.1 River surveys

4.1.1 The Avoca River – Woodenbridge

One site was electric fished on the Avoca River as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located between the villages of Avoca and Woodenbridge, adjacent to where the river and road (R752) come together (Fig. 4.1; Plate 4.1). One electric-fishing pass was conducted using four bank-based electric fishing units on the 14th of July 2011, along a 42m length of channel. Glide was the most abundant habitat type present, over a substrate of mainly cobble. Macrophyte vegetation was scarce throughout the stretch.



Fig. 4.1. Location of the Avoca River, Woodenbridge site surveillance monitoring site



Plate 4.1. The Avoca River, near Woodenbridge, Co. Wicklow

A total of two fish species were recorded in the Avoca River site. Salmon was the most abundant species, followed by eels (Table 4.1).

Table 4.1. Density of fish (no./m²), Avoca River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	0+	1+ & older	Total minimum density
Salmon	0.011	-	0.011
Eel	-	-	0.002
All Fish	-	-	0.012

Only six salmon were caught, ranging in length from 4.8cm to 6.4cm (mean = 5.5cm), with only one age class (0+) present.

4.1.2 The Brittas River - upstream of Brittas village

One site was electric fished on the Brittas River as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located upstream of a bridge on the Dublin Wicklow border, approximately 2km east of Brittas Village (Fig. 4.2; Plate 4.2). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 20th of September 2011, along an 84m length of channel. Riffle and glide dominated this stretch, with a substrate of cobble and gravel. The vegetation present at this site included a number of mosses and liverworts as well as emergent bank side species.



Plate 4.2. The Brittas River, Co. Wicklow

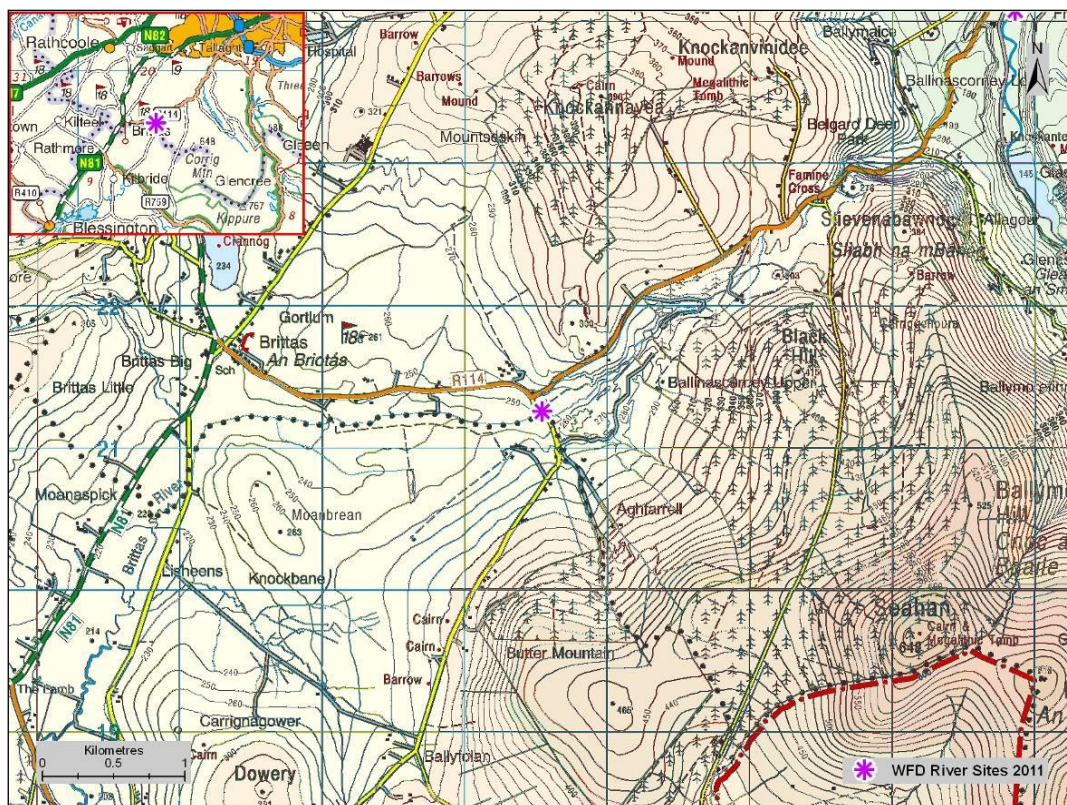


Fig. 4.2. Location of the Brittas River surveillance monitoring site

Only one fish species, brown trout, was recorded in the Brittas River site (Table 4.2).

Table 4.2. Density of fish (no./m²), Brittas River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Brown trout	0.053	0.093	0.146
All Fish	-	-	0.146

Brown trout ranged in length from 5.8cm to 18.2cm (mean = 10.7) (Fig. 4.3). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 38%, 49% and 13% of the total brown trout catch respectively.

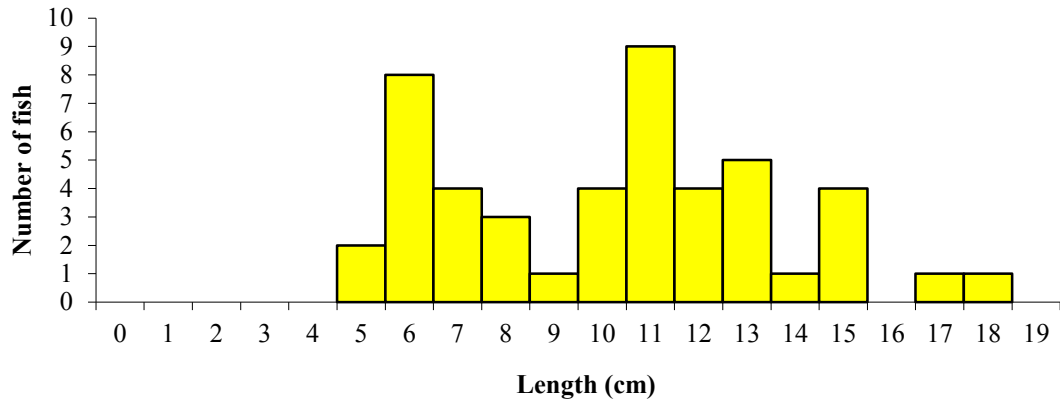


Fig. 4.3. Length frequency distribution of brown trout in the Brittas River site, September 2011 (n = 47)

4.1.3. The Broadmeadow Water, Ratoath Stream and Ward River

Three sites were electric fished in the Broadmeadow Water catchment as part of the WFD surveillance monitoring programme in rivers 2011; the Broadmeadow Water at Lispopple Bridge, the Ratoath stream in Ratoath, Co. Meath and the Ward River close to Swords village, Co. Dublin (Fig. 4.4).

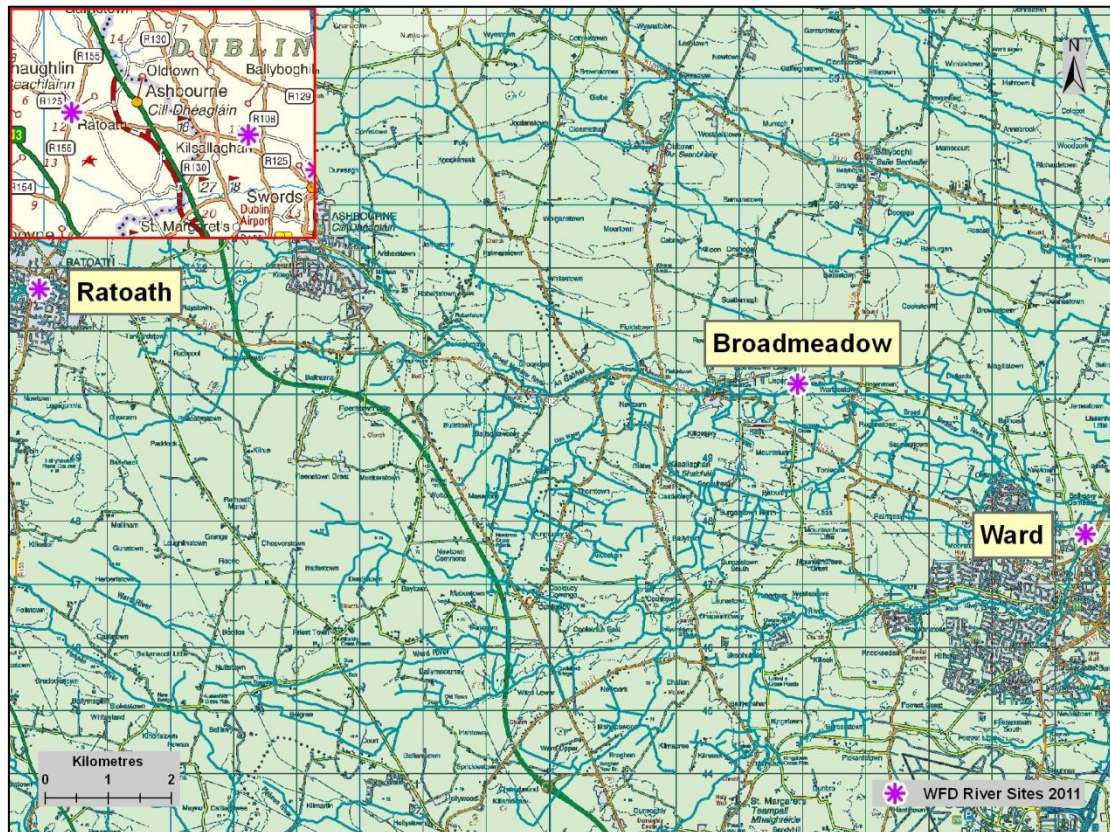


Fig. 4.4. Location of the Broadmeadow River, Ratoath Stream and Ward River surveillance monitoring sites

The Broadmeadow Water survey site was located downstream of Lispopple Bridge, in the Lispopple area between Ashbourne and Swords, Co. Dublin (Fig. 4.4; Plate 4.3). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 14th of September 2011, along a 45m length of channel. Riffle and glide dominated this stretch, with a substrate of mainly cobble and boulder. Liverworts and a number of emergent bankside species dominated the vegetation at this site.

The Ratoath Stream survey site was located downstream of a bridge near the Meadowbank Hill housing estate in Ratoath (Fig. 4.4; Plate 4.4). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 12th of July 2011, along a 36m length of channel. Riffle and glide dominated the habitat along this stretch, while the substrate consisted of mainly cobble and

gravel. Filamentous green algae were present in large quantities throughout this stretch, with few other species recorded.

The Ward River survey site was located upstream of a footbridge within the park between Balheary Business Campus and the Balheary Road (Fig 4.4; Plate 4.5). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 11th of July 2011, along a 45m length of channel. Glide was the most abundant habitat present along this stretch, while cobble dominated the substrate.



Plate 4.3. The Broadmeadow River at Lispopple, Co. Dublin



Plate 4.4. The Ratoath Stream in Ratoath, Co. Meath



Plate 4.5. The Ward River, Balheary, Swords, Co. Dublin

Broadmeadow River – Lispopple Bridge

A total of six fish species were recorded in the Broadmeadow River site. Three-spined stickleback was the most abundant species, followed by stone loach, eels, minnow, nine-spined stickleback and brown trout (Table 4.3).

Table 4.3. Density of fish (no./m²), Broadmeadow River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	0.302
Stone loach	-	-	0.093
Eel	-	-	0.054
Minnow	-	-	0.005
Brown trout	0.002	0.002	0.005
Nine-spined stickleback	-	-	0.002
All Fish	-	-	0.461

Three-spined stickleback ranged in length from 1.5cm to 4.7cm (mean = 3.2cm) (Fig. 4.5). Stone loach ranged in length from 3.0cm to 11.5cm (mean = 7.2cm) (Fig. 4.6), while eels were between 8.0cm and 34.2cm in length (mean = 23.9cm) (Fig. 4.7).

Two brown trout were also captured (7.9cm and 9.0cm), representing two age classes, 0+ and 1+.

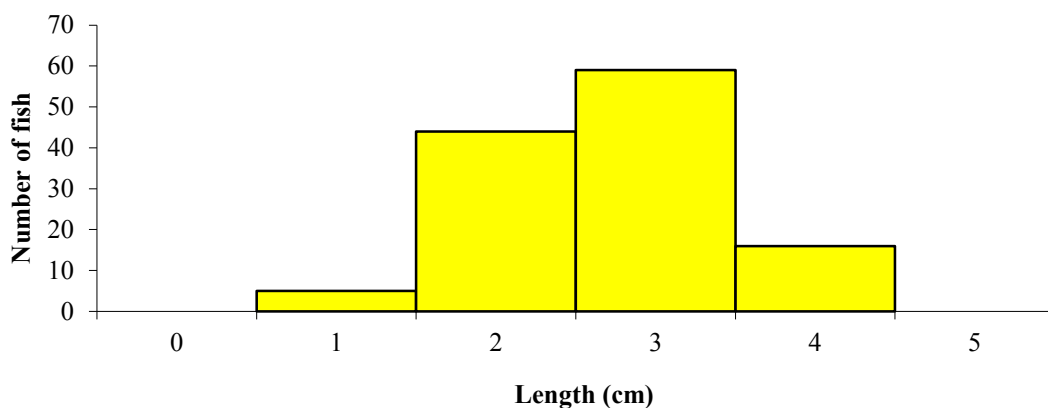


Fig. 4.5. Length frequency distribution of a sub-sample of three-spined stickleback in the Broadmeadow River site, September 2011 (n = 124)

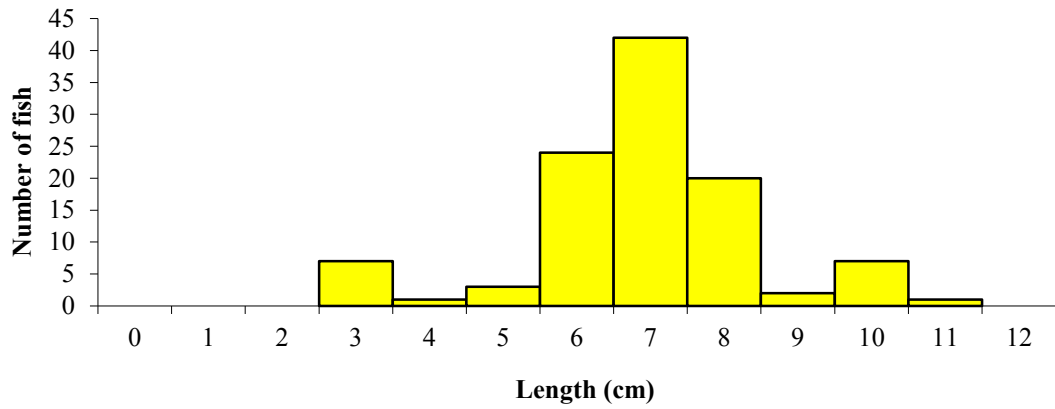


Fig. 4.6. Length frequency distribution of stone loach in the Broadmeadow River site, September 2011 (n = 107)

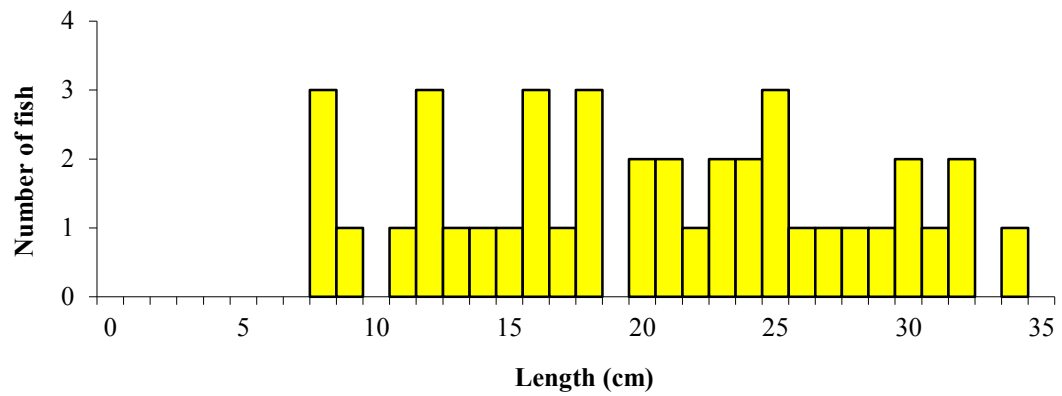


Fig. 4.7. Length frequency distribution of eels in the Broadmeadow River site, September 2011 (n = 40)

Ratoath Stream – Ratoath village

A total of four fish species were recorded in the Ratoath River site. Three-spined stickleback was the most abundant species, followed by nine-spined stickleback, eels and stone loach (Table 4.5).

Table 4.5. Density of fish (no./m²), Ratoath Stream site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	1.899
Nine-spined stickleback	-	-	0.084
Eel	-	-	0.009
Stone loach	-	-	0.009
All Fish	-	-	2.002

Three-spined stickleback ranged in length from 1.1cm to 6.4cm (mean = 2.7cm) (Fig. 4.8), while nine-spined stickleback ranged in length from 1.0 to 4.2cm (mean = 1.8cm) (Fig. 4.9).

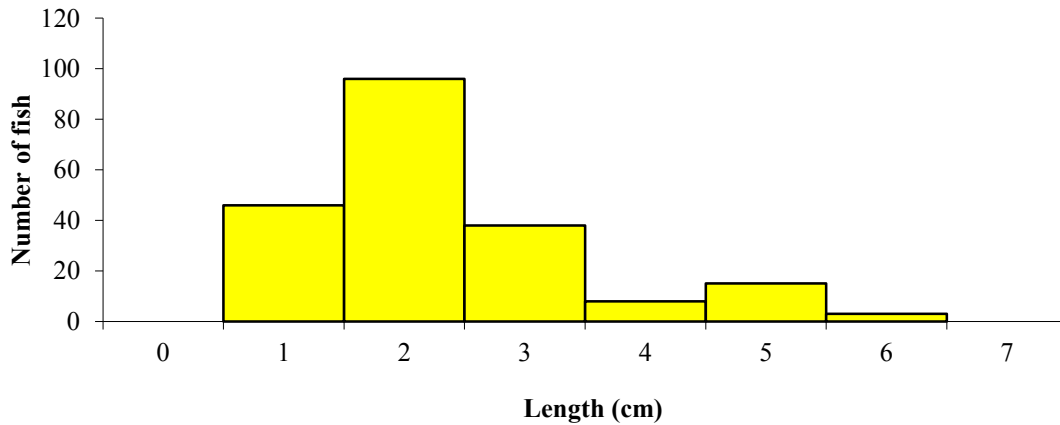


Fig. 4.8. Length frequency distribution of a sub-sample of three-spined stickleback in the Ratoath Stream site, July 2011 (n = 206)

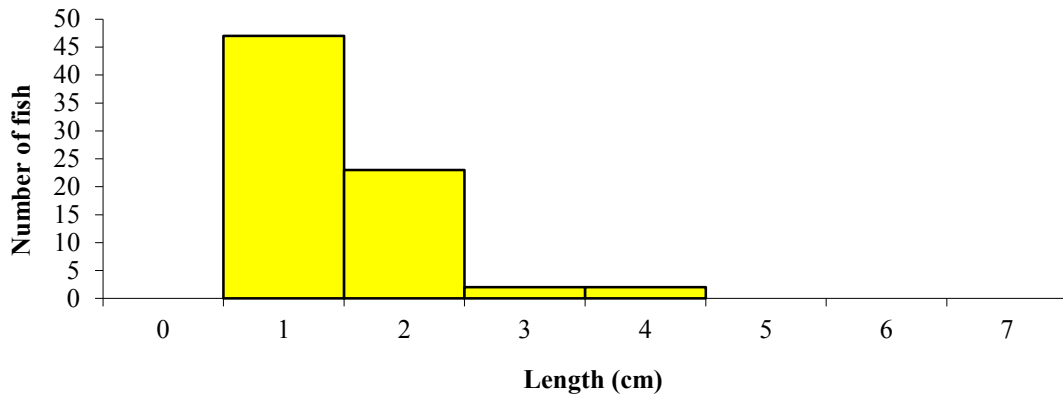


Fig. 4.9. Length frequency distribution of nine-spined stickleback in the Ratoath Stream site, July 2011 (n = 74)

The Ward River – Balheary, Swords

A total of five fish species were recorded in the Ward River site. Three-spined stickleback was the most abundant species, followed by minnow, eels, stone loach and brown trout (Table 4.5).

Table 4.5. Density of fish (no./m²), Ward River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	0.753
Minnow	-	-	0.753
Eel	-	-	0.160
Stone loach	-	-	0.130
Brown trout	0.019	0.006	0.025
All Fish	-	-	1.821

Three-spined stickleback ranged in length from 1.5cm to 7.0cm (mean = 3.5cm) (Fig. 4.10). Minnow ranged in length from 2.0cm to 8.3cm (mean = 5.7cm) (Fig. 4.11). Eels ranged in length from 7.8cm to 31.9cm (mean = 18.4cm) (Fig. 4.12).

Brown trout ranged in length from 6.3cm to 16.8cm (mean = 8.6cm). Two age classes (0+ and 1+) were present, accounting for 89% and 11% of the total brown trout catch respectively.

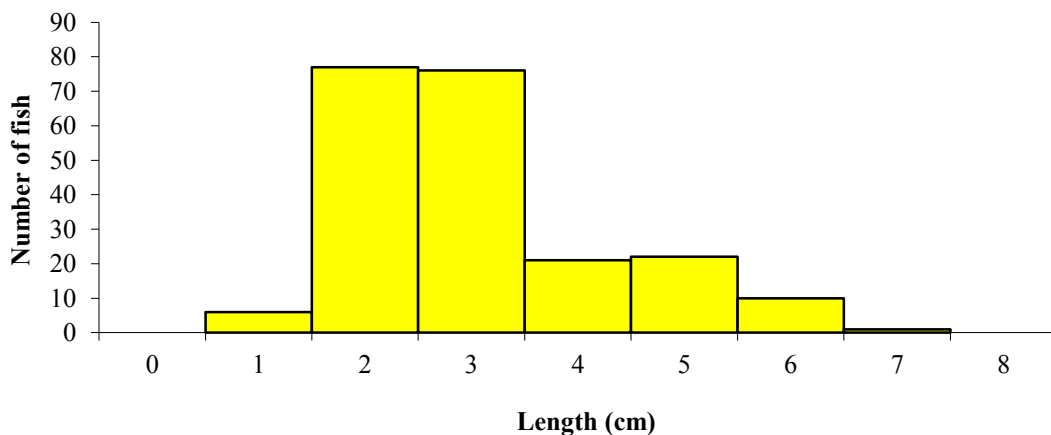


Fig. 4.10. Length frequency distribution of three-spined stickleback in the Ward River site, September 2011 (n = 213)

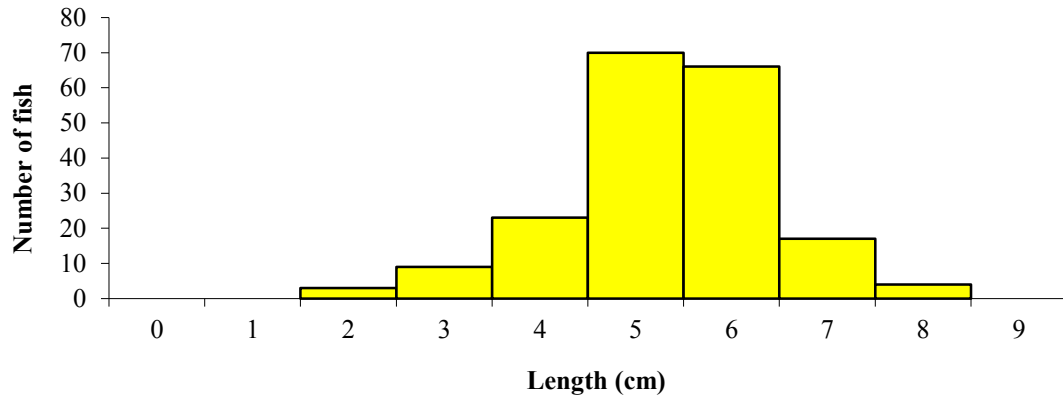


Fig. 4.11. Length frequency distribution of minnow in the Ward River site, September 2011 (n = 192)

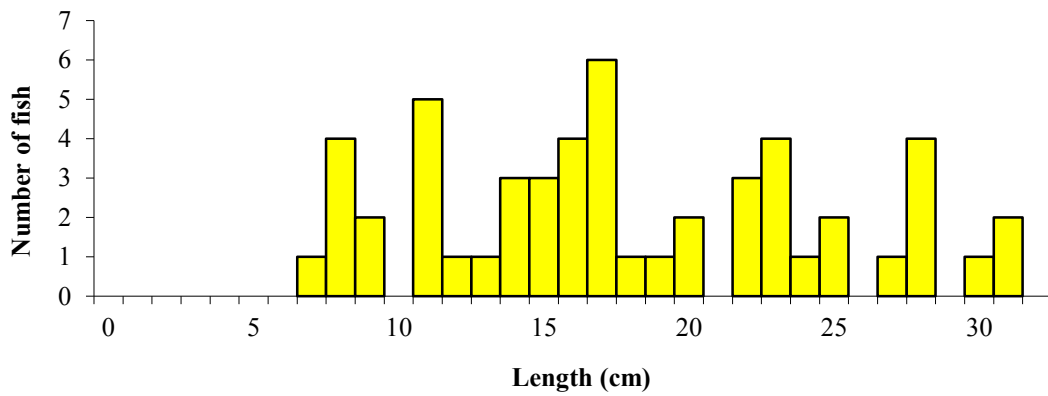


Fig. 4.12. Length frequency distribution of eels in the Ward River site, September 2011 (n = 52)

4.1.4. The Camac River (Riverside and Moneenalion)

Two sites were electric fished on the Camac River as part of the WFD surveillance monitoring programme in rivers 2011; the Camac at Riverside Estate, Clondalkin, Co. Dublin and the Camac at Moneenalion Commons Lower, Co. Dublin (Fig. 4.13).



Fig. 4.13. Location of the Camac River, (Riverside and Moneenalion) surveillance monitoring sites

The Camac River (Riverside) survey site was located within the Riverside Estate, near Clondalkin Village on the upstream side of the bridge leading into the estate (Fig. 4.13; Plate 4.6). Three electric-fishing passes were conducted using two bank-based electric fishing units on the 7th of September 2011, along a 38m length of channel. Glide was the dominant habitat at this stretch, with a substrate of mainly cobble. Vegetation was scarce at this heavily shaded site, with only a few species (mostly bryophytes) present.

The Camac River (Moneenalion) survey site was located downstream of a bridge at Moneenalion Commons Lower, just east of the Baldonnell Aerodrome (Fig. 4.13; Plate 4.7). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 7th of September 2011, along a 38m length of channel. Riffle and glide dominated this stretch, with a substrate mix of cobble,

gravel and sand. The aquatic vegetation at this site was mostly comprised of filamentous green algae and emergent bankside species.



Plate 4.6 The Camac River at Riverside Estate, Clondalkin, Co. Dublin



Plate 4.7. The Camac River at Moneenalion Commons Lower, Co. Dublin

The Camac River – Riverside Estate

A total of four fish species were recorded in the Camac River (Riverside) site. Minnow was the most abundant species, followed by brown trout, three-spined stickleback and eels (Table 4.6).

Table 4.6. Density of fish (no./m²), Camac River (Riverside) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Minnow	-	-	0.211
Brown trout	0.119	0.013	0.132
Three-spined stickleback	-	-	0.059
Eel	-	-	0.013
All Fish	-	-	0.416

Brown trout ranged in length from 7.4cm to 17.8cm (Fig. 4.14). Two age classes (0+ and 1+) were present, accounting for approximately 93% and 7% of the total brown trout catch respectively.

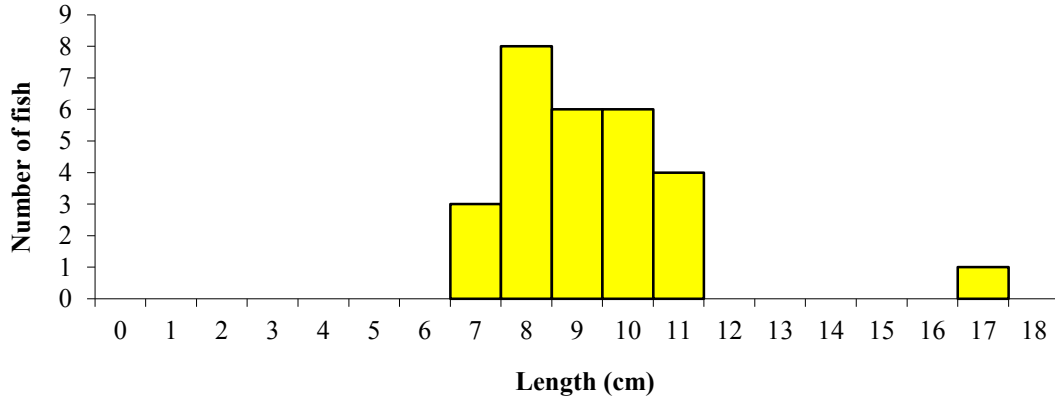


Fig. 4.14. Length frequency distribution of brown trout in the Camac River (Riverside) site, September 2011 (n = 28)

The Camac River – Moneenalion Commons Lower

A total of two fish species were recorded in the Camac River (Moneenalion) site. Three-spined stickleback was the most abundant species, followed by brown trout (Table 4.7).

Table 4.7. Density of fish (no./m²), Camac River (Moneenalion) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	0.193
Brown trout	0.103	0.006	0.110
All Fish			0.303

Brown trout ranged in length from 6.2cm to 12.9cm (Fig. 4.15). Two age classes (0+ and 1+) were present, accounting for approximately 97% and 3% of the total brown trout catch respectively.

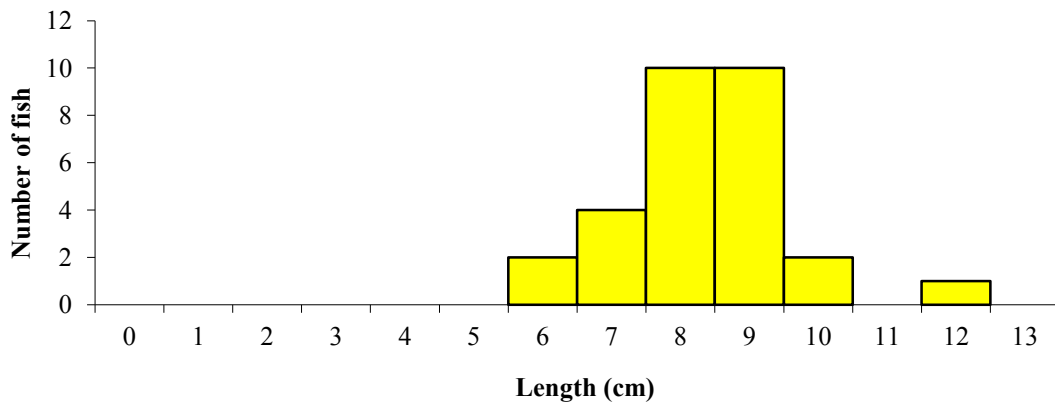


Fig. 4.15. Length frequency distribution of brown trout in the Camac River (Moneenalion) site, September 2011 (n = 29)

4.1.5. The River Dodder (Beaver Row, Mount Carmel, Bohernabreena and Piperstown)

Four sites were electric fished in the Dodder River catchment as part of the WFD surveillance monitoring programme in rivers 2011; the Dodder at Beaver Row, the Dodder at Mount Carmel, the Dodder at Bohernabreena and Piperstown stream (Fig. 4.16). The latter three sites were included in the programme to assess the impact of the weir at Beaver Row on fish passage upstream.

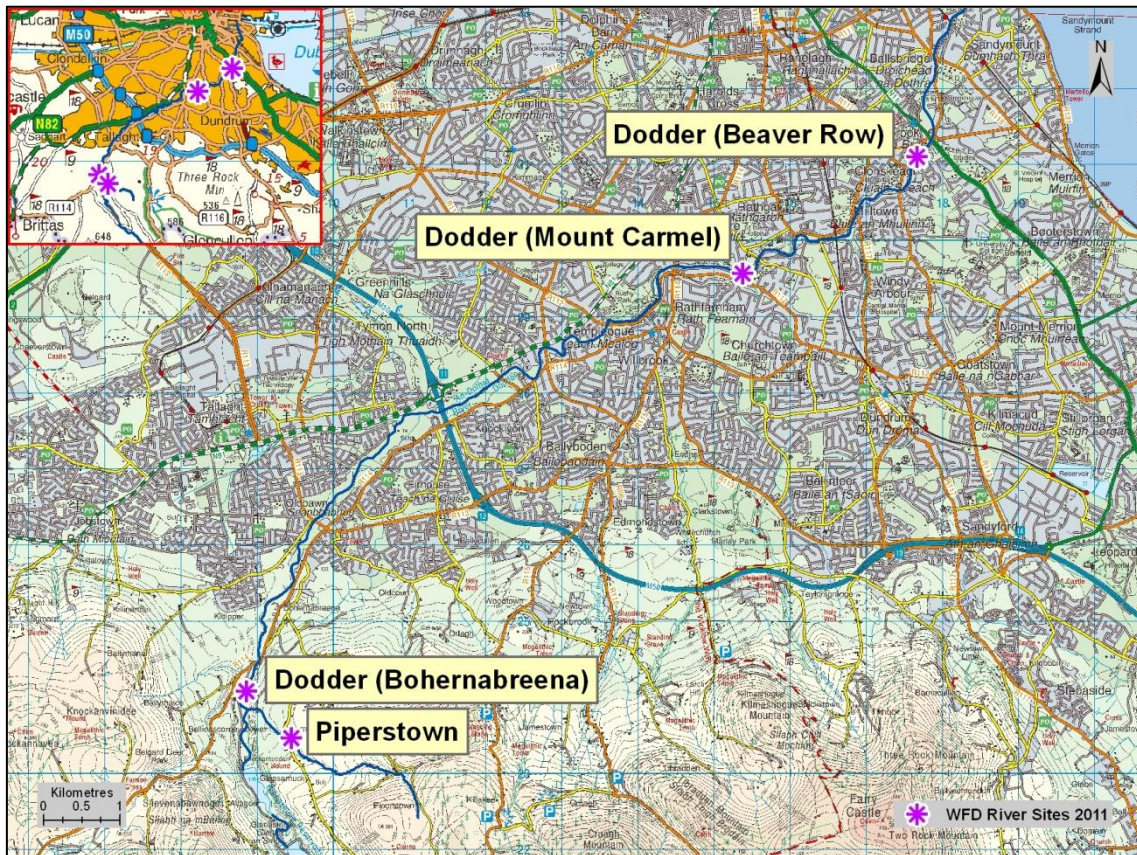


Fig. 4.16. Location of the River Dodder (Beaver Row, Mount Carmel and Bohernabreena) and Piperstown Stream surveillance monitoring sites

The River Dodder (Beaver Row) survey site was located upstream of the footbridge at Beaver Row in Donnybrook (Fig. 4.16; Plate 4.8). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 5th of July 2011, along a 47m length of channel. Riffle and glide dominated this stretch, with a substrate of mainly cobble and boulder. Vegetation at this site was varied, with an abundance of filamentous green algae and emergent bankside species. Two invasive plant species, Japanese knotweed and Himalayan balsam were also present along the banks.

The River Dodder (Mount Carmel) survey site was located downstream of a footbridge, along the Lower Dodder Road near Mount Carmel Hospital (Fig. 4.16; Plate 4.9). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 20th of September 2011, along a

35m length of channel. Riffle and glide dominated the habitat at this stretch, with a substrate composed mainly of cobble. A wide variety of vegetation types were recorded throughout this stretch, with algae, emergent bankside species and a number of bryophytes present. Three invasive species were also encountered including, montbretia, Japanese knotweed and Himalayan balsam.

The River Dodder (Bohernabreena) survey site was located between Bohernabreena and Ballinascorney, Co. Dublin on a stretch of the river along a semi private road, just off the R114 (Fig. 4.16; Plate 4.10). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 5th of July 2011, along a 43m length of channel. Riffle dominated the habitat at this site, with a substrate of mainly cobble. Vegetation was scarce along this heavily shaded stretch, with mosses dominating the rocky substrate.

The Piperstown Stream survey site was located at Corrageen, upstream of a small bridge on a quiet by-road (Fig. 4.16; Plate 4.11). One electric-fishing pass was conducted using one bank-based electric fishing unit on the 6th of September 2011, along a 47m length of channel. Riffle and pool dominated the habitat at this site, while the substrate was an even mix of cobble and gravel. The vegetation along this narrow stretch was varied and consisted of filamentous green algae, bryophytes and emergent bankside species. Water levels in the stream were extremely low at the time of the survey.



Plate 4.8. The River Dodder at Beaver Row, Co. Dublin



Plate 4.9. The River Dodder near Mount Carmel Hospital, Co. Dublin



Plate 4.10. The River Dodder at Bohernabreena, Co. Dublin



Plate 4.11. The Piperstown Stream at Corrageen, Co. Dublin

The River Dodder - Beaver Row

A total of six fish species (and sea trout are included as a separate “variety” of trout) were recorded in the River Dodder (Beaver Row) site. Salmon was the most abundant species, followed by brown trout, eels, stone loach, three-spined stickleback and minnow (Table 4.8). During the previous survey in 2008, most of the same species were recorded, with the exception of three-spined stickleback, which were only recorded in 2011, and sea trout, which were only recorded in 2008.

Table 4.8. Density of fish (no./m²), River Dodder (Beaver Row) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2008			2011		
	0+	1+ & older	Total minimum density	0+	1+ & older	Total minimum density
Salmon	0.032	0.037	0.068	0.567	0.019	0.586
Brown trout	0.030	0.025	0.054	0.292	0.005	0.297
Eel	-	-	0.019	-	-	0.027
Stone loach	-	-	0.004	-	-	0.010
Three-spined stickleback	-	-	-	-	-	0.010
Minnow	-	-	0.012	-	-	0.008
Sea trout	-	-	0.002	-	-	-
All Fish	-	-	0.160	-	-	0.938

Salmon captured during the 2011 survey ranged in length from 4.1cm to 18.8cm (mean = 6.4cm) (Fig. 4.17). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 97% and 3% of the total salmon catch respectively. Salmon captured during the 2008 survey ranged in length from 6.3cm to 16.2cm (mean = 17.9cm) (Fig. 4.17). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 57%, 39% and 5% of the salmon catch respectively.

Brown trout captured during the 2011 survey ranged in length from 4.5cm to 24.2cm (mean = 7.5cm) (Fig. 4.18). Three age classes (0+, 1+ and 2+) were present, accounting for 99%, 0.5% and 0.5% of the total brown trout catch respectively. Brown trout captured during the 2008 survey ranged in length from 6.2cm to 26.1cm (mean = 12.5cm) (Fig. 4.18). Three age classes were present (0+, 1+ and 2+), accounting for approximately 61%, 20% and 19% of the brown trout catch respectively.

Eels captured during the 2011 survey ranged in length from 12.0cm to 35.2cm (mean = 23.9cm) (Fig. 4.19). In 2008 they ranged in length from 7.0cm to 59.5cm (mean = 25.6cm).

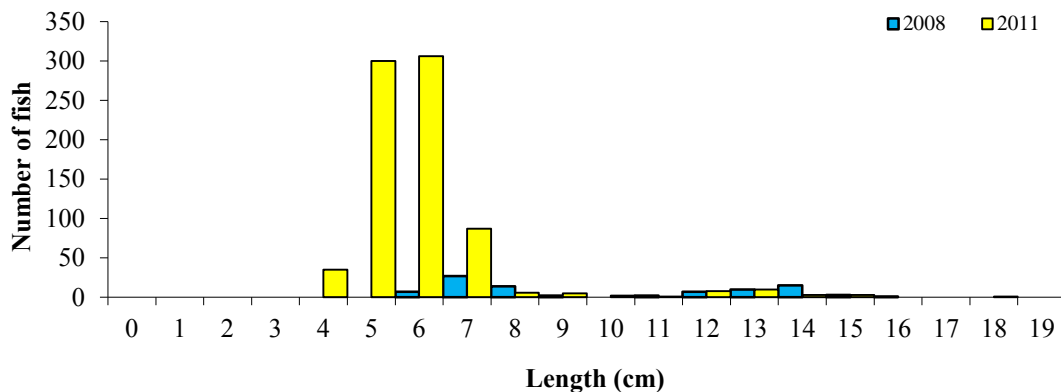


Fig. 4.17. Length frequency distribution of salmon in the River Dodder (Beaver Row) site, September 2008 (n = 88) and July 2011 (n = 767)

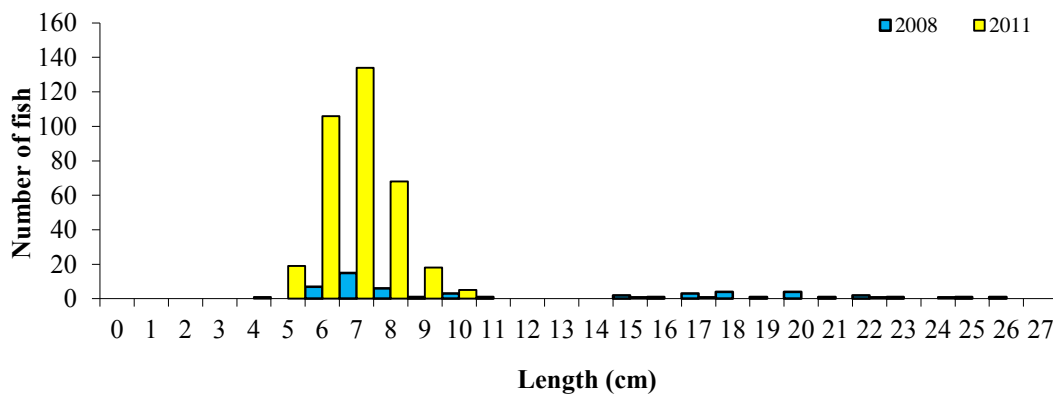


Fig. 4.18. Length frequency distribution of brown trout in the River Dodder (Beaver Row) site, September 2008 (n = 54) and July 2011 (n = 355)

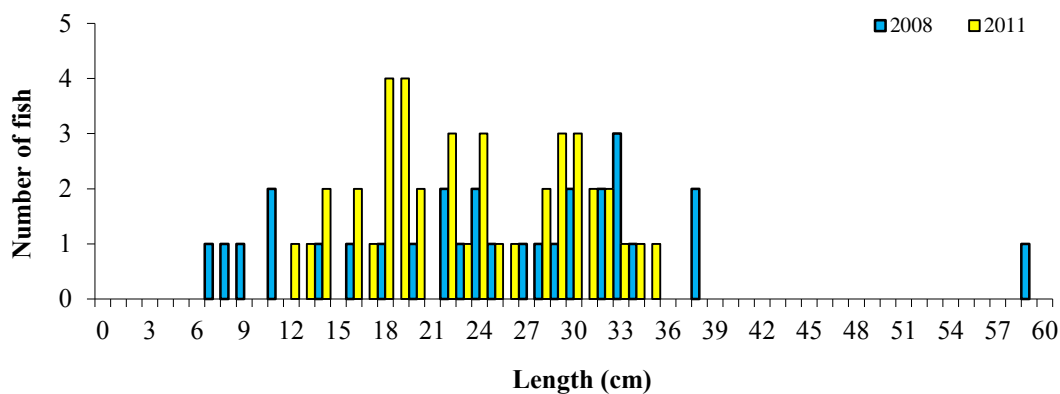


Fig. 4.19. Length frequency distribution of eels in the River Dodder (Beaver Row) site, September 2008 (n = 29) and July 2011 (n = 41)

The River Dodder - Mount Carmel

A total of five fish species were recorded in the River Dodder (Mount Carmel) site. Brown trout was the most abundant species, followed by three-spined stickleback, stone loach, eels and minnow (Table 4.9).

Table 4.9. Density of fish (no./m²), River Dodder (Mount Carmel) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Brown trout	0.091	0.020	0.111
Three-spined stickleback	-	-	0.069
Stone loach	-	-	0.034
Eel	-	-	0.002
Minnow	-	-	0.002
All Fish	-	-	0.219

Brown trout ranged in length from 5.4cm to 33.0cm (Fig. 4.20). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 89%, 10% and 1% of the total brown trout catch respectively.

Stone loach ranged in length from 5.0cm to 10.4cm (Fig. 4.21).

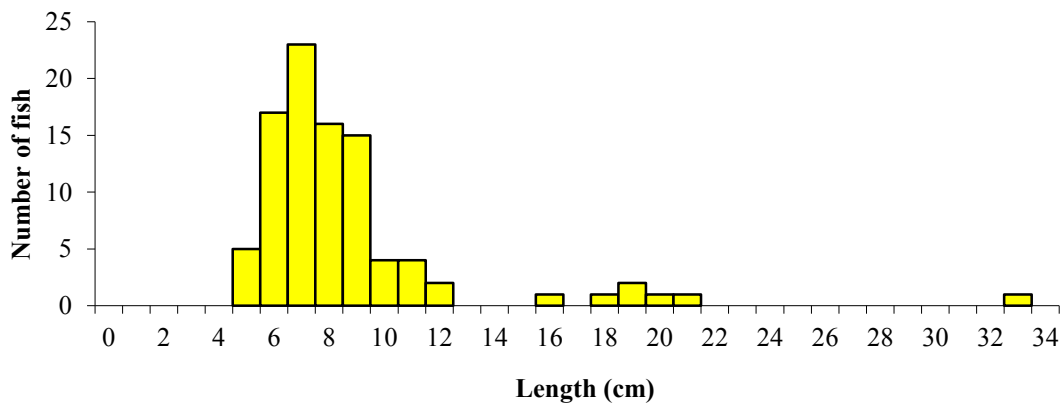


Fig. 4.20. Length frequency distribution of brown trout in the River Dodder (Mount Carmel) site, September 2011 (n = 93)

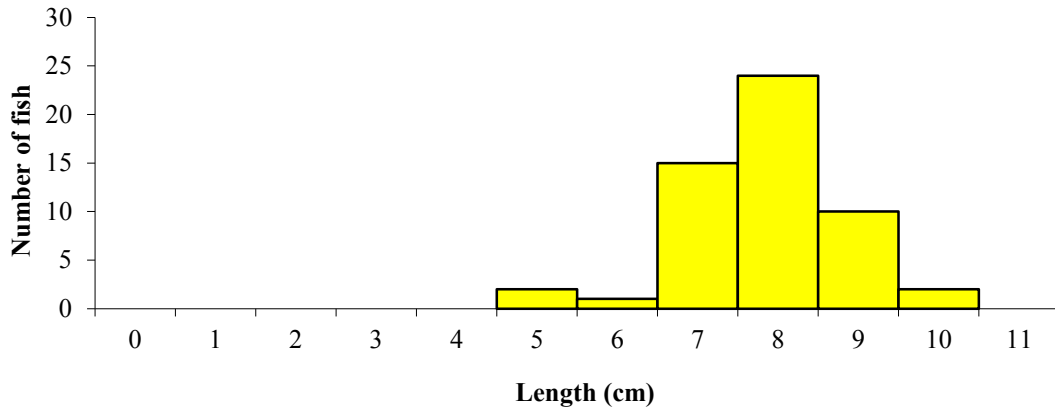


Fig. 4.21. Length frequency distribution of stone loach in the River Dodder (Mount Carmel) site, September 2011 (n = 54)

The River Dodder – Bohernabreena

A total of three fish species were recorded in the River Dodder (Bohernabreena) site. Brown trout was the most abundant species, followed by eels and stone loach (Table 4.10).

Table 4.10. Density of fish (no./m²), River Dodder (Bohernabreena) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Brown trout	0.095	0.139	0.234
Eel	-	-	0.004
Stone loach	-	-	0.004
All Fish	-	-	0.241

Brown trout ranged in length from 4.5cm to 18.8cm (Fig. 4.22). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 36%, 58% and 6% of the total brown trout catch respectively.

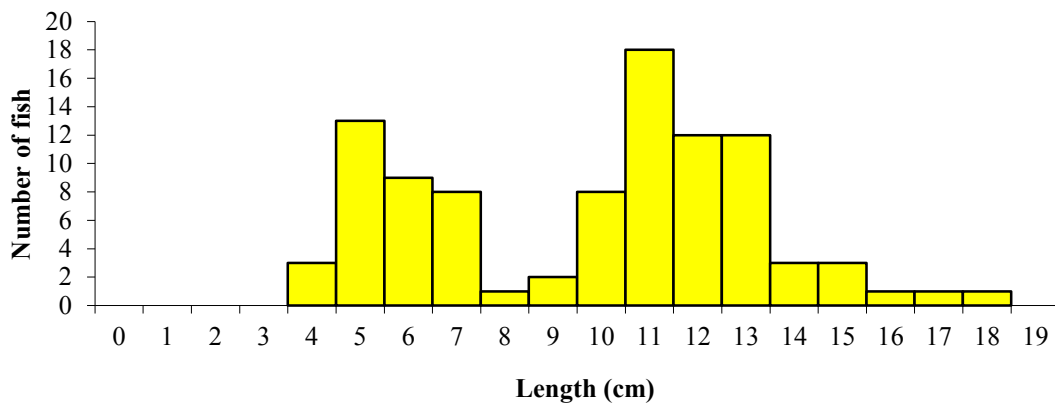


Fig. 4.22. Length frequency distribution of brown trout in the River Dodder (Bohernabreena) site, September 2011 (n = 95)

The Piperstown Stream

There were no fish recorded during the Piperstown Stream survey.

4.1.6. The Griffen River (Griffen Avenue and Grange Castle)

Two sites were electric fished on the Griffen River as part of the WFD surveillance monitoring programme in rivers 2011; Griffen Avenue and Grange Castle, Co. Dublin (Fig. 4.23).

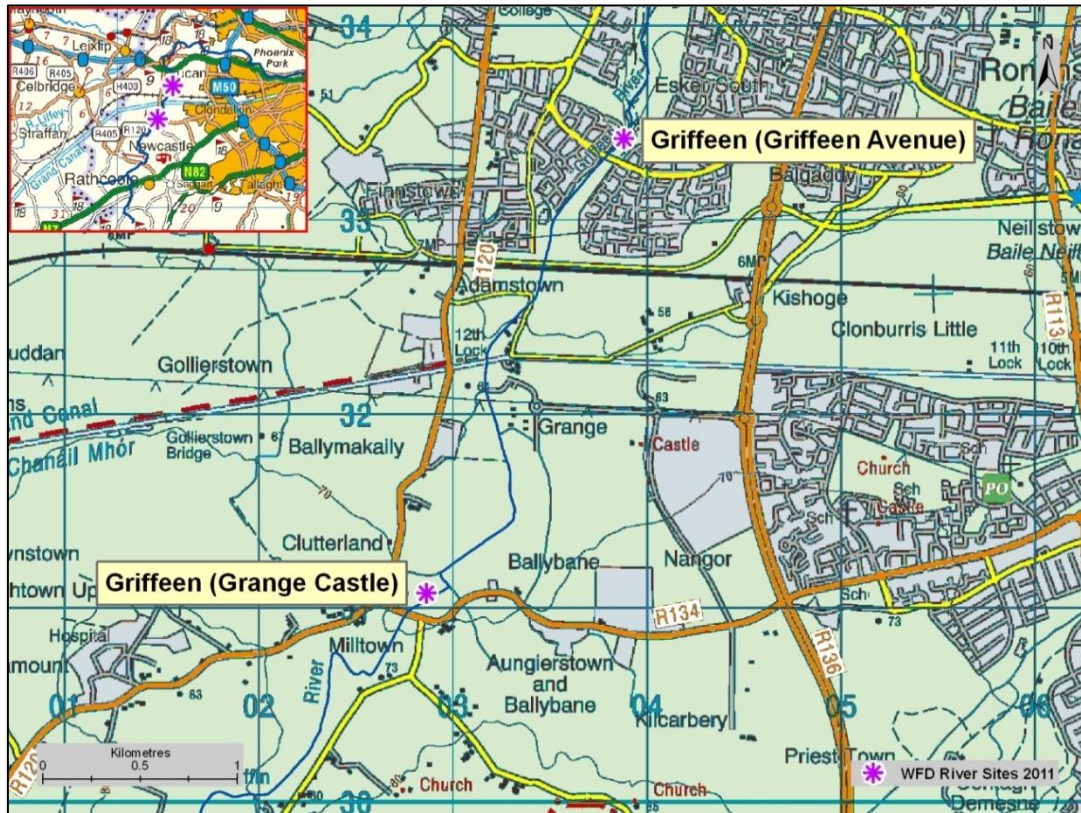


Fig. 4.23. Location of the Griffen River (Griffen Avenue and Grange Castle) surveillance monitoring sites

The Griffen River (Griffen Avenue) survey site was located within a park adjacent to the river, on the downstream side of Griffen Avenue near Adamstown (Fig. 4.23; Plate 4.12). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 15th of September 2011, along a 44m length of channel. Glide and pool dominated the habitat at this site, with the substrate composed of mainly sand and gravel. The vegetation at this site was dominated by filamentous green algae and a number of emergent bankside and riparian species.

The Griffen River (Grange Castle) survey site was located within Grange Castle Business Park, between the Cuisine de France Factory and the Nangor Road (Fig. 4.23; Plate 4.13). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 15th of September 2011, along a 42m length of channel. Glide dominated the habitat at this site, while the substrate was a good mix of cobble, gravel and sand. The vegetation at this site was dominated by filamentous green algae and a few emergent bankside species.



Plate 4.12. The Griffeen River at Griffeen Avenue, Co. Dublin



Plate 4.13. The Griffeen River at Grange Castle, Co. Dublin

Griffeen River – Griffeen Avenue

A total of four fish species were recorded in the Griffeen River (Griffeen Ave.) site. Three-spined stickleback was the most abundant species, followed by brown trout, roach and eels (Table 4.11).

Table 4.11. Density of fish (no./m²), Griffeen River (Griffeen Ave.) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	1.040
Brown trout	0.061	0.073	0.135
Roach	-	-	0.012
Eel	-	-	0.006
All Fish	-	-	1.192

Brown trout ranged in length from 8.5cm to 15.2cm (Fig. 4.24). Two age classes (0+ and 1+) were present, accounting for approximately 35% and 65% of the total brown trout catch respectively.

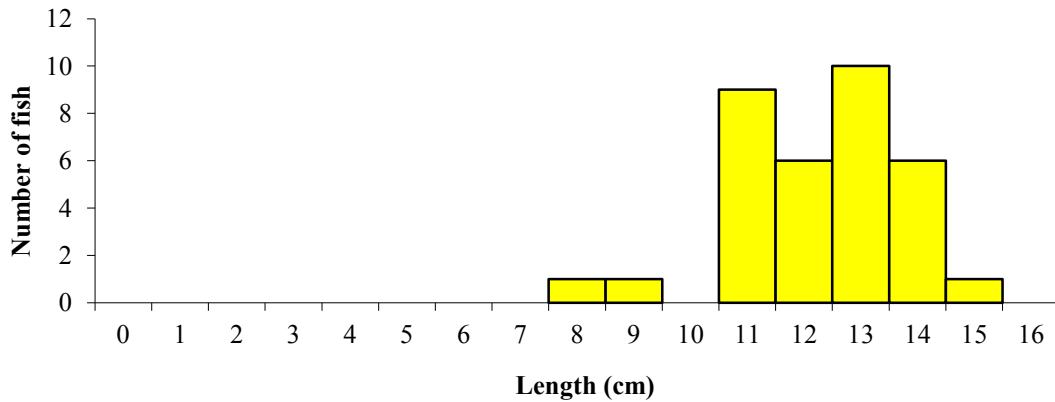


Fig. 4.24. Length frequency distribution of brown trout in the Griffeen River (Griffeen Ave.) site, September 2011 (n = 34)

Griffeen River – Grange Castle

Only one fish species, three-spined stickleback, was recorded in the Griffeen River (Grange Castle) site (Table 4.12).

Table 4.12. Density of fish (no./m²), Griffeen River (Grange Castle) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	1.128
All Fish	-	-	1.128

Three-spined stickleback ranged in length from 1.4cm to 5.8cm (mean = 2.7cm) (Figure 4.25).

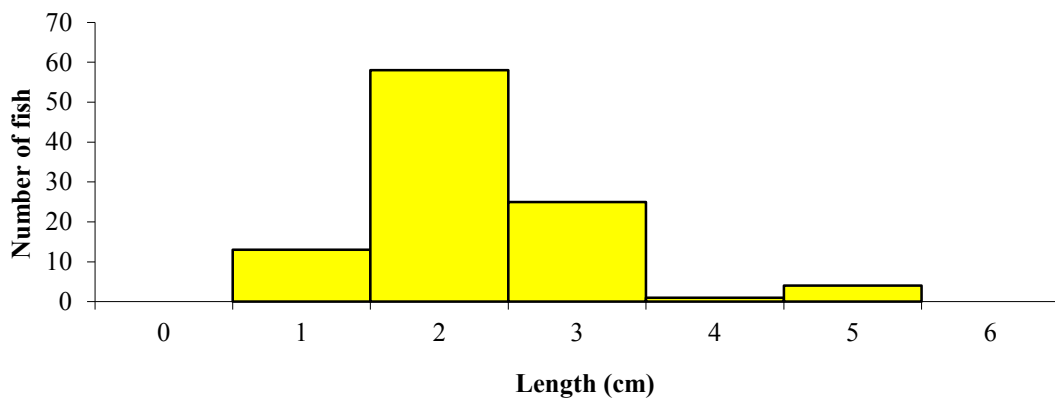


Fig. 4.25. Length frequency distribution of a sub-sample of three-spined stickleback in the Griffeen River (Grange Castle) site, September 2011 (n = 101)

4.1.7 The Mayne River (Wellfield bridge)

One site was electric fished on the Mayne River as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located upstream of Wellfield Bridge, approximately 1km north of Donaghmede (Fig. 4.26; Plate 4.14). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 8th of September 2011, along a 42m length of channel. The habitat along this stretch was a mix of glide, riffle and pool, with also a good mix of substrate, consisting of cobble, gravel, sand and mud/silt. The vegetation at this site consisted mainly of filamentous green algae and a number of bankside emergent species.



Fig. 4.26. Location of the Mayne River (Wellfield bridge) surveillance monitoring site



Plate 4.14. The Mayne River at Wellfield Bridge, Co. Dublin

A total of two fish species were recorded in the Mayne River site. Three-spined stickleback was the most abundant species, followed by eels (Table 4.13).

Table 4.13. Density of fish (no./m²), Mayne River (Wellfield) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	2.068
Eel	-	-	0.038
All Fish	-	-	2.105

Three-spined stickleback ranged in length from 1.7cm to 5.6cm (mean = 4.0cm) (Figure 4.27). Eels ranged in length from 7.6cm to 23.2cm (mean = 10.2cm).

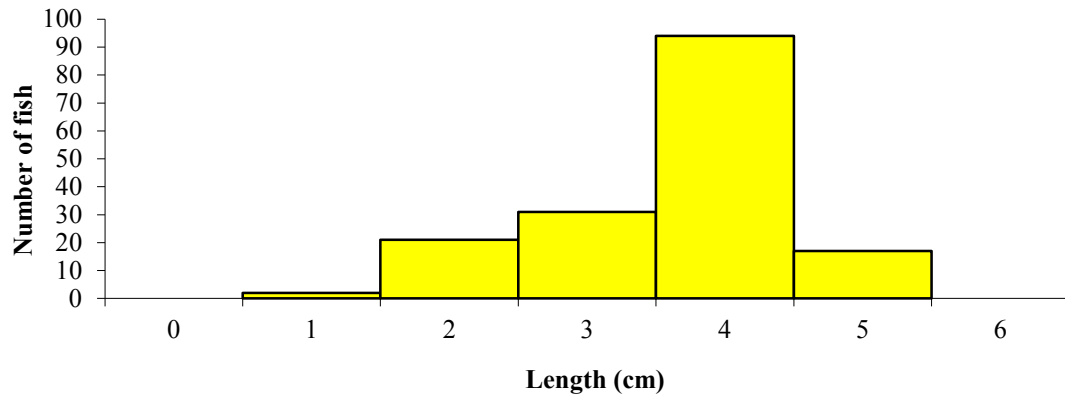


Fig. 4.27. Length frequency distribution of a sub-sample of three-spined stickleback in the Mayne River (Wellfield) site, September 2011 (n = 165)

4.1.8 The Owendoher River (Cruagh Road Br.)

One site was electric fished on the Owendoher River as part of the WFD surveillance monitoring programme in rivers 2011 (Fig. 4.28). The survey site was located upstream of Cruagh Road bridge on the R116, approximately 1km southeast of Rockbrook near Edmondstown (Fig. 4.28; Plate 4.15). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 6th of September 2011, along a 45m length of channel. Riffle and glide were the most abundant habitats along this stretch, while a good mix of substrate was present, consisting mainly of boulder, cobble and sand. The instream vegetation at this site was dominated by bryophytes.

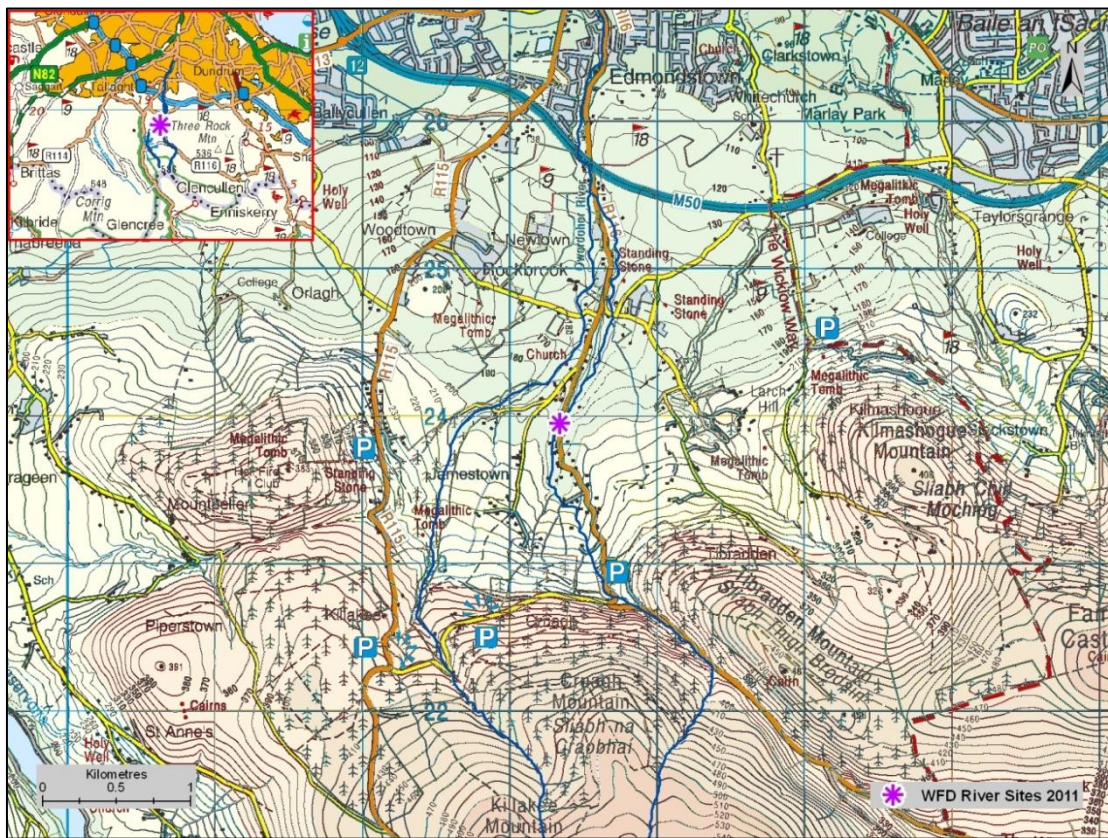


Fig. 4.28. Location of the Owendoher River (Cruagh Road Bridge) surveillance monitoring site



Plate 4.15. The Owendoher River (Cruagh Road Bridge), Rockbrook, Co. Dublin

Only one fish species, brown trout, was recorded in the Owendoher River site (Table 4.15).

Table 4.15. Density of fish (no./m²), Owendoher River (Cruagh Road Bridge) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Brown trout		0.085	0.085
All Fish	-	-	0.085

Brown trout ranged in length from 9.5cm to 14.7cm (mean = 11.6cm) (Fig. 4.29). Two age classes (1+ and 2+) were present, accounting for approximately 85% and 1% of the total brown trout catch respectively.

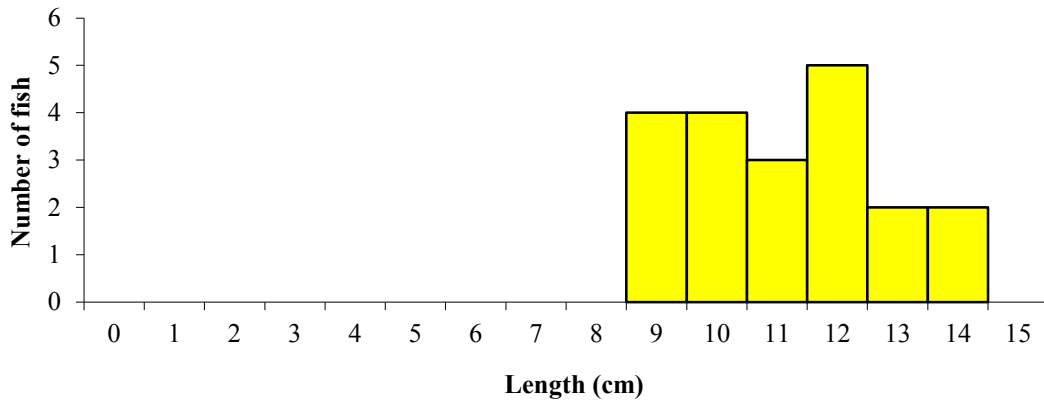


Fig. 4.29. Length frequency distribution of brown trout in the Owendoher River site, September 2011 (n = 37)

4.1.9 The Rye Water, Lyreen River and Baltracey River

Three sites were electric fished in the Rye Water catchment as part of the WFD surveillance monitoring programme in rivers 2011; the Rye Water at Kildare Bridge and Balfeghan bridge, the Lyreen River at Lyreen Angling Centre and the Baltracey River at Fraynes bridge (Fig. 4.30).

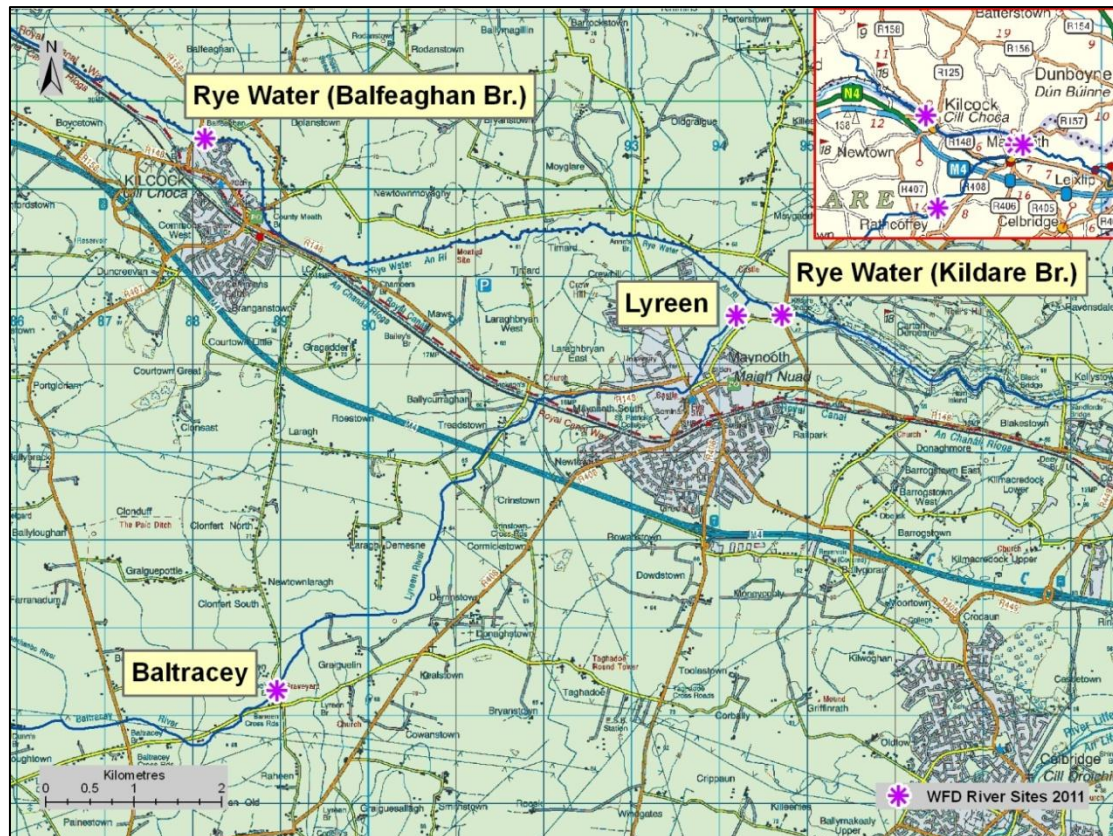


Fig. 4.30. Location of the Rye Water (Kildare Br., Balfeghan Br.), Lyreen River and Baltracey River surveillance monitoring sites

The Rye Water (Kildare Br.) survey site was located just upstream of Kildare Bridge just upstream of Carton House Estate (Fig 4.30; Plate 4.16). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 7th of July 2011, along a 42m length of channel. Glide was the only habitat present along this stretch, while cobble dominated the substrate. The instream vegetation at this site was dominated by filamentous green algae and a number of other bryophyte and emergent bankside species.

The Rye Water (Balfeghan Br.) survey site was located downstream of Balfeghan Bridge, opposite the Ryebridge housing estate, in Kilcock (Fig 4.30; Plate 4.17). Three electric-fishing passes were conducted using two bank-based electric fishing units on the 4th of July 2011, along a 45m length of channel. Glide was the most abundant habitat along this stretch, with cobble dominating a good mix

of different substrate types. Filamentous green algae and emergent bankside species were prevalent at this site.

The Lyreen River survey site was located beside the Lyreen Angling Centre, just upstream of the Lyreen's confluence with the Rye Water (Fig. 4.30; Plate 4.18). Three electric-fishing passes were conducted using two bank-based electric fishing units on the 19th of September 2011, along a 40m length of channel. Glide was the most dominant habitat along this stretch, while the substrate was a good mix of cobble, gravel and sand. Vegetation at this site consisted of filamentous green algae as well as a number of bankside emergent species.

The Baltracey River survey site was located upstream of Frayne's Bridge near the Barreen Cross Roads about 4.5km southwest of Maynooth (Fig. 4.30; Plate 4.19). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 14th of July 2011, along a 44m length of channel. Glide was the dominant habitat present, with a substrate of mainly cobble. The macrophyte vegetation consisted mainly of dense mats of filamentous green algae and emergent bankside species.



Plate 4.16. The Rye Water at Kildare Bridge, Co. Kildare/Meath border



Plate 4.17. The Rye Water at Balfeghan Bridge, Co. Kildare/Meath border



Plate 4.18. The Lyreen at the Lyreen Angling Centre, Co. Kildare



Plate 4.19. The Baltracey river at Fraynes Bridge, Co. Kildare.

The Rye Water (Kildare Br.)

A total of ten fish species were recorded in the Rye Water (Kildare Br.) site. Lamprey was the most abundant species, followed by minnow, salmon, nine-spined stickleback, stone loach, three-spined stickleback, brown trout, roach, eels and pike (Table 4.15). During the previous survey in 2008, most of the same species were recorded, except for salmon, nine-spined stickleback and roach, which were only present in the 2011 survey.

Table 4.15. Density of fish (no./m²), Rye Water (Kildare Br.) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2008			2011		
	0+	1+ & older	Total minimum density	0+	1+ & older	Total minimum density
Lamprey sp.	-	-	0.022	-	-	0.440
Minnow	-	-	0.444	-	-	0.208
Salmon	-	-	-	0.135	-	0.135
Nine-spined stickleback	-	-	-	-	-	0.111
Stone loach	-	-	0.150	-	-	0.101
Three-spined stickleback	-	-	0.002	-	-	0.066
Brown trout	0.044	0.020	0.064	0.055	0.010	0.066
Roach	-	-	-	-	-	0.021
Eel	-	-	0.020	-	-	0.007
Pike	-	-	0.002	-	-	0.003
All Fish	-	-	0.704	-	-	1.158

Lamprey captured during the 2011 survey ranged in length from 5.3cm to 17.3cm (mean = 12.4cm) (Fig. 4.31). In 2008 they ranged in length from 8.7cm to 16.0cm (Fig. 4.31).

Salmon captured during the 2011 survey ranged in length from 4.1cm to 7.6cm (mean = 5.0cm) (Fig. 4.32). Only one age class (0+) was present. No salmon were recorded at this site in 2008.

Brown trout captured during the 2011 survey ranged in length from 4.8cm to 24.9cm (mean = 14.8cm) (Fig. 4.33). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 25%, 62.5% and 12.5% of the total brown trout catch respectively. Brown trout captured in 2008 ranged in length from 4.9cm to 31.5cm (mean = 16.1cm) (Fig. 4.33). Four age classes (0+, 1+, 2+ and 3+) were present, 19.77cm and 24.98cm respectively, accounting for approximately 40%, 28%, 30% and 2% of the trout catch respectively.

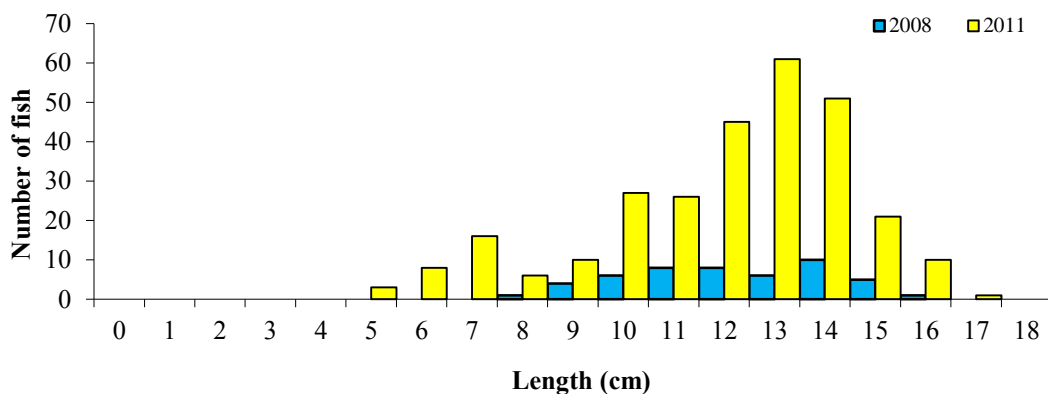


Fig. 4.31. Length frequency distribution of lamprey in the Rye Water (Kildare Br.) site, June 2008 (n = 49) and July 2011 (n = 285)

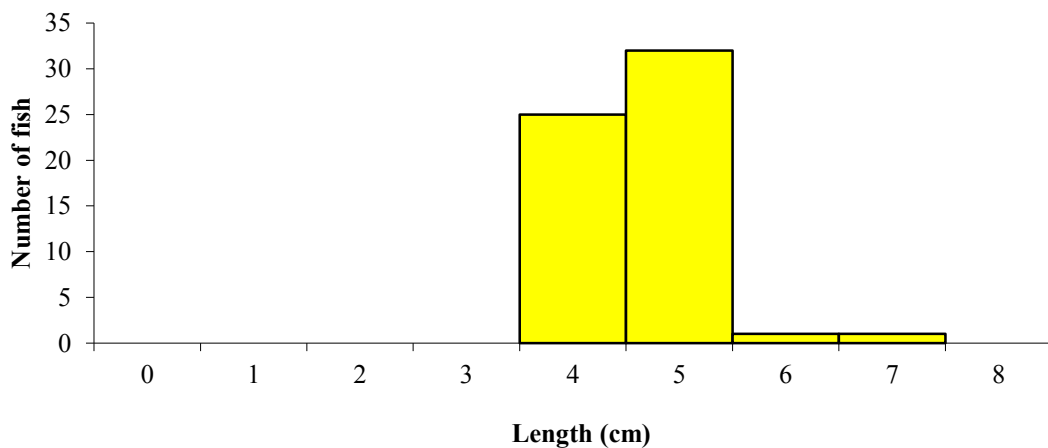


Fig. 4.32. Length frequency distribution of salmon in the Rye Water (Kildare Br.) site, July 2011 (n = 59)

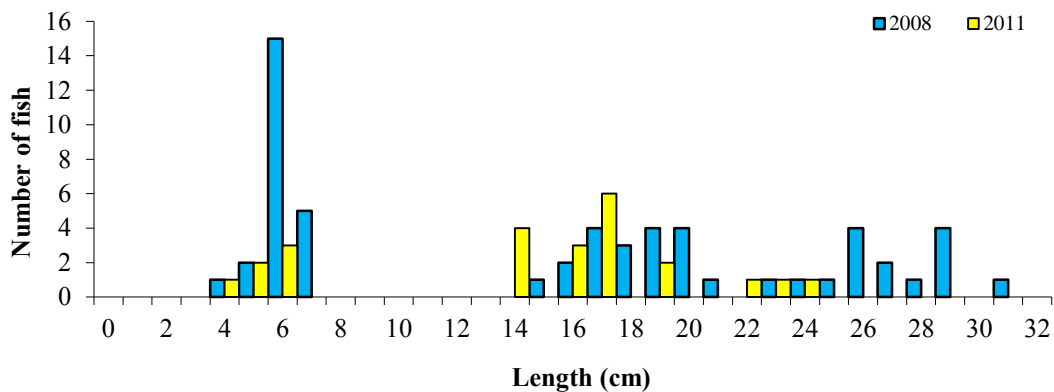


Fig. 4.33. Length frequency distribution of brown trout in the Rye Water (Kildare Br.) site, June 2008 (n = 57) and July 2011 (n = 24)

The Rye Water (Balfeaghan Br.)

A total of five fish species were recorded in the Rye Water (Balfeaghan Br.) site. Minnow was the most abundant species, followed by three-spined stickleback, brown trout, stone loach and lamprey (Table 4.16).

Table 4.16. Density of fish (no./m²), Rye Water (Balfeaghan Br.) site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Minnow	-	-	2.285
Three-spined stickleback	-	-	0.790
Brown trout	0.066	0.013	0.079
Stone loach	-	-	0.066
Lamprey sp.	-	-	0.033
All Fish	-	-	3.253

Minnow ranged in length from 1.9cm to 7.2cm (mean 4.6cm) (Fig. 4.34), while three-spined stickleback ranged in length from 1.6cm to 5.4cm (mean = 3.0cm) (Fig. 4.35).

Brown trout ranged in length from 5.2cm to 26.3cm (mean = 7.6cm) (Fig.4.36). Two age classes were present (0+ and 2+), accounting for approximately 92% and 8% of the total brown trout catch respectively.

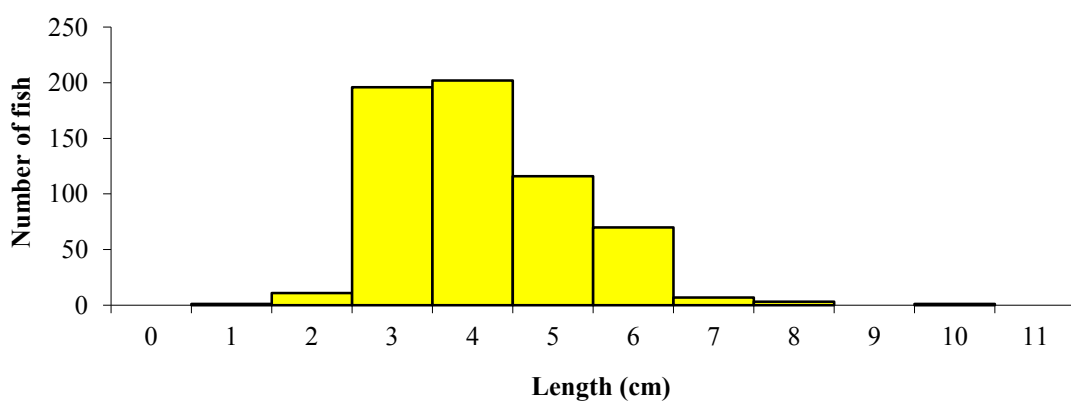


Fig. 4.34. Length frequency distribution of minnow in the Rye Water (Balfeaghan Br.) site, July 2011 (n = 607)

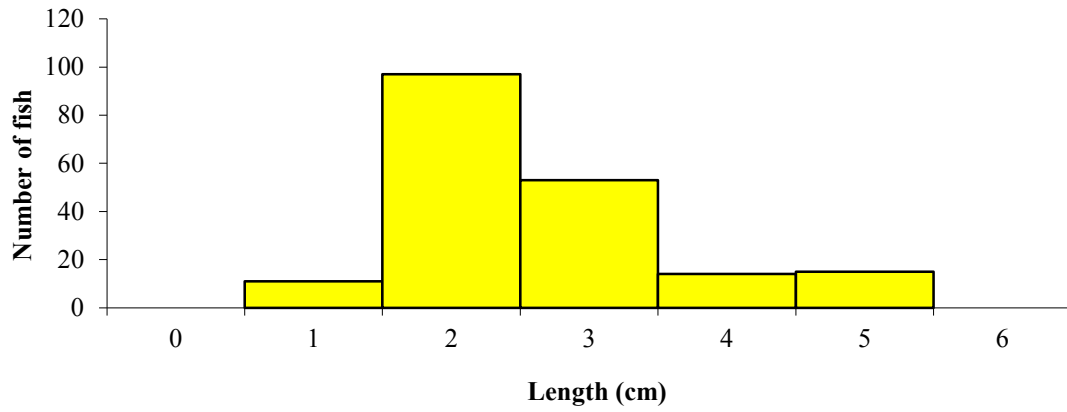


Fig. 4.35. Length frequency distribution of three-spined stickleback in the Rye Water (Balfeaghan Br.) site, July 2011 (n = 190)

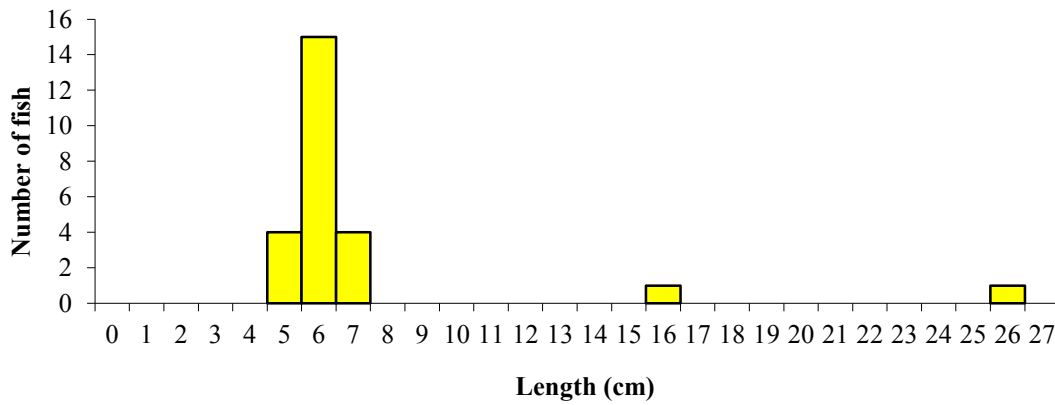


Fig. 4.36. Length frequency distribution of brown trout in the Rye Water (Balfeaghan Br.) site, July 2011 (n = 25)

The Lyreen River (Lyreen Angling Centre)

A total of seven fish species were recorded in the Lyreen River site. Minnow was the most abundant species, followed by brown trout, stone loach, three-spined stickleback, lamprey, eels and nine-spined stickleback (Table 4.17).

Table 4.17. Density of fish (no./m²), Lyreen River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Minnow	-	-	1.150
Brown trout	0.053	-	0.053
Stone loach	-	-	0.041
Three-spined stickleback	-	-	0.018
Lamprey sp.	-	-	0.018
Eel	-	-	0.006
Nine-spined stickleback	-	-	0.006
All Fish	-	-	1.290

Brown trout ranged in length from 8.8cm to 11.5cm (mean = 10.2cm) (Fig. 4.37). Only one age class (1+) was present.

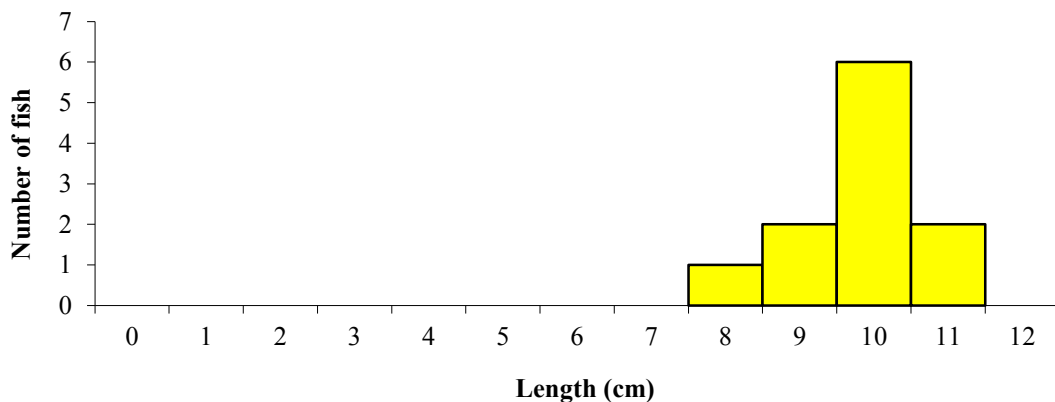


Fig. 4.37. Length frequency distribution of brown trout in the Lyreen River site, September 2011 (n = 11)

The Baltracey River (Fraynes Bridge)

A total of four fish species were recorded in the Baltracey River site. Three-spined stickleback was by far the most abundant species, followed by brown trout, lamprey and minnow (Table 4.18).

Table 4.18. Density of fish (no./m²), Baltracey River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	6.078
Lamprey sp.	-	-	0.160
Brown trout	0.160	0.007	0.167
Minnow	-	-	0.152
All Fish	-	-	6.557

Three-spined stickleback ranged in length from 1.3cm to 5.7cm (Fig. 4.38). Brown trout ranged in length from 5.6cm to 13.6cm (Fig. 4.39). Two age classes (0+ and 1+) were present, accounting for approximately 97% and 3% of the total brown trout catch respectively.

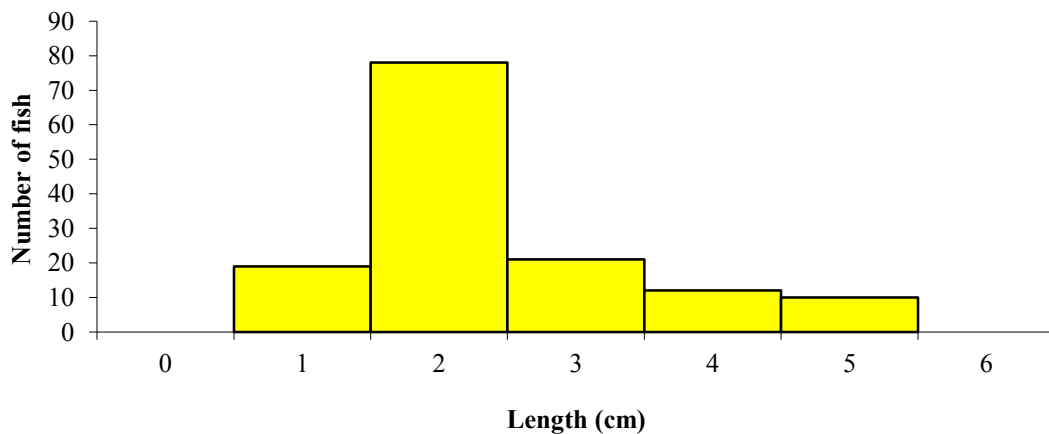


Fig. 4.38. Length frequency distribution of a sub-sample of three-spined stickleback in the Baltracey River site, July 2011 (n = 140)

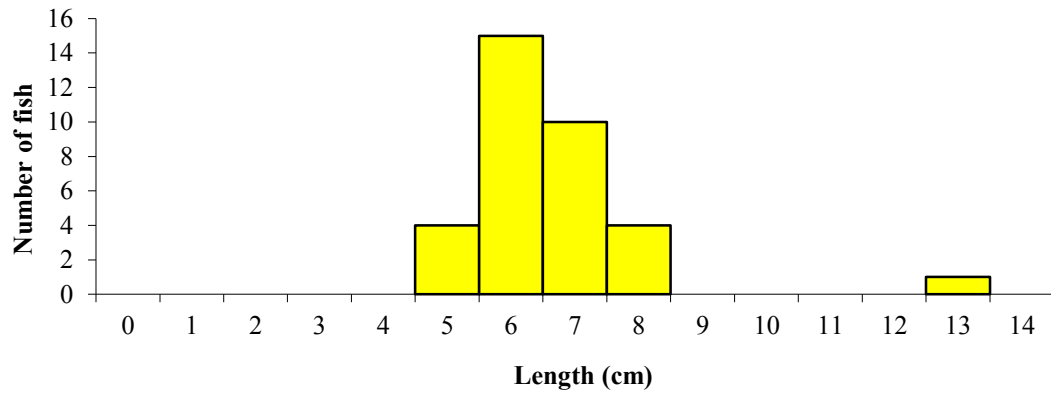


Fig. 4.39. Length frequency distribution of brown trout in the Baltracey River site, July 2011 (n = 34)

4.1.10 The Tolka River and Pinkeen River

Two sites were electric fished in the Tolka River catchment as part of the WFD surveillance monitoring programme in rivers 2011; the River Tolka at Violet Hill Drive, Glasnevin and the Pinkeen River, Bridge south of Calliaghwee townland (Fig. 4.40).

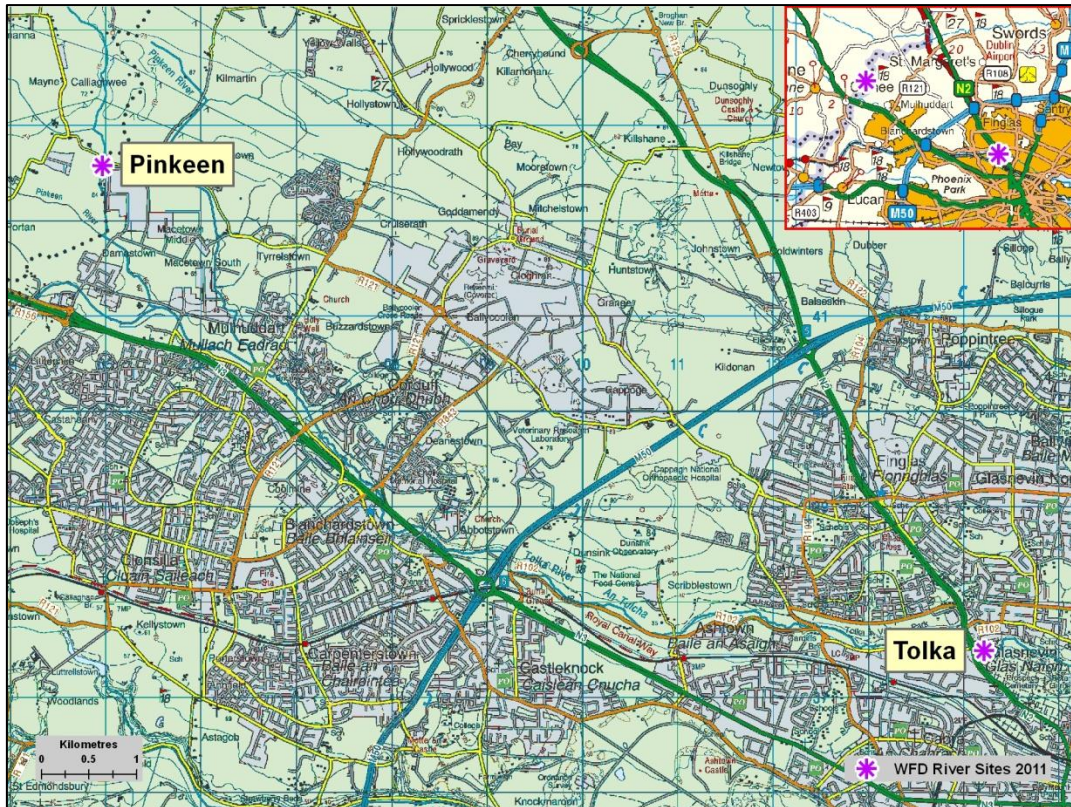


Fig. 4.40. Location of the Tolka River and Pinkeen River surveillance monitoring sites

The Tolka River survey site was located downstream of the N2 (Finglas Road) bridge, between the Violet Hill housing estate and Glasnevin Cemetery (Fig 4.40; Plate 4.20). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 21st of September 2011, along a 39m length of channel. Glide dominated a good mix of habitat types along this stretch, while gravel and cobble were the most abundant substrate types. The instream vegetation at this site consisted of a number of bryophytes as well as emergent bankside species.

The Pinkeen River survey site was located downstream of a bridge south of Calliaghwee townland on the northern side of the Macetown and Damastown Industrial Parks (Fig. 4.40; Plate 4.21). Three electric-fishing passes were conducted using one bank-based electric fishing unit on the 21st of September 2011, along a 40m length of channel. Glide dominated a good mix of habitat along this stretch, while the substrate was mostly comprised of gravel. Vegetation was very scarce along this heavily shaded site, with only a few (mostly bryophytes) species recorded.



Plate 4.20. The Tolka River (Violet Hill), Glasnevin, Co. Dublin



Plate 4.21. The Pinkeen River (Br. S. of Calliaghwee), Co. Dublin/Kildare border

The Tolka River (Violet Hill)

A total of six fish species were recorded in the Tolka River site. Minnow was the most abundant species, followed by three-spined stickleback, lamprey, eels, stone loach and salmon (Table 4.19).

Table 4.19. Density of fish (no./m²), Tolka River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Minnow	-	-	1.083
Three-spined stickleback	-	-	0.303
Lamprey sp.	-	-	0.021
Eel	-	-	0.012
Stone loach	-	-	0.003
Salmon	-	0.003	0.003
All Fish	-	-	1.424

Minnow ranged in length from 2.0cm to 8.0cm (mean = 5.1cm) (Fig. 4.41). Three-spined stickleback ranged in length from 1.6cm to 6.6cm (mean = 3.6cm) (Fig. 4.42).

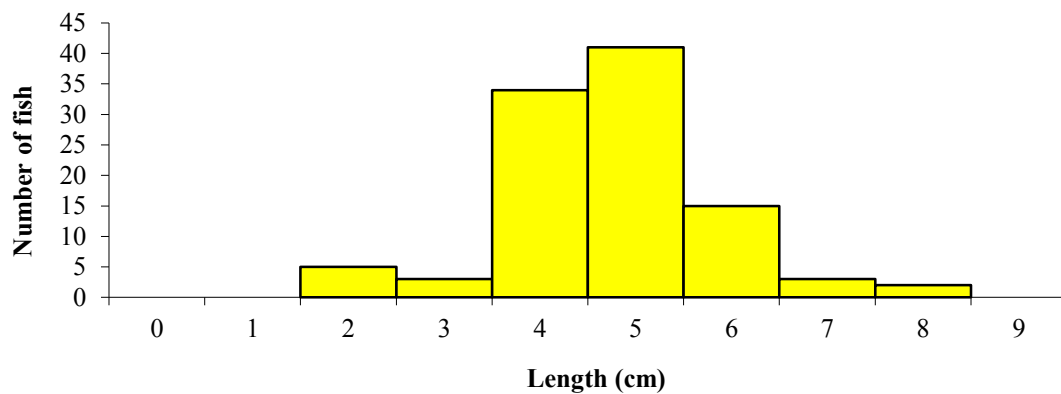


Fig. 4.41. Length frequency distribution of a sub-sample of minnow in the Tolka River site, September 2011 (n = 103)

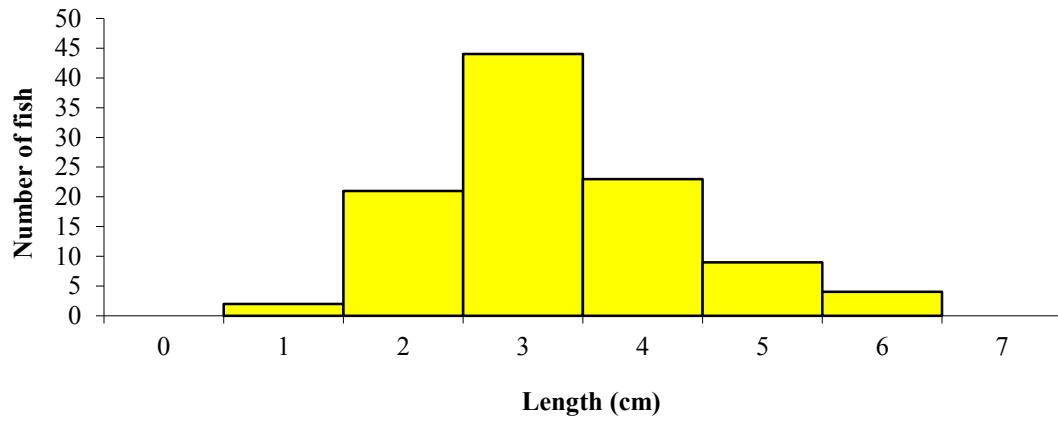


Fig. 4.42. Length frequency distribution of a sub-sample of three-spined stickleback in the Tolka River site, September 2011 (n = 103)

The Pinkeen River (Br. S. of Calliaghwee)

A total of three fish species were recorded in the Pinkeen River site. Three-spined stickleback was the most abundant species, followed by nine-spined stickleback and minnow (Table 4.20).

Table 4.20. Density of fish (no./m²), Pinkeen River site (fish density has been calculated as minimum estimates based on one fishing)

Common name	2011		
	0+	1+ & older	Total minimum density
Three-spined stickleback	-	-	0.941
Nine-spined stickleback	-	-	0.049
Minnow	-	-	0.016
All Fish	-	-	1.005

Three-spined stickleback ranged in length from 1.9cm to 6.3cm (mean = 3.4cm) (Fig. 4.43)

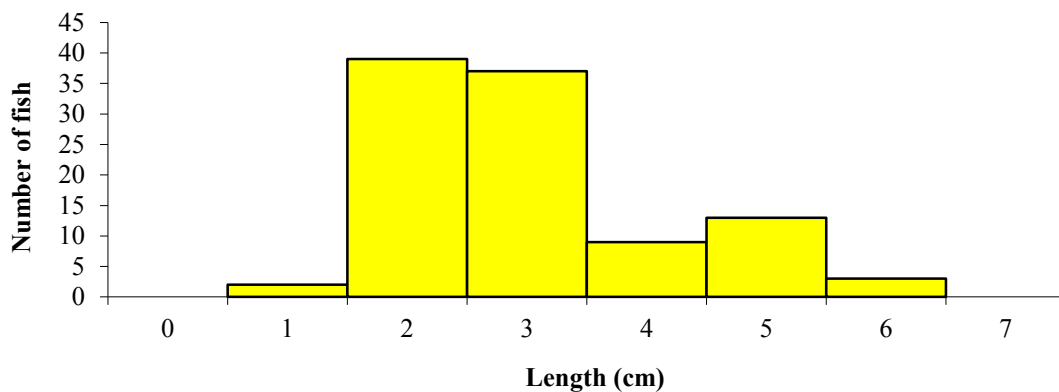


Fig. 4.43. Length frequency distribution of a sub-sample of three-spined stickleback in the Pinkeen River site, September 2011 (n = 103)

4.2 Community Structure

4.2 Species distribution

A total of 10 fish species were recorded within the 21 ERBD sites surveyed during 2011 (Fig. 4.44). Three-spined stickleback was the most common fish species recorded, occurring in 16 sites followed by brown trout, eels, minnow, stone loach, lamprey and nine-spined stickleback, salmon and roach. Pike were only recorded at one site.

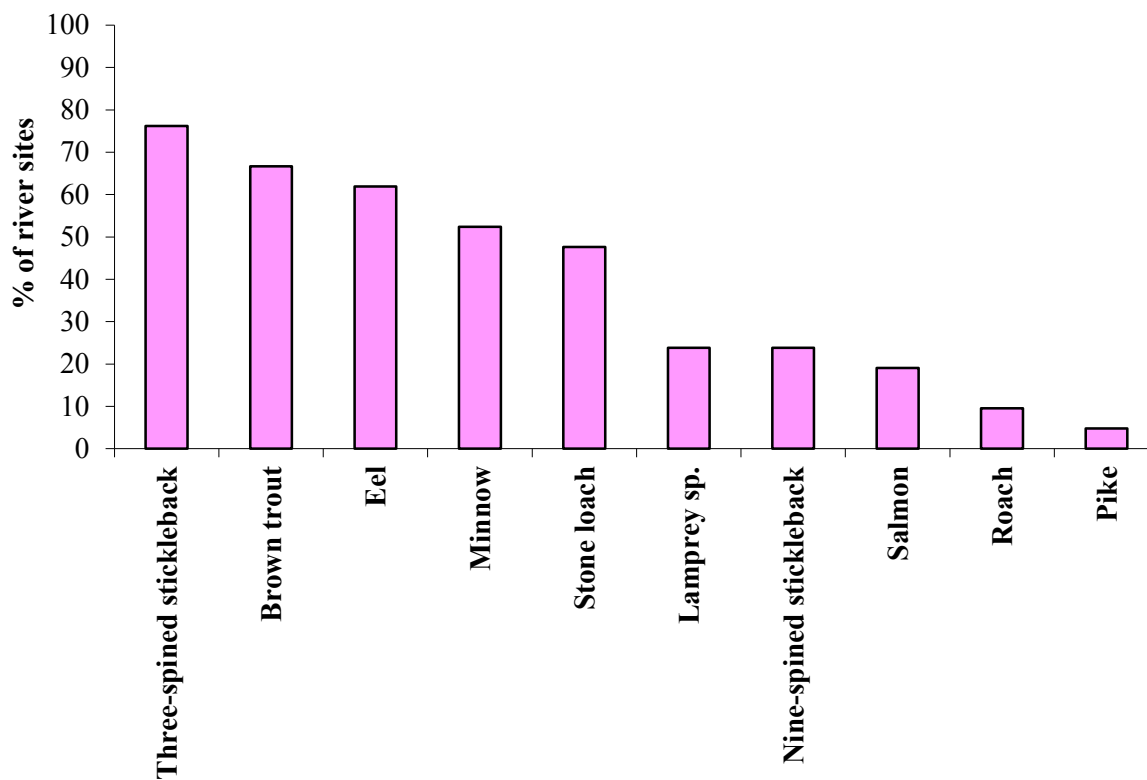


Fig. 4.44. Percentage of sites where each fish species was recorded in the ERBD for WFD SM monitoring 2011

4.3 Age and growth

Growth rates based on back-calculated length-at-age data were analysed for brown trout and salmon in each river site surveyed in the ERBD during 2011.

The mean back-calculated length-at-age data for brown trout in the ERBD are shown in Figure 4.45 and Appendix 1. Brown trout were recorded in 14 sites, with twelve sites containing brown trout aged 1+ or older. Ages ranged from 0+ to 2+, and fish aged 0+ comprised the most abundant age class within the region. The largest brown trout recorded in the ERBD in 2011 was caught in the River Dodder (Mount Carmel), which measured 33.0cm in length, weighed 369g and was aged 2+. The brown trout at each river site were assigned growth categories described by Kennedy and Fitzmaurice (1971), who examined the relationship between alkalinity and growth of brown trout in Irish streams and rivers. Using this method, the growth rate could only be reliably estimated from fish at sites where individual fish were 2+ or older, and where sufficient numbers were caught. Growth was considered “slow” at the River Dodder (Bohernabreena) site (Appendix 1).

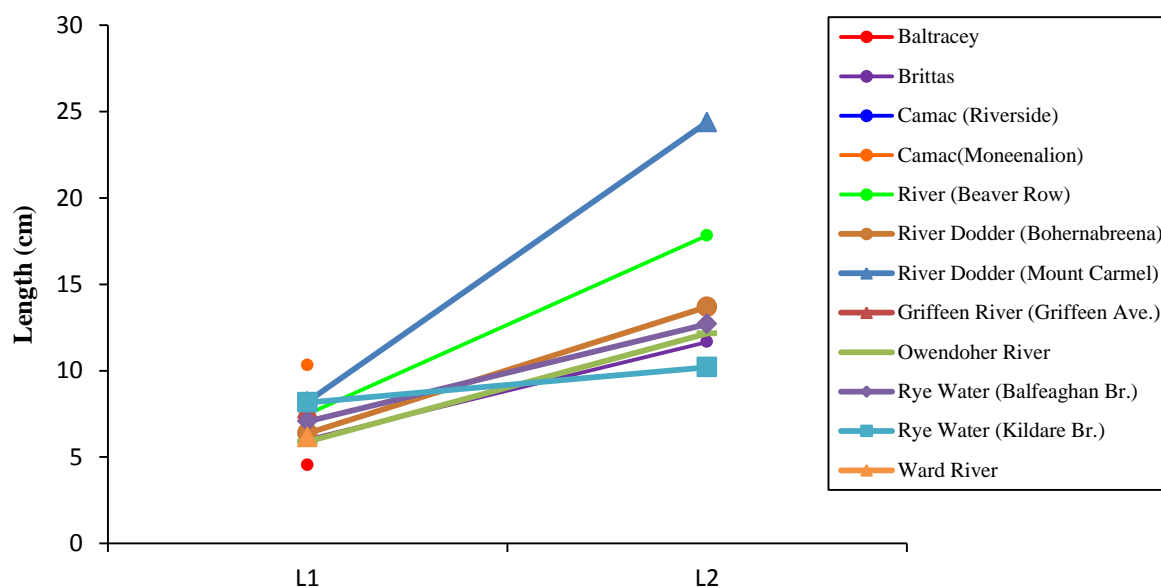


Fig. 4.45. Back calculated length-at-age for brown trout in each river, WFD surveillance monitoring 2011

Salmon were recorded in four river sites, with only one river, the Dodder (Beaver Row) containing individuals aged 1+ or older. Salmon ages ranged from 0+ to 2+, with the most abundant age class 0+. The largest juvenile salmon recorded in the ERBD during 2011 was caught in the River Dodder at Beaver Row, which measured 18.8cm, weighed 81.0g and was aged 2+. Information on growth for salmon is shown in Appendix 2.

The mean back-calculated length-at-age data for roach in the ERBD is shown in Figure 4.46 and Appendix 3. A total of eight roach were recorded within the ERBD in 2011 and these were recorded between two sites, the Griffeen River (Griffeen Avenue) and Rye Water (Kildare Br.).

4.3 Ecological status

An essential step in the WFD process is the classification of the ecological status of lakes, rivers and transitional waters, which in turn will assist in identifying objectives that must be set in the individual River Basin District Management Plans. Following an approach similar to that developed by the Environment Agency in England and Wales, the Fisheries Classification Scheme 2 (FCS2) has been developed for the Republic of Ireland and Northern Ireland, along with a separate version for Scotland, to comply with the requirements of the WFD. Agencies throughout each of the three regions contributed data to be used in the model, which was developed under the management of the Scotland & Northern Ireland Forum for Environmental Research (SNIFFER). This method is a geostatistical model based on Bayesian probabilities, that makes probabilistic comparisons of observed fish counts with expected (predicted) fish counts under reference (un-impacted conditions). This classification system generates Ecological Quality Ratings (EQRs) between 1 and 0 for each site, corresponding to the five different ecological status classes of High, Good, Moderate, Poor and Bad. Confidence levels are then assigned to each class and represented as probabilities. The confidence level for a site is expressed as the probability of that site being assigned to each different status class, with the highest class probability being the overall classification.

Using this tool and expert opinion, each site surveyed in 2011 has been assigned a draft fish classification status (Table 4.21). One site was classified as “High”, four sites as “Good”, eleven sites as “Moderate”, three sites as “Poor” and one site as “Bad”. Only two of these sites were surveyed in both 2008 and 2011, with both showing an improvement in status.

Table 4.21. Ecological status of sites surveyed in the ERBD for surveillance monitoring 2011 (figures in brackets indicate confidence in class)

River	Site name	Site Code	Previous ecological status	Ecological status 2011
Avoca	1km N of Woodenbridge	10A030800	-	Bad (100%)
Broadmeadow Water	Lispopple Br.	08B020700	-	Moderate (83%)
Ratoath	Br. in Ratoath	08R010150	-	Moderate
Ward	Br. d/s of Scotchstone Br.	08W010620	-	Moderate
Brittas	Br. just off R114	09B020100	-	Good
Camac	Riverside Estate Br.	09C020310	-	Moderate (91%)
Camac	Moneenalion Commons Br.	09C020250	-	Moderate (81%)
Dodder	Footbridge, Beaver Row	09D010900	Good (2008)	High (70%)
Dodder	Mount Carmel Hospital	09D010680	-	Moderate (87%)
Dodder	Bohernabreena	09D010100	-	Good (98%)
Piperstown	Tributary at Corrageen	09P030200	-	NA*
Owendoher	Cruagh Road Br.	09O011100	-	Poor (100%)
Griffeen	Griffeen Avenue Br.	09G050300	-	Moderate (92%)
Griffeen	Grange Castle	09G050200	-	Moderate (62%)
Lyreen	Lyreen Angling Centre	09L020100	-	Moderate (94%)
Baltracey	Fraynes Br.	09C030600	-	Moderate
Rye Water	Kildare Br.	09R010400	Moderate (2008)	Good (59%)
Rye Water	Balfeghan Br.	09R010100	-	Good (88%)
Tolka	Violet Hill Drive	09T011100	-	Poor (66%)
Pinkeen	Br. S. of Calliaghwee	09P020500	-	Poor (84%)
Mayne	Wellfield Br.	09M030500	-	Moderate (96%)

*The Piperstown stream was not assigned a status classification as no fish were captured at the site; the absence of fish at the site was attributed to low water levels.

5. DISCUSSION

A total of ten fish species were recorded during the 2011 WFD surveillance monitoring programme for fish in rivers within the ERBD. Three-spined stickleback was the most commonly encountered species in the ERBD, recorded in 16 of the 21 sites, followed by brown trout and eels. The Rye Water (Kildare Br.) was the most diverse site surveyed within the ERBD in 2011 with a total of ten species recorded. The site that recorded the lowest diversity in this region was the Owendoher River, with only one species (brown trout) present. The Piperstown stream site contained no fish; this result has been attributed to low water levels at the time of the survey. The greatest abundances of brown trout and salmon were both recorded in the River Dodder at Beaver Row.

Electric fishing surveys carried out in 2011 by IFI, including one for the WFD (Section 4.1.20) have confirmed the presence of salmon in the Tolka River for the first time in over 100 years. This indicates the potential for this river as a salmon fishery, however an improvement in water quality is required before a sustainable population can be established into the future. The high abundance of salmon recorded in the River Dodder at Beaver Row (Section 4.1.7) and the absence of any salmon in any of the sites surveyed upstream of this location (Sections 4.1.8 to 4.1.10), highlights the difficulties faced by salmon trying to migrate through barriers/weirs within this river system. In Ireland the WFD Freshwater Morphology Programme of Measures and Standards has identified barriers to fish migration as one of the principal issues placing channels at risk in terms of failing to achieve good hydromorphology status. Such barriers can adversely impact on fish community composition and population structure (Gargan, *et al.*, 2011).

Following the methods of Kennedy and Fitzmaurice (1971), growth could only be estimated at one site, the River Dodder (Bohernabreena) it was determined to be “slow”.

The Fish Classification Scheme 2 (FCS2) tool for assessing the ecological status of rivers has been recently developed for the Republic of Ireland which is compliant with the requirements of the WFD. Using this tool and expert opinion, each site surveyed in 2011 has been assigned a draft fish classification status. One site was classified as “High”, four sites as “Good”, eleven sites as “Moderate”, three sites as “Poor” and one site as “Bad”.

6. REFERENCES

- CEN (2003) *Water Quality — Sampling of Fish with Electricity*. European Standard. Ref. No. EN 14011:2000.
- Council of the European Communities (2000) Establishing a framework for Community action in the field of water policy. Directive of the European Parliament and of the Council establishing a framework for community action in the field of water policy (2000/60/EC). *Official Journal of the European Communities*, **43**, 1-73.
- Gargan, P.G., Roche, W.K., Keane, S., Cullagh, A., Mills, P. and O' Keeffe, J. (2011) Comparison of field- and GIS-based assessments of barriers to Atlantic salmon migration: a case study in the Nore Catchment, Republic of Ireland. *Journal of Applied Ichthyology*, **27 (Suppl. 3)**, 66-72
- Kennedy, M. and Fitzmaurice, P. (1971) Growth and food of Brown Trout *Salmo Trutta* (L.) in Irish Waters. *Proceedings of the Royal Irish Academy*, **71 (B) (18)**, 269-352.

APPENDIX 1

Summary of the growth of brown trout in rivers (L1=back calculated length at the end of the first winter etc.)

River		L1	L2	L3	Growth Category
Baltracey	Mean	n/a			n/a
	S.D.	n/a			
	S.E.	n/a			
	n	1			
	Min	4.5			
	Max	4.5			
Brittas	Mean	6.0	11.7		n/a
	S.D.	1.3	1.2		
	S.E.	0.3	0.5		
	n	20	5		
	Min	4.3	10.5		
	Max	9.3	13.7		
Camac (Riverside)	Mean	8.4			n/a
	S.D.	1.1			
	S.E.	0.8			
	n	2			
	Min	7.6			
	Max	9.1			
Camac (Moneenalion)	Mean	n/a			n/a
	S.D.	n/a			
	S.E.	n/a			
	n	1			
	Min	10.3			
	Max	10.3			
Dodder (Beaver Row)	Mean	7.5	17.8		n/a
	S.D.	0.8	1.5		
	S.E.	0.5	1.1		
	n	3	2		
	Min	6.7	16.7		
	Max	8.4	18.9		
Dodder (Mount Carmel)	Mean	8.2	n/a		n/a
	S.D.	1.9	n/a		
	S.E.	0.7	n/a		
	n	8	1		
	Min	5.3	24.4		
	Max	12.0	24.4		

APPENDIX 1 continued

Summary of the growth of brown trout in rivers (L1=back calculated length at the end of the first winter etc.)

River		L1	L2	L3	Growth Category
Dodder (Bohernabreena)	Mean	6.4	13.7		Slow
	S.D.	1.4	1.0		
	S.E.	0.3	0.4		
	n	31	7		
	Min	4.1	12.7		
	Max	9.4	15.6		
Griffeen (Griffeen Ave.)	Mean	7.8			n/a
	S.D.	1.3			
	S.E.	0.4			
	n	13			
	Min	5.0			
	Max	9.4			
Owendoher	Mean	5.9	12.2		n/a
	S.D.	1.2	1.0		
	S.E.	0.4	0.7		
	n	10	2		
	Min	4.6	11.5		
	Max	8.3	12.9		
Rye Water (Kildare Br.)	Mean	8.2	n/a		n/a
	S.D.	1.6	n/a		
	S.E.	0.4	n/a		
	n	14	1		
	Min	5.4	10.2		
	Max	11.1	10.2		
Rye Water (Balfeghan Br.)	Mean	n/a	n/a		n/a
	S.D.	n/a	n/a		
	S.E.	n/a	n/a		
	n	1	1		
	Min	7.1	12.7		
	Max	7.1	12.7		
Ward	Mean	n/a			n/a
	S.D.	n/a			
	S.E.	n/a			
	n	1			
	Min	6.1			
	Max	6.1			

APPENDIX 2

Summary of the growth of salmon in rivers (L1=back calculated length at the end of the first winter etc.)

River		L1	L2
Dodder (Beaver Row)	Mean	6.7	14.8
	S.D.	0.9	n/a
	S.E.	0.2	n/a
	n	15	1
	Min	5.1	14.8
	Max	8.3	14.8
Tolka	Mean	3.6	
	S.D.	n/a	
	S.E.	n/a	
	n	1	
	Min	3.6	
	Max	3.6	

APPENDIX 3

Summary of the growth of roach in rivers (L1=back calculated length at the end of the first winter etc.)

River		L1	L2	L3	L4	L5	L6
Griffeen (Griffeen Ave.)	Mean	n/a	n/a				
	S.D.	n/a	n/a				
	S.E.	n/a	n/a				
	n	1	1				
	Min	2.8	5.3				
	Max	2.8	5.3				
Rye Water (Kildare Br.)	Mean	2.9	7.4	12.2	15.9	18.3	21.4
	S.D.	0.5	2.2	1.8	1.6	1.7	2.6
	S.E.	0.2	1.0	0.8	0.7	0.9	1.8
	n	5	5	5	5	4	2
	Min	2.3	4.1	9.7	14.0	16.8	19.6
	Max	3.4	9.8	14.1	17.7	20.1	23.2

A large, dark blue abstract shape with a white dashed line pattern that flows across the page. The shape is irregular, starting from the left edge and extending towards the right, with a white border on its right side. The dashed lines are white and form a series of overlapping, wavy patterns.

**Inland Fisheries Ireland
Swords Business Campus,
Swords,
Co. Dublin,
Ireland.**

**Web: www.fisheriesireland.ie
Email: info@fisheriesireland.ie
Tel: +353 1 8842 600
Fax: +353 1 8360 060**