



Sampling Fish for the Water Framework Directive

Rivers 2011

South Western River Basin District



Iascach Intíre Éireann
Inland Fisheries Ireland

Water Framework Directive Fish Stock Survey of Rivers in the South Western River Basin District

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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). Five of these surveys were carried out at river sites in the South Western River Basin District (SWRBD) in July 2011 by staff from Inland Fisheries Ireland (IFI) (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, surveys this year can be compared with surveys from before to determine whether the status of our rivers is improving or deteriorating.

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

Five river sites were surveyed in five river catchments within the SWRBD during 2011: the Glashaboy, Laune, Lee, Maine and Womanagh catchments. The sites ranged in surface area from 167m² for the Glashaboy River to 311m² for the Womanagh River. The sites were divided into two categories for reporting purposes: wadeable sites, which were surveyed with bank-based electric fishing units, and non-wadeable sites, which were surveyed with boat-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 SWRBD is shown in Figure 2.1.

Table 2.1. Location and codes of wadeable river sites surveyed for WFD surveillance monitoring, SWRBD 2011

River	Site name	Catchment	Site Code	Waterbody code
Glashaboy	Ballyvorisheen Br.	Glashaboy	19G010200	SW_19_755
Gweestin	Gweestin Br.	Laune	22G061200	SW_22_2207
Martin	Bawnafinny Br.	Lee	19M010600	SW_19_838
Shanowen	Ford u/s Maine confl	Maine	22S010100	SW_22_3452
Womanagh	ATV centre	Womanagh	19W011300	SW_19_1793

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

River	Upstream catchment (km ²)	Wetted width (m)	Surface area (m ²)	Mean depth (m)	Max depth (m)
Glashaboy (Ballyvorisheen Br.)	15.43	3.70	167	0.25	0.37
Gweestin (Gweestin Br.)	67.79	7.97	271	0.43	0.82
Martin (Bawnafinny Br.)	88.46	6.80	306	0.23	0.69
Shanowen (Ford u/s Maine confl)	41.39	7.23	289	0.21	0.46
Womanagh ATV centre	66.87	6.90	338	0.36	0.62

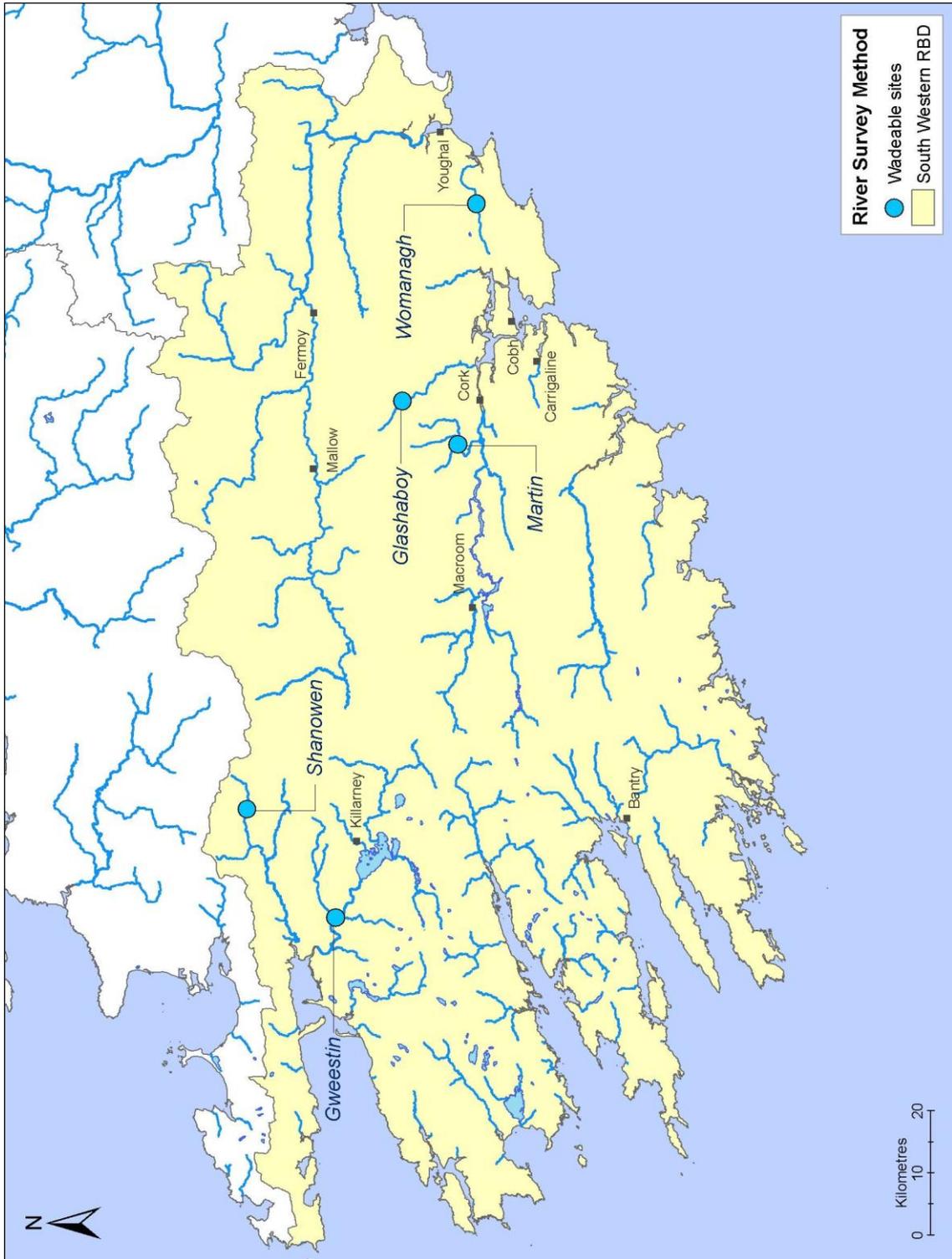


Fig. 2.1. Location map of river sites surveyed throughout the SWRBD for WFD fish surveillance monitoring 2011

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) or boat-based electric fishing units carried in flat-bottomed boats. 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, river lamprey (*Lampetra fluviatilis*) and brook lamprey (*Lampetra planeri*) were treated as one. 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. Samples of European eels were retained for further analysis.

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, and opercular bones were aged using an Olympus SZX10 microscope/digital camera system. Growth rates were 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 Glashaboy River

One site was electric fished on the Glashaboy River as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located just downstream of Ballyvorisheen Bridge, two kilometres north of Carrignavar village (Fig. 4.1; Plate 4.1). Three electric-fishing passes were conducted using two bank-based electric fishing units on the 26th of July 2011, along a 45m length of channel. The mean wetted width of the channel was 3.70m and the mean depth was 25.0cm. A total wetted area of 167m² was surveyed. Glide and pool dominated the habitat along this stretch, while the substrate was dominated by sand, gravel and cobble. A variety of vegetation was recorded at this site including, filamentous green algae and bryophytes as well as emergent bankside and floating species.

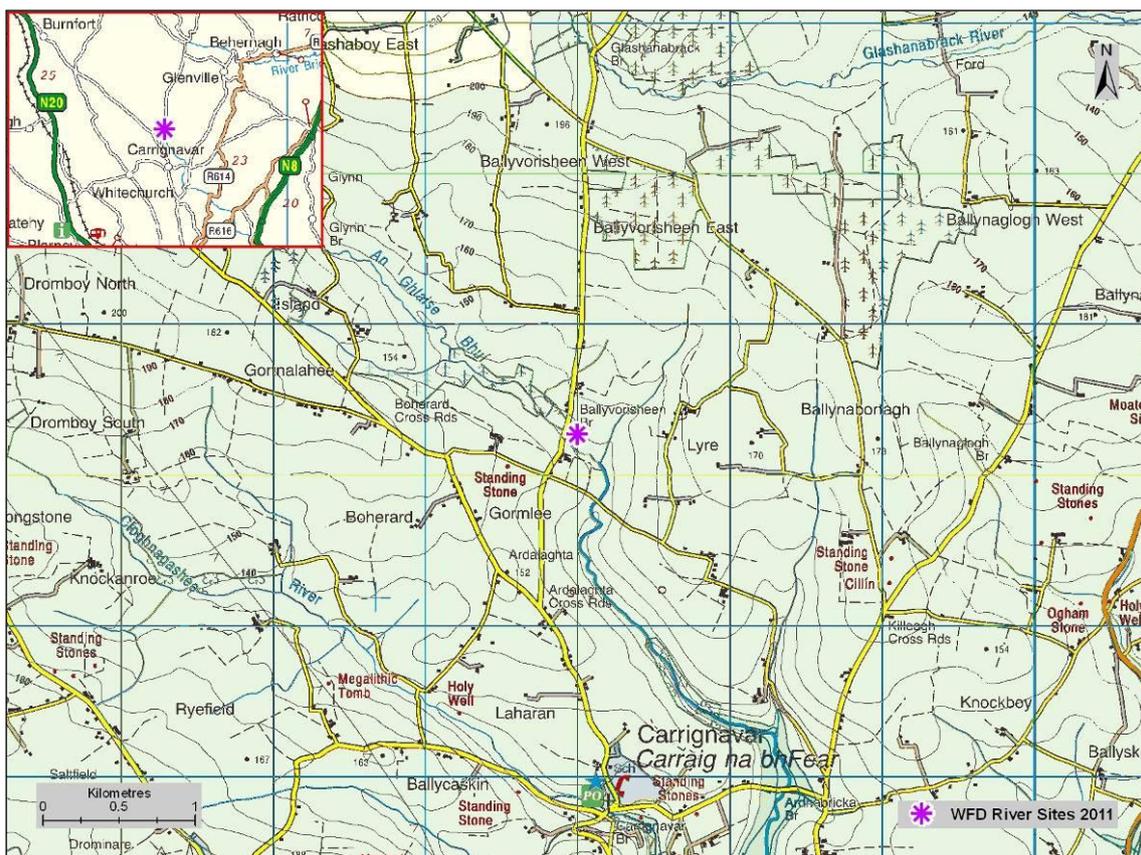


Fig. 4.1. Location of the Glashaboy River surveillance monitoring site



Plate 4.1. The Glashaboy River at Ballyvorisheen Bridge, Co. Cork

A total of four fish species were recorded in the Glashaboy River site. Brown trout was the most abundant species, followed by salmon, stone loach and eels (Table 4.1). During the previous survey in 2008, the same species composition was recorded, although no salmon fry were captured during the 2008 survey.

Table 4.1. Density of fish (no./m²), Glashaboy River 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
Brown trout	0.207	0.278	0.485	0.084	0.102	0.186
Salmon	-	0.017	0.017	0.132	0.006	0.138
Stone loach	-	-	0.025	-	-	0.012
Eel	-	-	0.019	-	-	0.006
All fish	-	-	0.546	-	-	0.342

Brown trout captured during the 2011 survey ranged in length from 5.6cm to 21.2cm (mean = 11.7cm) (Fig. 4.2). Two age classes (0+ and 1+) were present, accounting for approximately 44% and

56% of the total brown trout catch respectively. Brown trout captured during the 2008 survey ranged in length from 4.9cm to 23.8cm (mean = 11.0cm) (Fig. 4.2). Four age classes (0+, 1+, 2+ and 3+) were present, accounting for approximately 52%, 34%, 10% and 4% of the brown trout catch respectively.

Salmon captured during the 2011 survey ranged in length from 6.5cm to 14.6cm (mean = 7.9cm) (Fig. 4.3). Two age classes (0+ and 1+) were present, accounting for approximately 97% and 3% of the total salmon catch respectively. Salmon captured during the 2008 survey ranged in length from 11.5cm to 15.4cm (mean = 12.8cm) (Fig. 4.3). Two age classes (1+ and 2+) were present, accounting for approximately 92% and 8% of the salmon catch respectively.

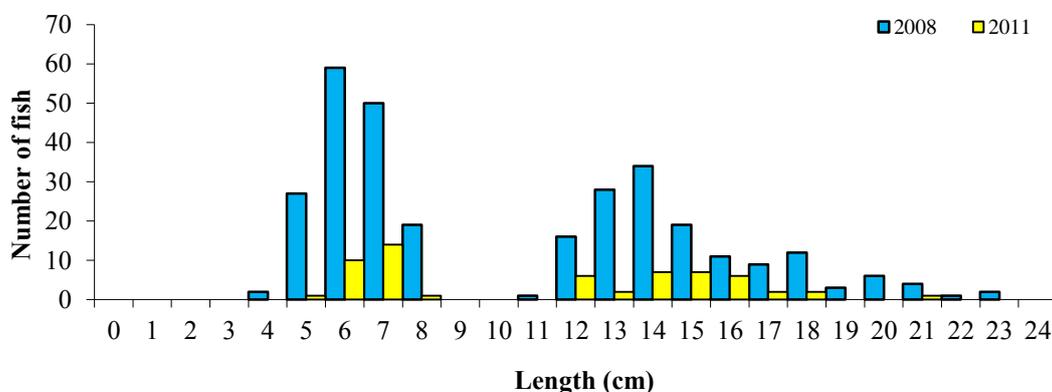


Fig. 4.2. Length frequency distribution of brown trout in the Glashaboy River site, July 2008 (n = 303) and July 2011 (n = 59)

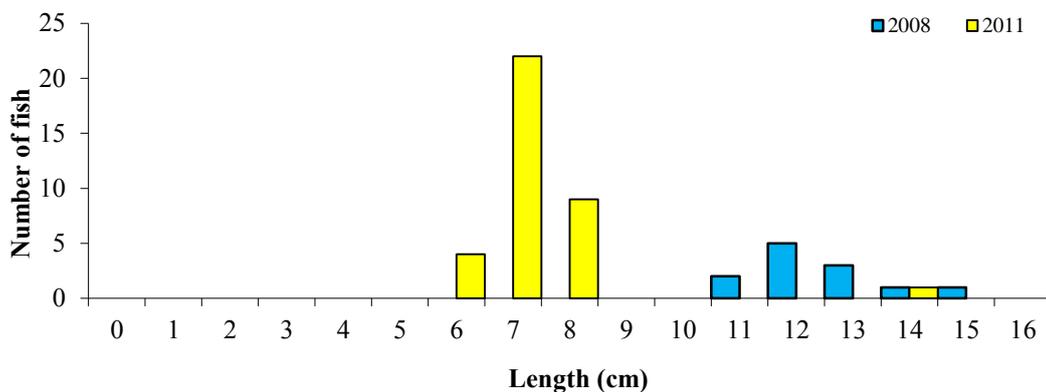


Fig. 4.3. Length frequency distribution of salmon in the Glashaboy River site, July 2008 (n = 12) and July 2011 (n = 36)

4.1.2 The Gweestin River

One site was electric fished on the Gweestin River as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located upstream of Gweestin Bridge, approximately seven kilometres south-east of Killorglin (Fig. 4.4; Plate 4.2). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 27th of July 2011, along a 34m length of channel. The mean wetted width of the channel was 7.97m and the mean depth was 43.0cm. A total wetted area of 271m² was surveyed. Glide and pool dominated the habitat, while the substrate was an even mix of cobble, gravel and sand. A variety of vegetation was recorded at this site, with bryophytes and emergent bankside species most abundant.

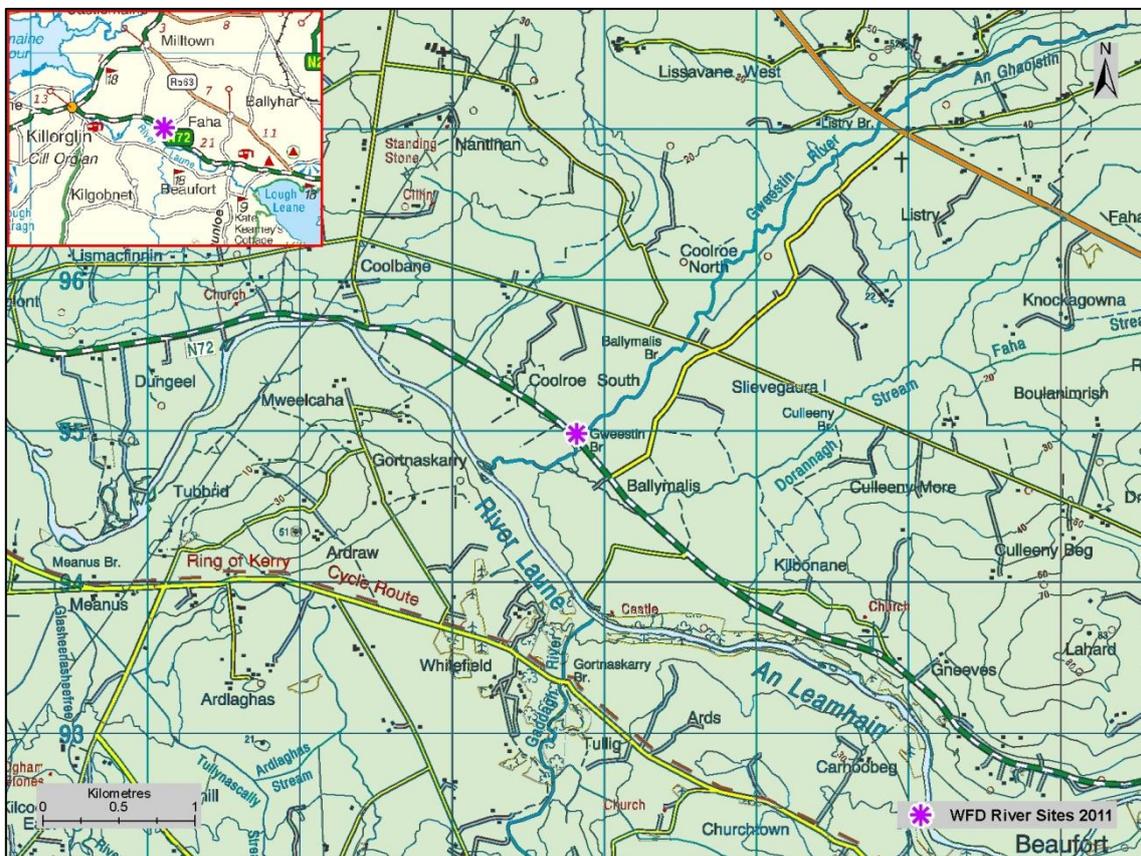


Fig. 4.4. Location of the Gweestin River surveillance monitoring site



Plate 4.2. The Gweestin River at Gweestin Bridge, Co. Kerry

A total of seven fish species were recorded in the Gweestin River site. Salmon was the most abundant species, followed by minnow, lamprey, three-spined stickleback, brown trout, stone loach and eels (Table 4.2). During the previous survey in 2008 a similar species composition was recorded. However, in 2011 three-spined stickleback and stone loach were recorded, while sea trout were only recorded in the 2008 survey.

Table 4.2. Density of fish (no./m²), Gweestin River 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	0.009	0.019	0.028	0.410	0.059	0.469
Minnow	-	-	0.011	-	-	0.325
Lamprey sp.	-	-	0.002	-	-	0.048
Three-spined stickleback	-	-	-	-	-	0.033
Brown trout	-	0.021	0.021	-	0.026	0.026
Stone loach	-	-	-	-	-	0.015
Eel	-	-	0.002	-	-	0.007
Sea trout	-	-	0.003	-	-	-
All fish	-	-	0.067	-	-	0.923

Salmon captured during the 2011 survey ranged in length from 3.9cm to 12.2cm (mean = 6.3cm) (Fig. 4.5). Two age classes (0+ and 1+) were present, accounting for approximately 81% and 19% of the total salmon catch respectively. Salmon captured during the 2008 survey ranged in length from 5.2cm to 13.1cm (mean = 9.9cm) (Fig. 4.5). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 30%, 64% and 6% of the salmon catch respectively.

Minnow captured during the 2011 survey (Fig.4.6) ranged in length from 2.5cm to 7.2cm (mean = 4.95cm). In 2008 they ranged in length from 2.0cm to 7.2cm (mean = 5.7cm).

Brown trout captured during the 2011 survey ranged in length from 12.1cm to 23.6cm (mean 15.1cm) (Fig. 4.7). Two age classes (1+ and 3+) were present, accounting for approximately 89% and 11% of the total brown trout catch respectively. Brown trout captured during the 2008 survey ranged in length from 15.0cm to 32.7cm (mean = 21.4cm) (Fig. 4.7). Four age classes (1+, 2+, 3+ and 4+) were present, accounting for approximately 38%, 41%, 14% and 7% of the brown trout catch respectively.

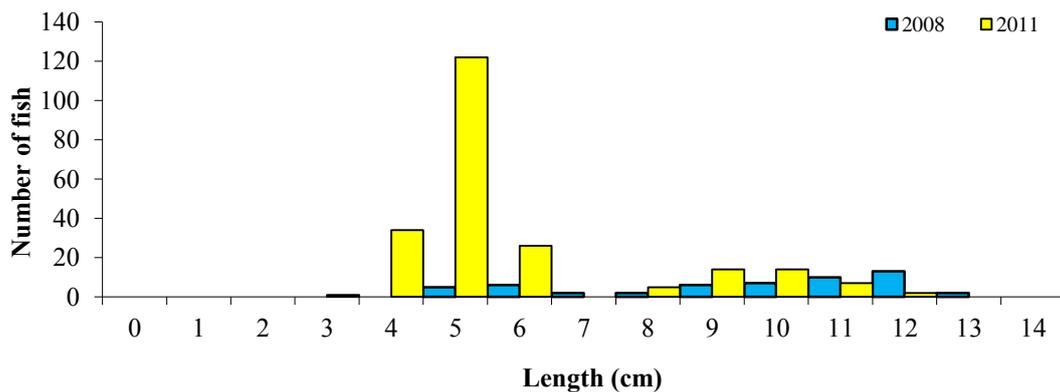


Fig. 4.5. Length frequency distribution of salmon in the Gweestin River site, September 2008 (n = 53) and July 2011 (n = 225)

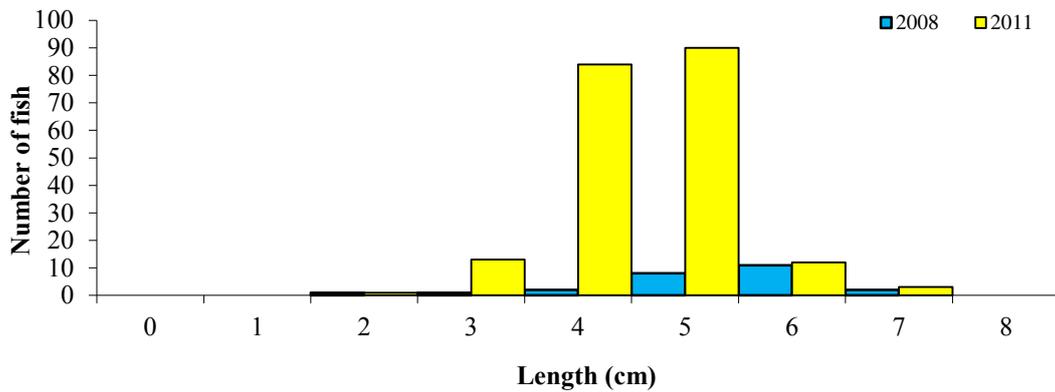


Fig. 4.6. Length frequency distribution of minnow in the Gweestin River site, September 2008 (n = 25) and July 2011 (n = 203)

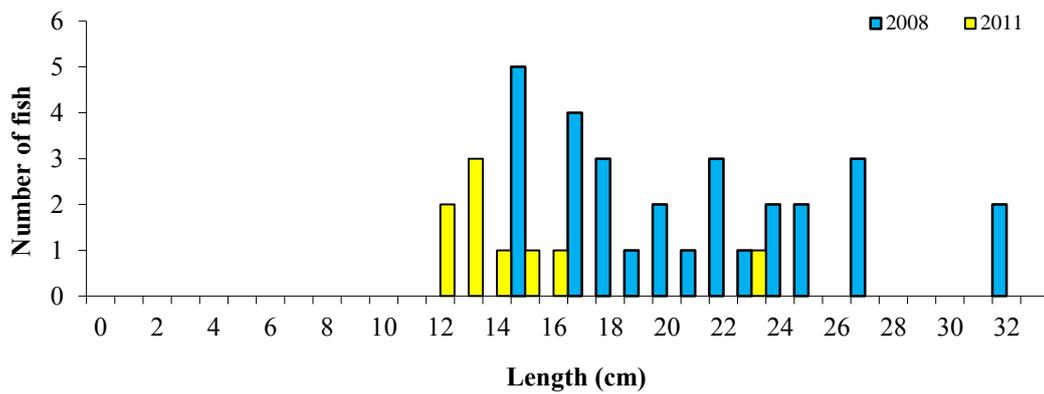


Fig. 4.7. Length frequency distribution of brown trout in the Gweestin River site, September 2008 (n = 29) and July 2011 (n = 9)

4.1.3 The River Martin

One site was electric fished on the River Martin as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located on the upstream side of Bawnafinny Bridge, one kilometre south-west of Blarney (Fig. 4.8; Plate 4.3). Three electric-fishing passes were conducted using three bank-based electric fishing units on the 27th of July 2011, along a 45m length of channel. The mean wetted width of the channel was 6.80m and the mean depth was 23.0cm. A total wetted area of 306m² was surveyed. The habitat at along this stretch was an even mix of riffle, glide and pool, while cobble was the most abundant substrate present. The vegetation at this site consisted mainly of emergent bankside species.

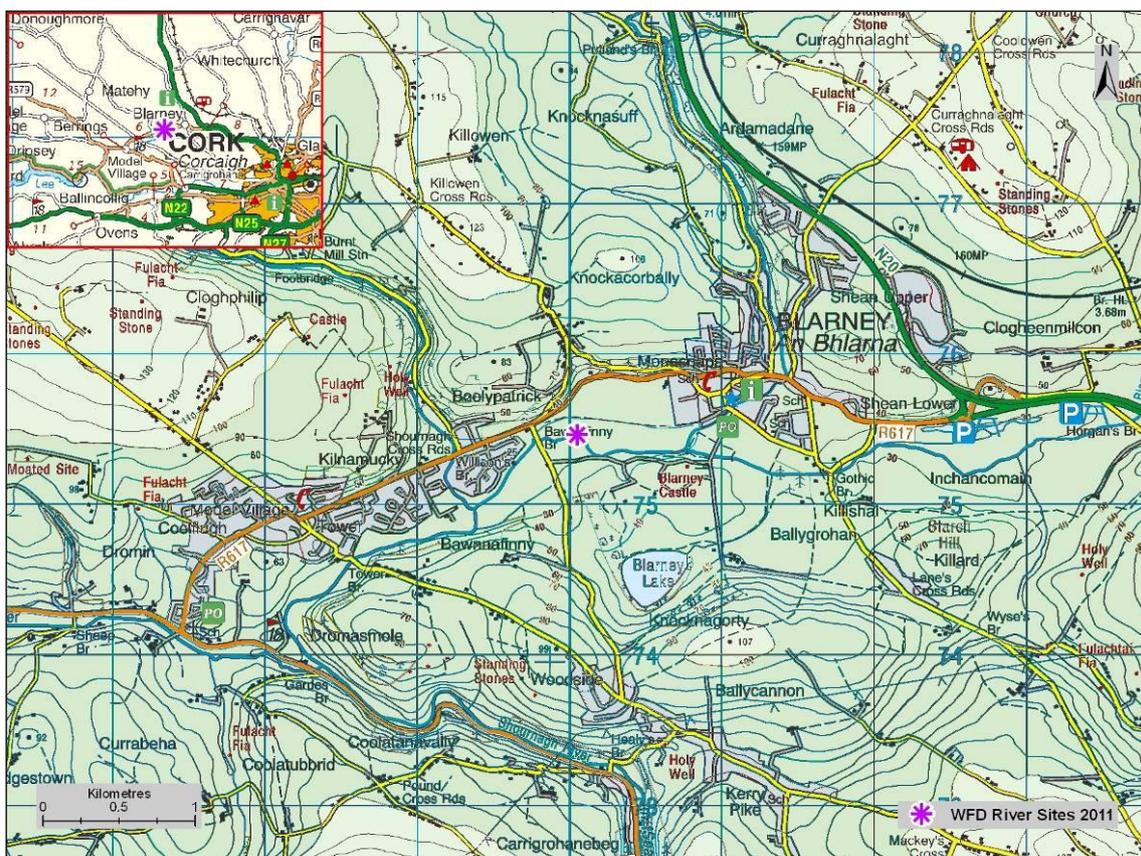


Fig. 4.8. Location of the River Martin surveillance monitoring site



Plate 4.3. The Martin River at Bawnafinny Bridge, Co. Cork

A total of six fish species were recorded in the River Martin site. Salmon was the most abundant species, followed by brown trout, lamprey, three-spined stickleback, stone loach and eels (Table 4.3). During the previous survey in 2008, the same species were recorded.

Table 4.3. Density of fish (no./m²), River Martin 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	0.403	0.059	0.462	0.830	0.252	1.082
Brown trout	0.026	0.046	0.072	0.023	0.085	0.108
Lamprey sp.	-	-	0.049	-	-	0.062
Three-spined stickleback	-	-	0.013	-	-	0.010
Stone loach	-	-	0.016	-	-	0.007
Eel	-	-	0.003	-	-	0.003
All fish	-	-	0.615	-	-	1.271

Salmon captured during the 2011 survey ranged in length from 3.8cm to 14.2cm (mean = 6.85cm) (Fig. 4.9). Two age classes (0+ and 1+) were present, accounting for approximately 80% and 20% of the total salmon catch respectively. Salmon captured during the 2008 survey had similar lengths ranging in length from 4.0cm to 13.9cm (mean = 6.7cm) (Fig. 4.9). Two age classes (0+ and 1+) were also present, accounting for approximately 85% and 15% of the salmon catch respectively.

Brown trout captured during the 2011 survey ranged in length from 4.6cm to 28.4cm (mean = 14.8cm) (Fig. 4.10). Four age classes (0+, 1+, 2+ and 3+) were present, accounting for approximately 14%, 61%, 20% and 4% of the total brown trout catch respectively. Brown trout captured during the 2008 survey ranged in length from 5.4cm to 26.1cm (mean = 12.8cm) (Fig. 4.10). Four age classes (0+, 1+, 2+ and 3+) were also present, accounting for approximately 44%, 11%, 34% and 9% of the brown trout catch respectively.

Lamprey captured during the 2011 survey (Fig. 4.11) ranged in length from 4.8cm to 13.9cm (mean = 10.63cm). In 2008 they ranged in length from 4.9cm to 13.6cm (mean = 8.3cm).

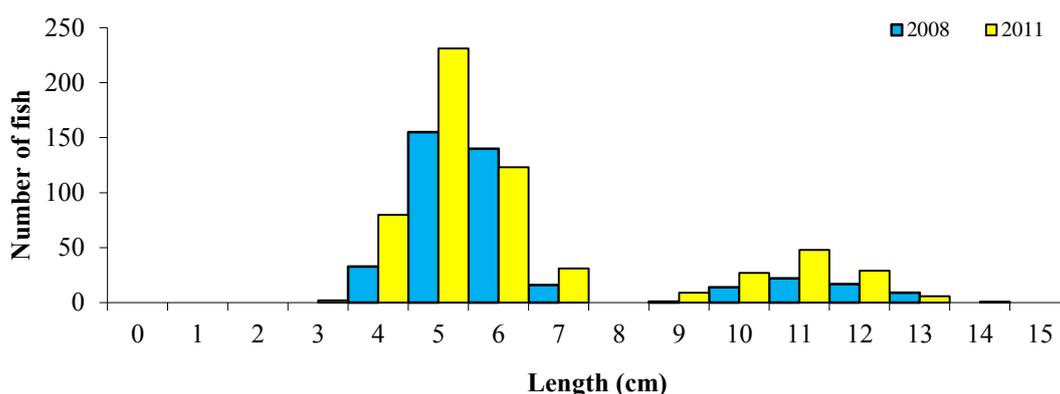


Fig. 4.9. Length frequency distribution of salmon in the River Martin site, July 2008 (n = 407) and July 2011 (n = 587)

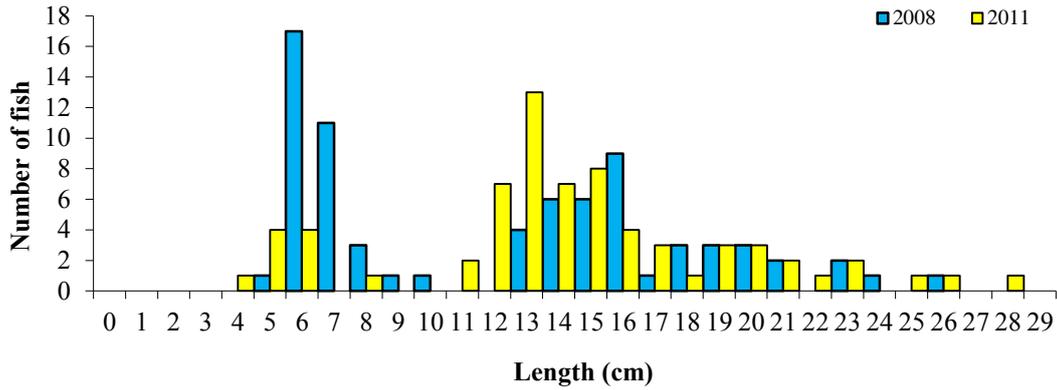


Fig. 4.10. Length frequency distribution of brown trout in the River Martin site, July 2008 (n =75) and July 2011 (n = 69)

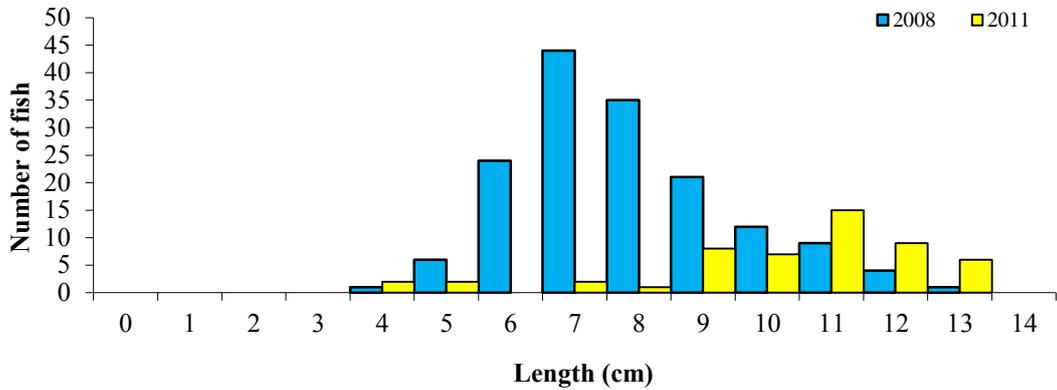


Fig. 4.11. Length frequency distribution of lamprey in the River Martin site, July 2008 (n = 157) and July 2011 (n =52)

4.1.4 The Shanowen River

One site was electric fished on the Shanowen River as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located downstream of the bridge near the townland of Tullig, less than one kilometre before its confluence with the River Maine (Fig. 4.12; Plate 4.4). Two electric-fishing passes were conducted using three bank-based electric fishing units on the 28th of July 2011, along a 40m length of channel. The mean wetted width of the channel was 7.23m and the mean depth was 21.0cm. A total wetted area of 289m² was surveyed. Glide dominated the habitat along this stretch, while the substrate consisted of mainly, cobble, gravel and boulder. A variety of vegetation was recorded at this site, with filamentous green algae, bryophytes and emergent bankside species all prevalent throughout. Japanese knotweed was also encountered close to the survey stretch.

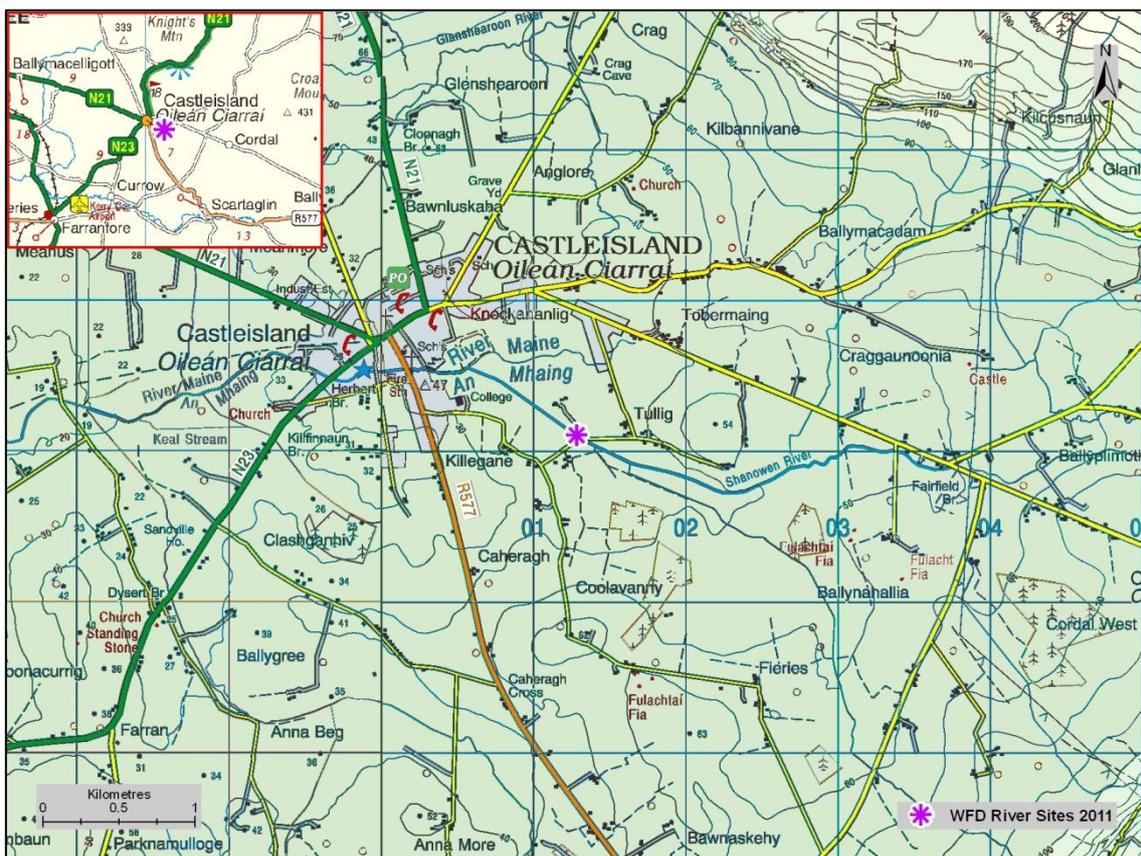


Fig. 4.12. Location of the Shanowen River surveillance monitoring site



Plate 4.4. The Shanowen River near Castleisland, Co. Kerry

A total of five fish species were recorded in the Shanowen River site. Salmon was the most abundant species, followed by eels, brown trout, stone loach and lamprey (Table 4.4). This river was also surveyed in 2008, with results from that survey also shown for comparative purposes. During the previous survey in 2008, a similar species composition was recorded with the exception of stoneloach, which were only recorded 2011, and three-spined stickleback, which were only recorded in 2008.

Table 4.4. Density of fish (no./m²), Shanowen River 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	0.464	0.199	0.663	0.563	0.135	0.677
Eel	-	-	0.032	-	-	0.062
Brown trout	0.016	0.026	0.042	0.031	0.021	0.052
Stone loach	-	-	-	-	-	0.024
Lamprey sp.	-	-	0.005	-	-	0.003
Three-spined stickleback	-	-	0.006	-	-	-
All fish	-	-	0.748	-	-	0.819

Salmon captured during the 2011 survey ranged in length from 3.8cm to 15.6cm (mean =6.9cm) (Fig. 4.13). Two age classes (0+ and 1+) were present, accounting for approximately 83% and 17% of the total salmon catch respectively. Salmon captured in 2008 ranged in length from 4.5cm to 14.2cm (mean = 7.9cm) (Fig. 4.13). Two age classes (0+ and 1+) were also present, accounting for approximately 73% and 27% of the salmon catch respectively.

Eels captured during the 2011 survey (Fig. 4.14) ranged in length from 11.4cm to 33.4cm (mean = 18.3cm). In 2008 they ranged in length from 10.5cm to 41.4cm (mean = 20.7cm).

Brown trout captured during the 2011 survey ranged in length from 6.3cm to 23.9cm (Fig. 4.15). Four age classes (0+, 1+, 2+ and 3+) were present, accounting for approximately 52%, 29%, 14% and 5% of the total brown trout catch respectively. Brown trout captured during the 2008 survey ranged in length from 5.6cm to 21.5cm (mean = 12.5cm) (Fig. 4.15). Three age classes (0+, 1+ and 2+) were present, accounting for approximately 44%, 49% and 7% of the brown trout catch respectively.

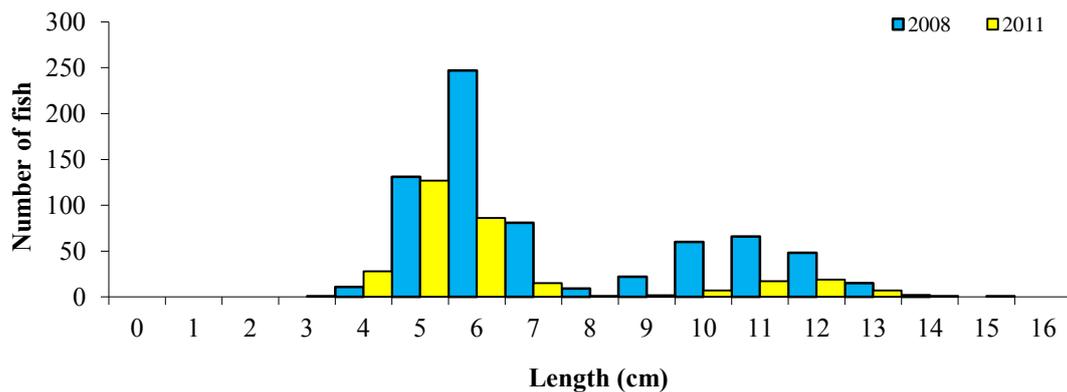


Fig. 4.13. Length frequency distribution of salmon in the Shanowen River site, July 2008 (n = 692) to July 2011 (n = 312)

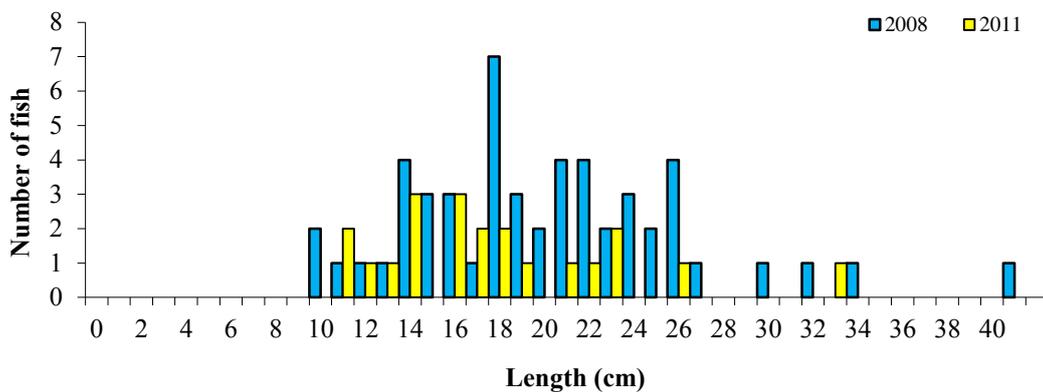


Fig. 4.14. Length frequency distribution of eels in the Shanowen River site, July 2008 (n = 52) to July 2011 (n = 21)

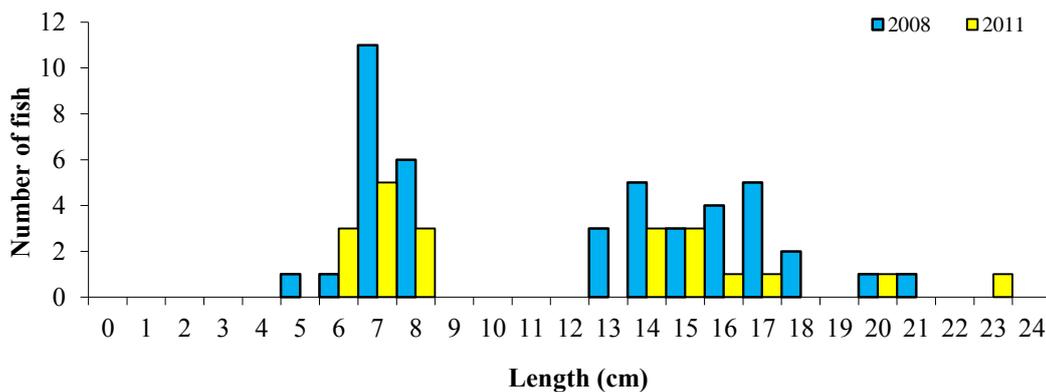


Fig. 4.15. Length frequency distribution of brown trout in the Shanowen River site, July 2008 (n = 43) to July 2011 (n = 21)

4.1.5 The Womanagh River

One site was electric fished on the Womanagh River as part of the WFD surveillance monitoring programme in rivers 2011. The survey site was located approximately two hundred metres downstream of the Womanagh River's confluence with the Dower River (Fig. 4.16; Plate 4.5). Three electric-fishing passes were conducted using two bank-based electric fishing units on the 25th of July 2011, along a 45m length of channel. The mean wetted width of the channel was 6.90m and the mean depth was 36.0cm. A total wetted area of 311m² was surveyed. Glide was by far the most dominant habitat present along this stretch of river, while the substrate was comprised of mainly sand, gravel and mud/silt. This site was rich in vegetation, with filamentous green algae and emergent bankside species abundant throughout.

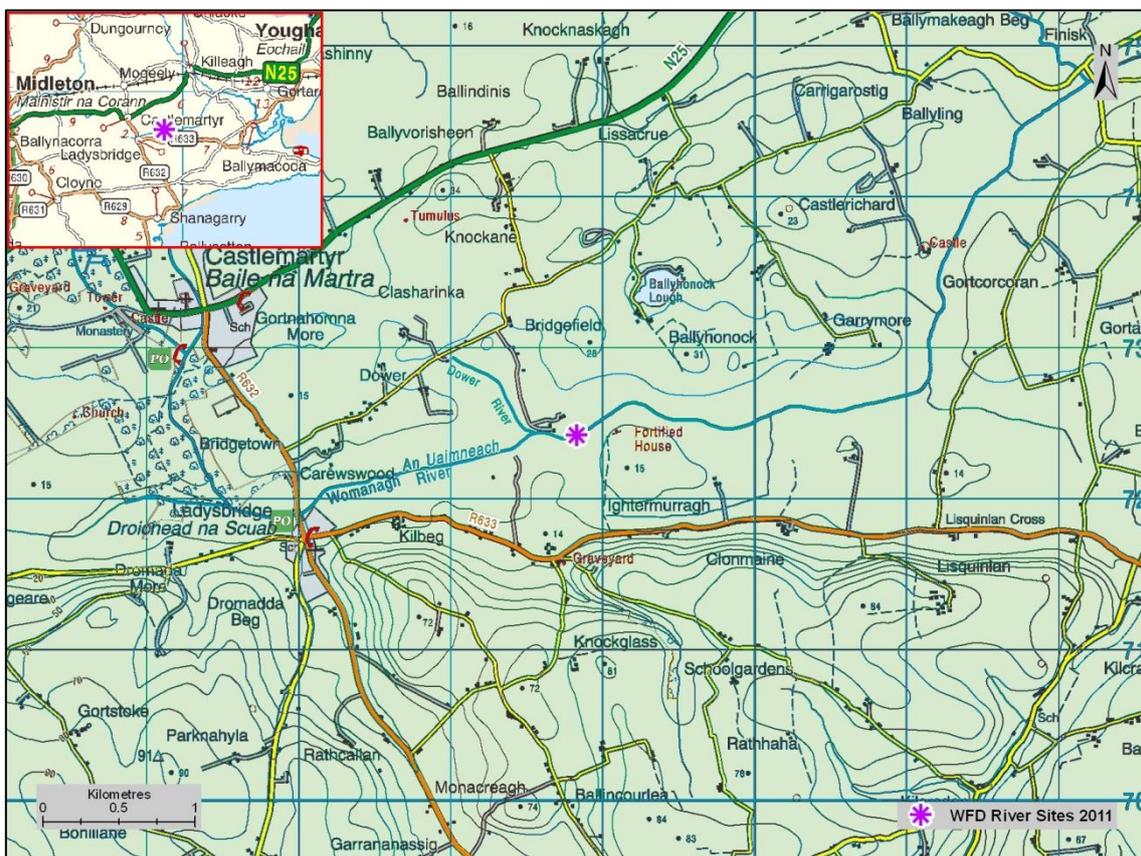


Fig. 4.16. Location of the Womanagh River surveillance monitoring site



Plate 4.5. The Womanagh River downstream of the Dower River confluence, Co. Cork

A total of six fish species were recorded in the Womanagh River site. Three-spined stickleback was the most abundant species, followed by brown trout, eels, lamprey, salmon and flounder (Table 4.5). During the previous survey, a similar species composition was recorded with the exception of lamprey and flounder, which were only recorded in the 2011 survey.

Table 4.5. Density of fish (no./m²), Womanagh 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	-	-	0.415
Brown trout	-	0.052	0.052
Eel	-	-	0.048
Lamprey sp.	-	-	0.048
Salmon	0.026	-	0.026
Flounder	-	-	0.010
All fish	-	-	0.599

Three-spined stickleback captured during the 2011 survey (Fig. 3.17) ranged in length from 1.0cm to 6.0cm (mean = 3cm).

Brown trout captured during the 2011 survey ranged in length from 12.9cm to 26.5cm (Fig. 4.18). Two age classes (1+ and 2+) were present, accounting for approximately 90% and 10% of the total brown trout catch respectively.

Lamprey captured during the 2011 survey (Fig. 4.19) ranged in length from 6.0cm to 13.7cm (mean = 9.34cm). Eels captured during the 2011 survey (Fig. 4.20) ranged in length from 8.4cm to 32.9cm (mean = 21.0cm).

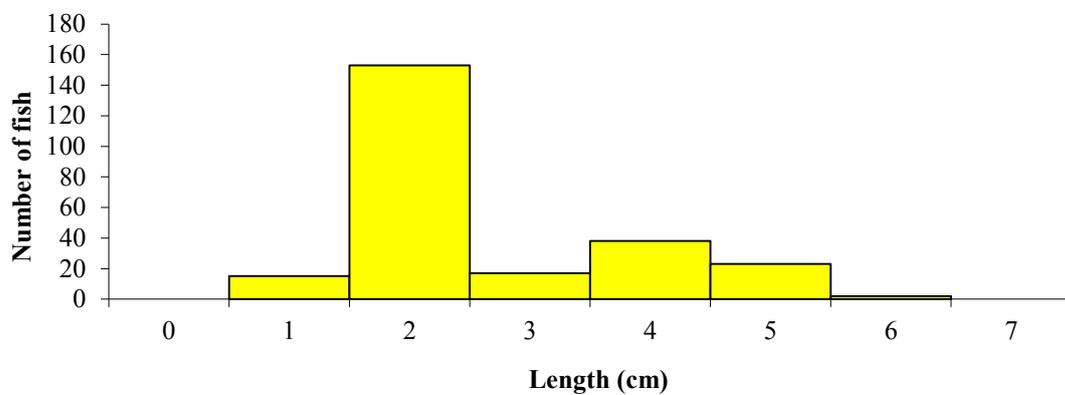


Fig. 4.17. Length frequency distribution of three-spined stickleback in the Womanagh River site, July 2011 (n = 248)

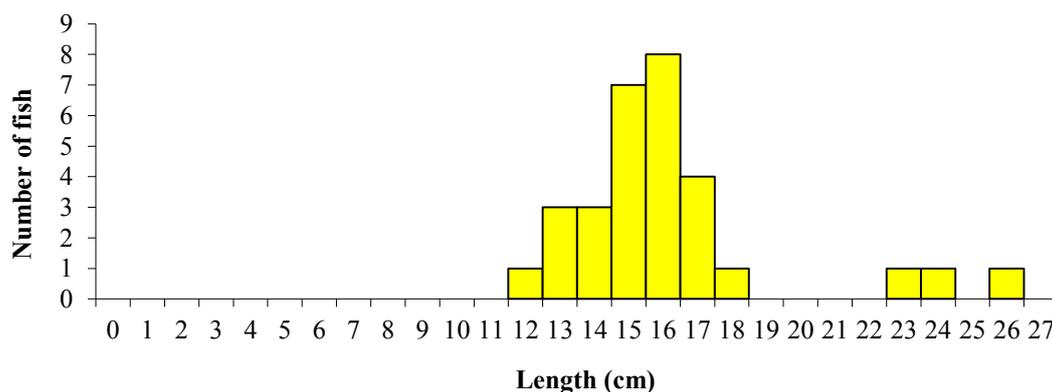


Fig. 4.18. Length frequency distribution of brown trout in the Womanagh River site, July 2011 (n = 30)

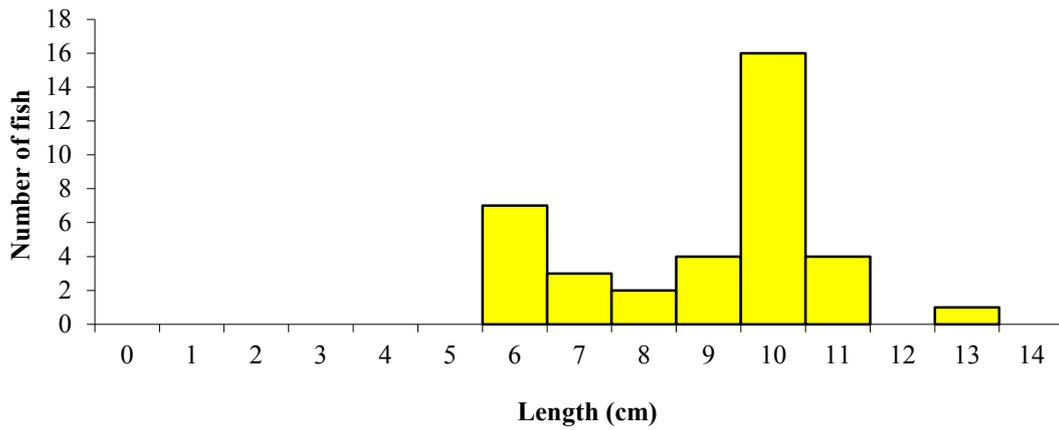


Fig. 4.19. Length frequency distribution of lamprey in the Womanagh River site, July 2011 (n = 37)

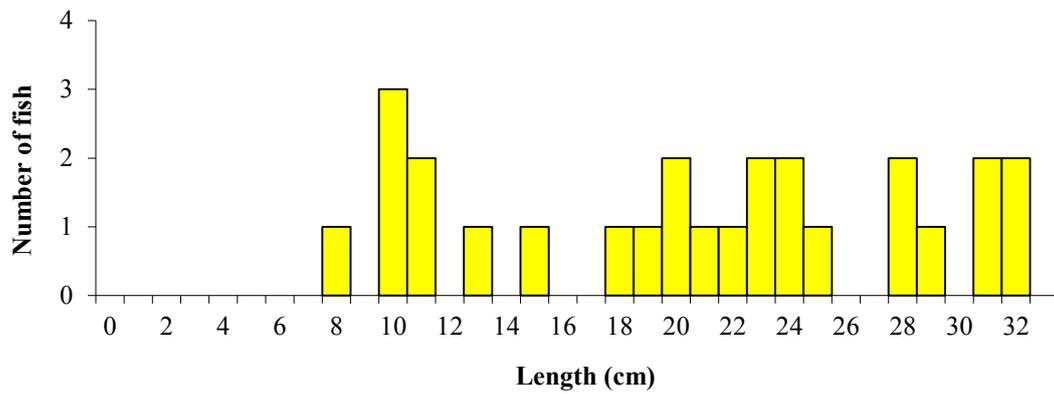


Fig. 4.20. Length frequency distribution of eels in the Womanagh River site, July 2011 (n = 26)

4.2 Community structure

4.2. Species distribution

A total of eight fish were recorded within the five SWRBD sites surveyed during 2011 (Fig.4.21). Brown trout, eels and salmon were the most common fish species, occurring at all sites within the region, followed by lamprey and stone loach (80%) and three-spined stickleback (60%). Flounder and minnow were only recorded at one site each.

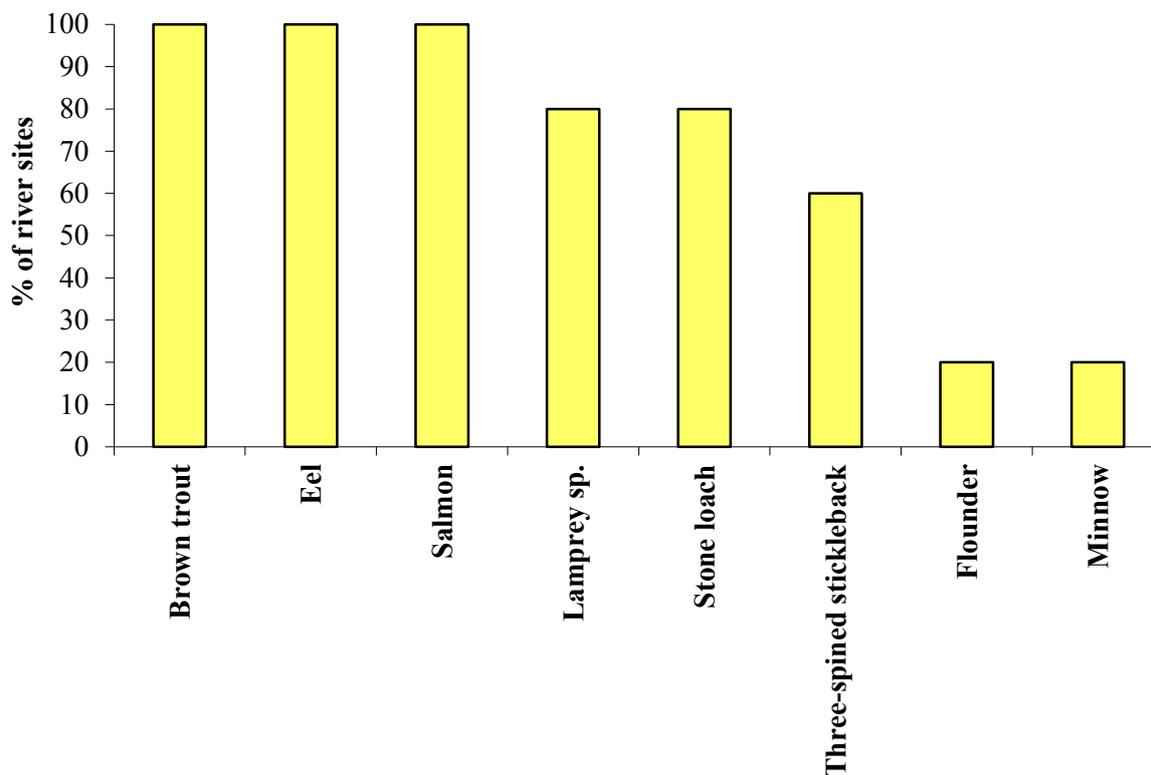


Fig. 4.21. Percentage of sites where each fish species was recorded in the SWRBD for WFD SM monitoring 2011

4.3. Age and growth

Growth rates based on back-calculated length-at-age data were analysed for brown trout in each river site surveyed in the SWRBD during 2011. Brown trout were recorded in all five SWRBD rivers and ranged in age from 0+ to 3+. Brown trout ages ranged from 0+ to 3+, and fish aged 1+ comprised the most abundant age class at both sites. The largest brown trout recorded in the SWRBD in 2011 was caught in the Martin River, and it measured 28.4cm in length, weighed 288g and was aged at 3+. 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 Martin site (Appendix 1).

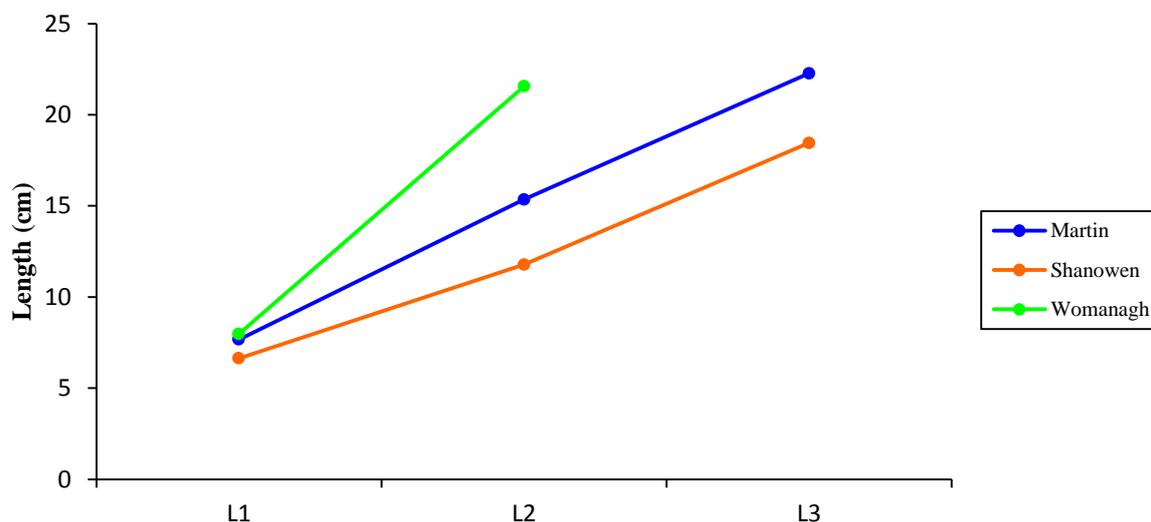


Fig. 4.22. Back calculated lengths for brown trout in each river site, WFD surveillance monitoring 2011

All rivers in the SWRBD contained salmon aged at least 1+ except for the Glashaboy site, which only contained salmon in the 0+ age category. As a result only L1 data was available (Appendix 2), therefore no growth curves are shown.

The largest salmon recorded in the SWRBD during 2011 was caught in the Shanowen River, measured 15.6cm in length and weighed 45.0g. The mean L1 of salmon ranged from 3.6cm in the Gweestin site to 5.1cm in the Shanowen site (Appendix 2). The Glashaboy contained too few fish to be compared reliably.

4.4 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 4.6). Two sites were classified as “High” with the remaining three classed as “Good”. Four of these sites were surveyed in both 2008 and 2011. When comparing the status for both years, two sites showed an improvement, while two sites had no change.

Table 4.6. Ecological status of sites surveyed in the SWRBD for surveillance monitoring 2011
 (figures in brackets indicate confidence of site status being correct)

River	Site Code	Site name	Previous ecological status	Ecological status 2011
Glashaboy	19G010200	Ballyvorisheen Br.	Good (2008)	Good (97%)
Gweestin	22G061200	Gweestin Br.	Moderate (2008)	Good (86%)
Martin	19M010600	Bawnafinny Br.	Good (2008)	High (89%)
Shanowen	22S010100	Ford u/s Maine confl.	High (2008)	High (100%)
Womanagh	19W011300	ATV centre		Good (58%)

5. DISCUSSION

A total of eight fish species were recorded during the 2011 WFD surveillance monitoring programme for fish in rivers within the SWERBD. Brown trout, eels and salmon were the most commonly encountered species, recorded in all five sites, followed by stone loach and three-spined stickleback. The Gweestin River site was the most diverse site surveyed within the SWRBD for the Water Framework Directive in 2011, with a total of seven species present. The site that recorded the lowest species diversity in this region was the Glashaboy River, with a total of four species present. The greatest abundances of brown trout and salmon were recorded Glashaboy River and River Martin respectively.

Following the methods of Kennedy and Fitzmaurice (1971), growth could only be estimated at one sites, on the Martin River, where it was determined to be “slow” in both.

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. All sites surveyed in the SWRBD have been assigned a classification of at least “Good” status. Two sites were assigned “High” status.

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.

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

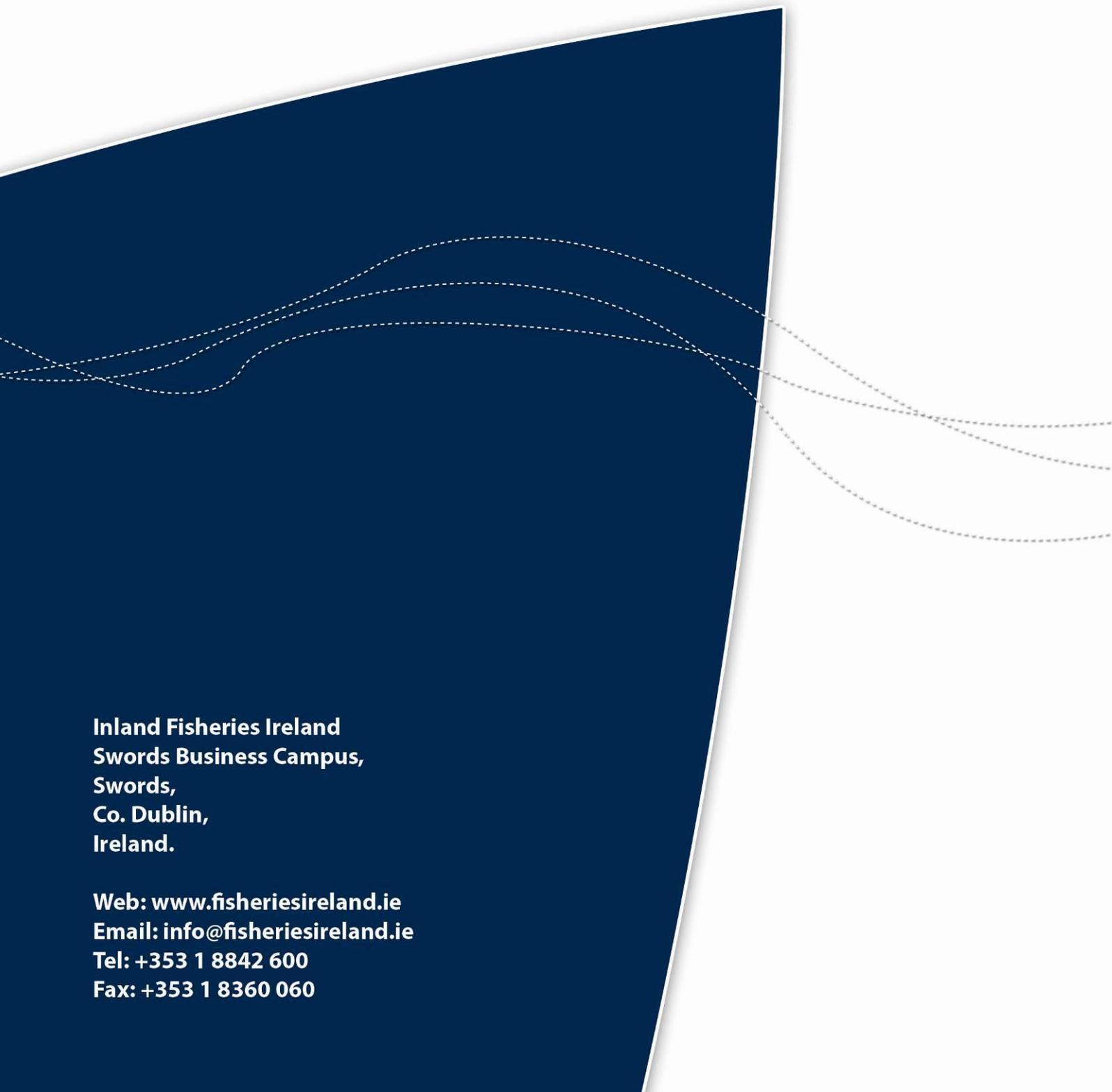
Summary of the growth of a subsample of brown trout in rivers (L1=back calculated length at the end of the first winter etc.)

River		L1	L2	L3	Growth Category
Glashaboy	Mean	7.5			n/a
	S.D.	1.8			
	S.E.	0.4			
	n	26			
	Min	4.3			
	Max	11.7			
Gweestin	Mean	6.2	n/a	n/a	n/a
	S.D.	1.5	n/a	n/a	
	S.E.	0.5	n/a	n/a	
	n	9	1	1	
	Min	3.8	16.4	20.1	
	Max	8.8	16.4	20.1	
Martin	Mean	7.7	15.4	n/a	Slow
	S.D.	1.6	1.5	n/a	
	S.E.	0.3	0.4	n/a	
	n	39	13	1	
	Min	4.5	12.2	22.3	
	Max	10.6	19.1	22.3	
Shanowen	Mean	6.6	11.8	n/a	n/a
	S.D.	1.1	1.4	n/a	
	S.E.	0.4	0.8	n/a	
	n	9	3	1	
	Min	5.1	10.9	18.4	
	Max	8.4	13.4	18.4	
Womanagh	Mean	8.0	21.6		n/a
	S.D.	1.6	2.6		
	S.E.	0.3	1.9		
	n	23	2		
	Min	4.6	19.7		
	Max	11.9	23.4		

APPENDIX 2

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

River		L1
Glashaboy	Mean	n/a
	S.D.	n/a
	S.E.	n/a
	n	1
	Min	7.2
	Max	7.2
Gweestin	Mean	3.6
	S.D.	0.7
	S.E.	0.2
	n	20
	Min	2.3
	Max	5.2
Martin	Mean	4.9
	S.D.	1.0
	S.E.	0.2
	n	22
	Min	2.6
	Max	6.5
Shanowen	Mean	5.1
	S.D.	1.2
	S.E.	0.3
	n	23
	Min	3.2
	Max	7.6



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