

Loughs Agency Water Framework Directive Fish in Rivers Classification Report 2016

Water Framework Directive Fish Population Assessment

Loughs Agency of the Foyle Carlingford and Irish Lights Commission
Art Niven and Mark McCauley, August 2017



This report outlines results and classifications from Water Framework Directive fish surveillance and routine monitoring programmes within rivers of the Foyle and Carlingford areas during 2016

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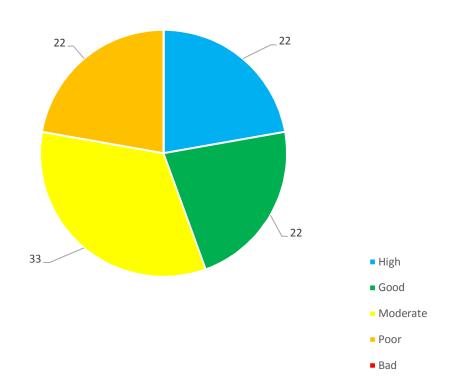
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EXECUTIVE SUMMARY

Nine Water Framework Directive fish surveillance monitoring stations were surveyed within the Loughs Agency jurisdiction in 2016. Six were within Northern Ireland and three in Ireland. 22% of sites surveyed were classified as high status, 22% as good status and 33% as moderate status, 22% poor. 0% of sites were classified as bad status.



Classification in 2016 was completed using the WFD compliant classification tool, Fish Classification Scheme 2 Ireland (FCS2 Ireland) with the option of a professional judgement over ride. No results were over ridden using professional judgement in 2016. An overview of the classification system is provided and a synopsis of the survey data presented.

Additional data and information has been presented in a series of excel spreadsheets and ESRI Arc GIS shape files. All data reported is stored within the Loughs Agency Geographical Information System (GIS) and is available upon request. Photographs of each site have been included and outline recommendations made for consideration as part of any programme of measures.

Additional indicative classifications have been derived for water bodies within the Foyle and Carlingford areas where certain criteria have been applied to semi quantitative Salmon Management Plan electrofishing data. These criteria have been developed by the Northern Ireland Water Framework Directive Fish Group and are outlined within this report.

A number of recommendations are made to ensure the continued success of Water Framework Directive river fish monitoring.

1.0 INTRODUCTION

This report has been prepared to disseminate results for Water Framework Directive fish monitoring within the Foyle and Carlingford areas as managed by the Loughs Agency. The Loughs Agency reports this information to the Northern Ireland Environment Agency and the Environmental Protection Agency in Ireland. The report provides classifications for water bodies with surveillance monitoring stations and for water bodies covered by routine semi quantitative Salmon Management Plan monitoring within the Loughs Agency jurisdictions of the Foyle and Carlingford areas for 2016. Additional information has been provided in electronic format.

WFD compliant fish surveys at surveillance stations are required under national and European law. Annex V of the WFD outlines that rivers are included within monitoring programmes and that the composition abundance and age structure of fish fauna are examined (Council of the European Communities, 2000).

A synopsis of targeted Water Framework Directive river fish sampling within the Foyle and Carlingford areas has been provided below for fieldwork conducted in 2016.

Other sites outside the Foyle and Carlingford areas have been monitored by the Agri Food and Biosciences Institute (AFBI) under contract to NIEA. Loughs Agency and AFBI have previously collaborated on a number of surveys to ensure continuity of sampling methods, no collaborative surveys were conducted in 2016.

2.0 BASIS FOR WATER FRAMEWORK DIRECTIVE FISH CLASSIFICATION

The Fish Classification Scheme 2 tool for Ireland (FCS2 Ireland) has been developed to classify fish fauna from high status to bad status to comply with Water Framework Directive requirements. FCS2 Ireland is a statistical model based on the Environment Agency (England) Fisheries Classification Scheme 2 (FCS2). FCS2 Ireland compares the observed abundance of fish of each species with a site specific prediction of the expected fish community under near undisturbed "reference conditions". The predicted reference conditions are

estimated using models created for each part of the UK and Ireland (UKTAG, 2013).

FCS2 Ireland was used for the first time within the Loughs Agency jurisdiction in 2012 to classify fish in rivers. This methodology is WFD compliant and has replaced professional opinion as the main method of classification. A professional opinion over ride can still be employed if deemed appropriate. Fish classifications will be incorporated into final surface water classifications.

Data collection was conducted in the field during June, July, August and September 2016 and involved the use of a quantitative electrofishing methodologies and a semi quantitative methodology. Electrofishing is the preferred method for WFD surveillance monitoring of fish in rivers to obtain a representative sample of fish from each monitoring station. This method is compliant with the European Committee for Standardisation (CEN) standards for assessing fish stocks in wadeable rivers (CEN, 2003).

Quantitative electrofishing requires the netting off of a section of river using stop nets. Removal sampling is then conducted utilising electrofishing equipment with the numbers, age class and species of each fish being recorded for each pass. After an appropriate depletion has been achieved, which facilitates a density estimation to be made, all fish were returned alive to the river.

Additional habitat variables were recorded and the exact sampling locations were recorded using a Trimble Juno hand held GPS unit.

Professional judgement over ride can be utilised where classifications are deemed to be inaccurate due to the presence of barriers to migration downstream of the sampling stations. Consideration of this issue has not been incorporated into the FCS2 (Ireland) model at this time. Other scenarios for professional judgement over ride include significant deviation from expected classification and higher than normal water levels during survey.

NURSERY AREA	
Grade 1	 50 -80mm water depth 0.5 - 8% gradient Stable cobble/boulder substrate > or = 70% bed cover Providing adequate cover
Grade 2	Marginally outside grade 1 on one count only
Grade 3	Well outside grade 1 on one or more counts
Grade 4	Absent, deep, channelized, silty etc.
SPAWNING AREA	
Grade 1	 Flow 300 – 600mm/sec Water depth 150 – 700mm 70% substrate 30-80mm diameter Gravel depth: Trout = 50-150mm Salmon = 200-500mm
Grades 2-4	Failing as for nursery habitat above
HOLDING AREA	
Grade 1	 Depth minimum m ideally > or = 2m Suitable cover Bankside/substrate stability
Grades 2-4	Failing as for nursery habitat above

Table 1. Habitat classification based on Department of Agriculture for Northern Ireland (Fisheries Division) advisory leaflet on the evaluation of habitat for salmon and trout

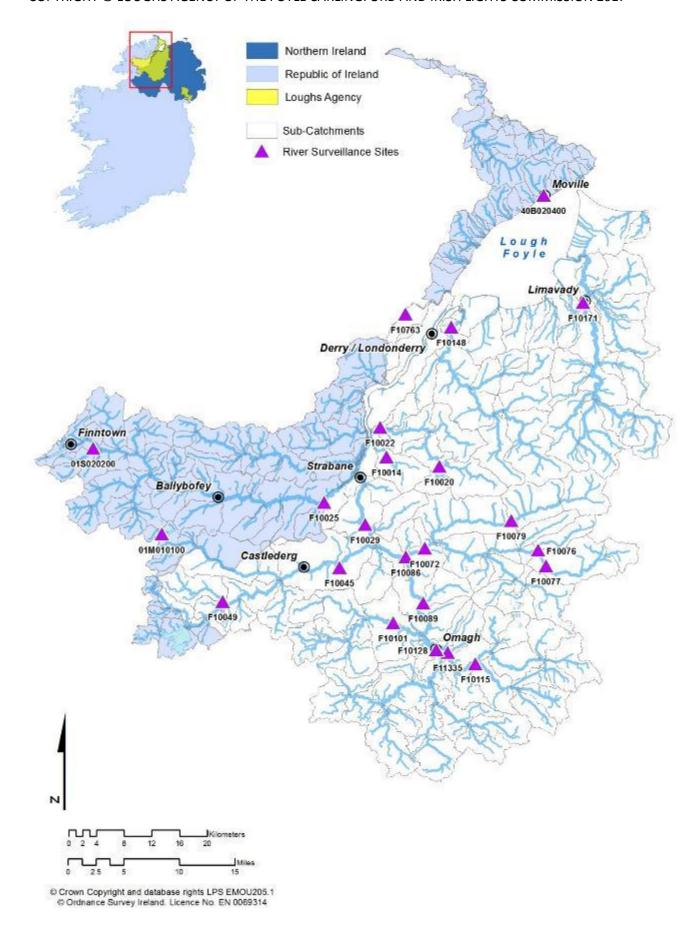


Figure 1. WFD Fish surveillance river sites within the Foyle area, Northern Ireland and Ireland
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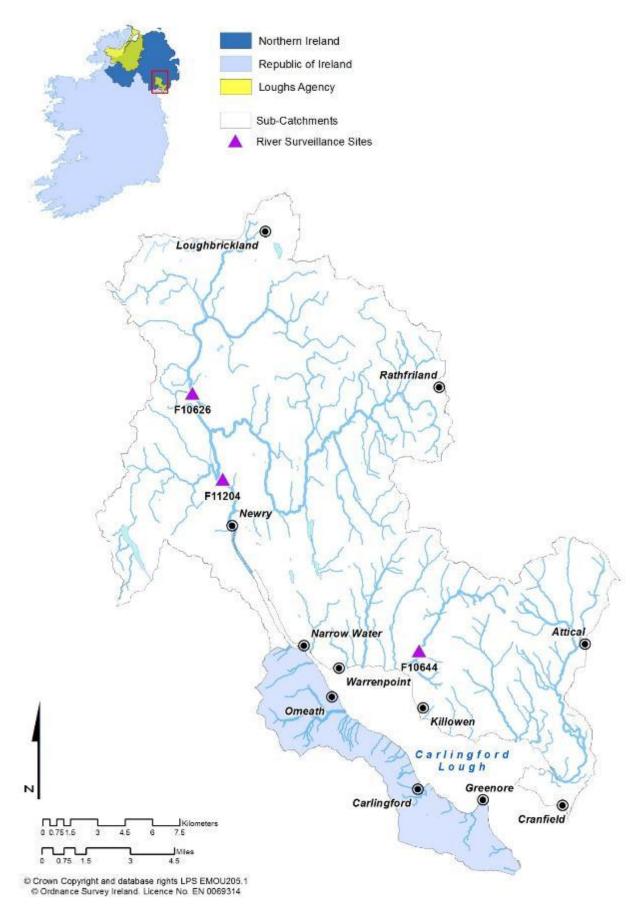


Fig 2. WFD fish surveillance river sites within the Carlingford area, Northern Ireland. There are no sites within Ireland in the Carlingford area.

3.0 CLASSIFICATIONS

3.1 F10025 River Finn at Clady Bridge Finn WFD Fish Classification 2016

GBNI1NW010103063

FISHING	Sal 0+	Sal 1+	Tro 0+	Tro 1+	Eel	Lamprey	3 Spined Stickleback	Stone loach	Total
Single Pass	29	9	1	0	6	4	1	12	62
TOTAL	29	9	1	0	6	4	1	12	62

Table 2. Electrofishing sampling results

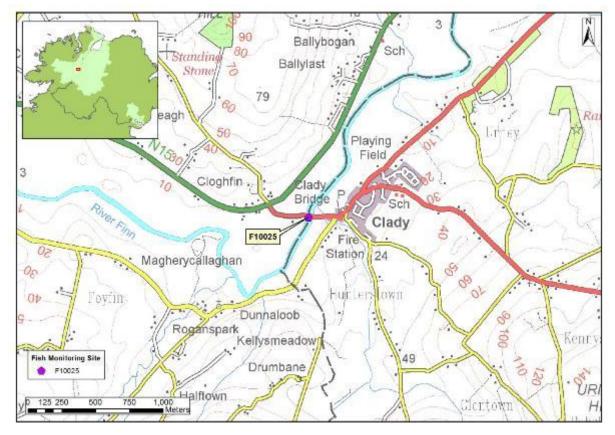


Fig 3. Site F10025

3.11 Results

Site F10025 was surveyed using a quantitative electrofishing method. This involved a single pass electrofishing method over a defined area. From this data, density estimates have been calculated for all species and age classes present.

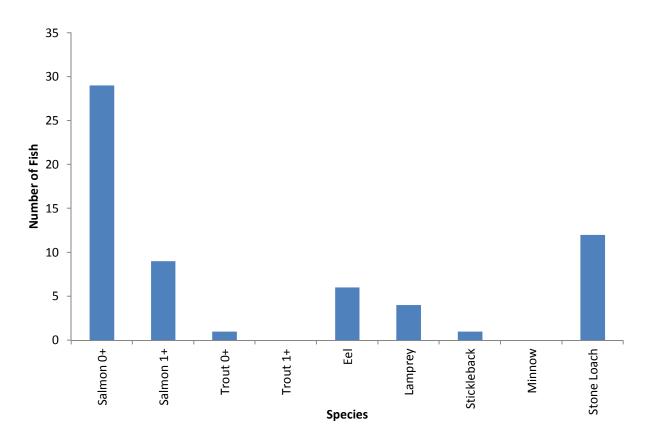


Fig 4. Total catch

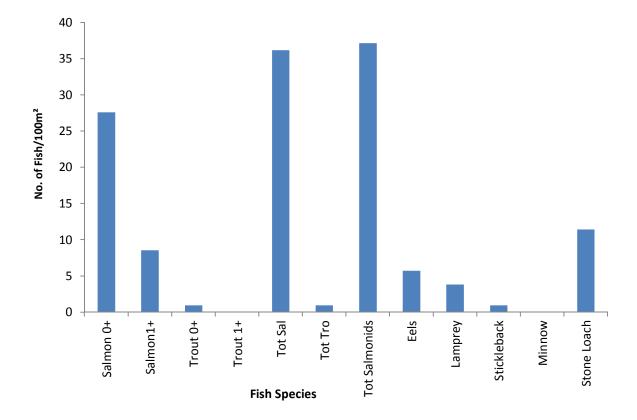


Fig 5. Density/100m²

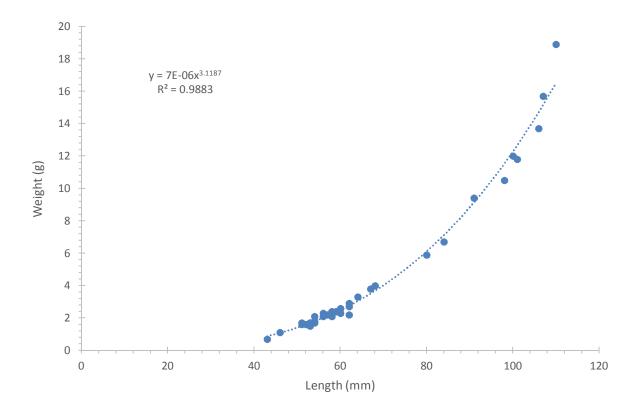


Fig 6. Length weight relationship of Atlantic salmon n = 38

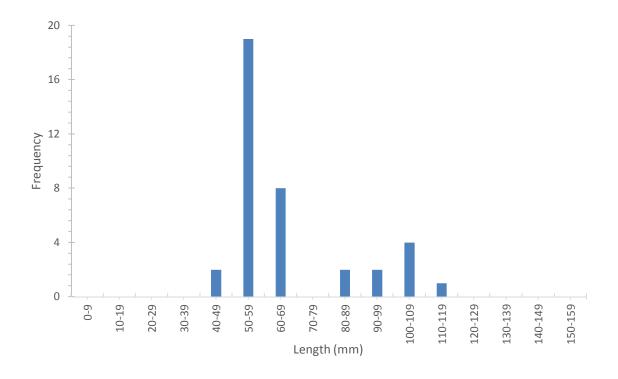


Fig 7. Length frequency distribution for Atlantic salmon n = 38

This site is composed predominantly of grade 3 nursery habitat (45%) with grade 3 holding habitat (40%) and grade 3 spawning habitat (15%).

This site was surveyed upstream of the surveillance monitoring station which is located at Clady Bridge. The site surveyed is downstream of Liscooley Bridge and has been moved for operational reasons. It is approximately 7km upstream from Clady Bridge. The exact location is given in the spreadsheets supplied which provide grid references for upstream and downstream locations. With a change to the waterbody boundaries post 2016, the survey location may need to be reviewed.

The site is on the main stem of the River Finn. Additional biological information is available in the spreadsheets provided. The diversity of in-channel and riparian habitats are good.





3.12 Proposed Programme of Measures

Within the waterbody, potential programmes of measures could include improved riparian land management in the form of stock proof fencing and native buffer zone creation. Some improvement of in-channel substrate could be conducted by either loosening compacted gravels or by importing new substrate. Treatment of riparian invasive species is also required. At the waterbody level riparian invasive species particularly Himalayan balsam is a significant problem. Bank erosion as a result of trampling by cattle is also an issue within the waterbody. Channel maintenance, dredging and flood banks are also significant issues within the waterbody.





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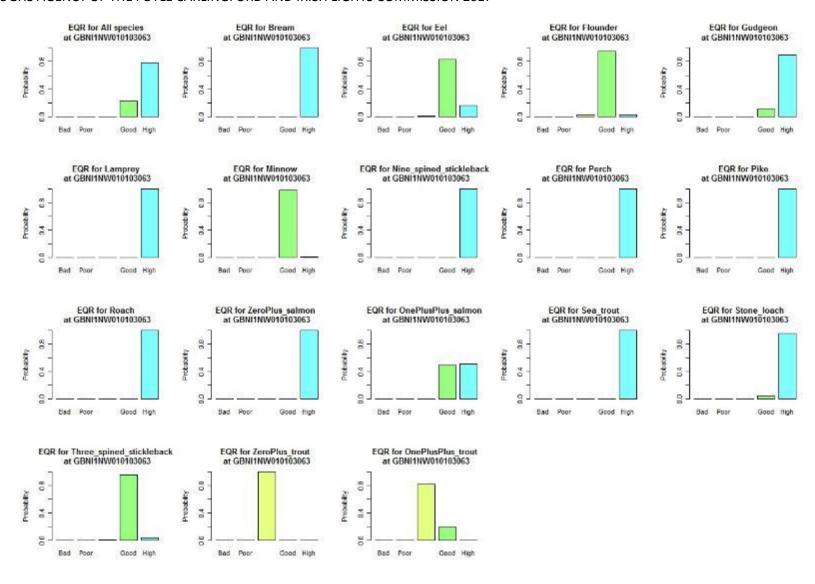


Fig 8. FCS2 (Ireland) output. Bar charts of the probability of class

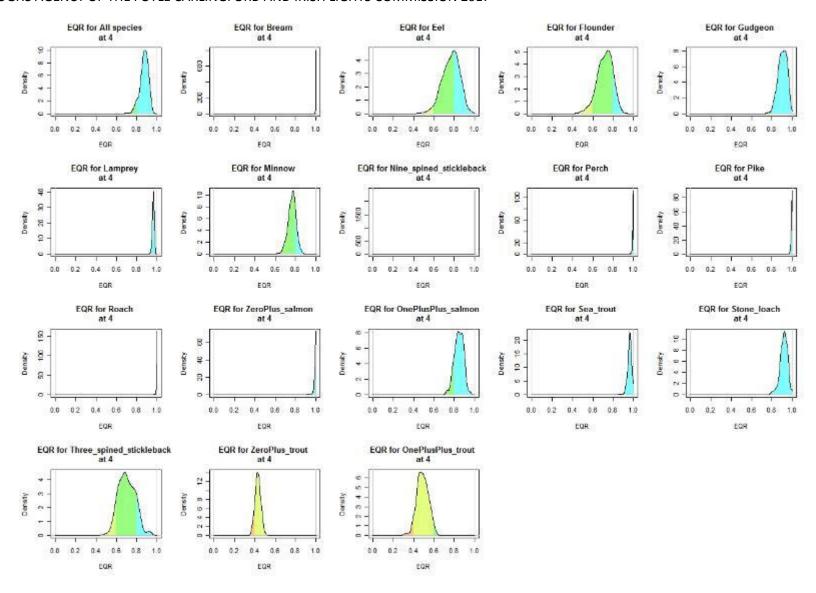


Fig 9. FCS2 (Ireland) output. Density estimates of the EQR variables

3.2 F10072 Owenkillew River at Killymore Bridge GBNI1NW010102028 Owenkillew WFD Fish Classification 2016

HIGH

FISHING	Sal 0+	Sal 1+	Tro 0+	Tro 1+	Eel	Lamprey	Stone Loach	Total
1st	36	32	13	2	6	4	10	103
TOTAL	36	32	13	2	6	4	9	103

Table 3. Sampling results

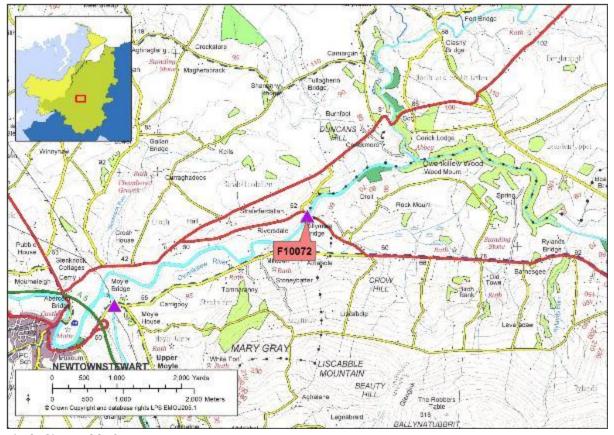


Fig 3. Site F10072

3.21 Results

Site F10072 was surveyed using a single pass quantitative electrofishing method. Prolonged high water precluded removal sampling over multiple passes. From this data minimum density estimates have been calculated for all species present.

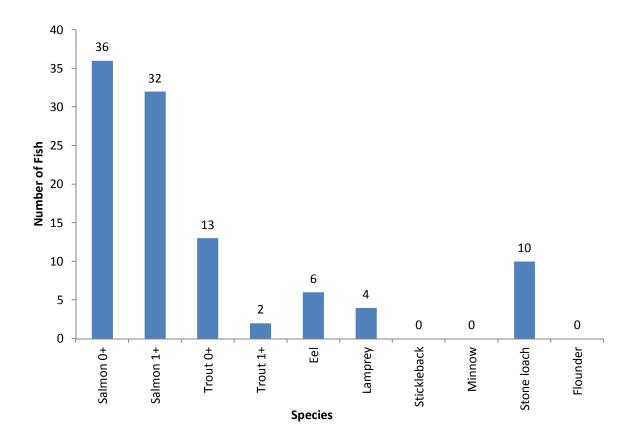


Fig 10. Total catch

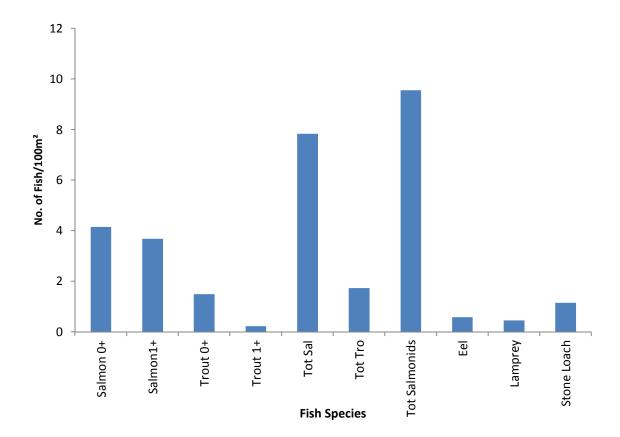


Fig 11. Density/100m²

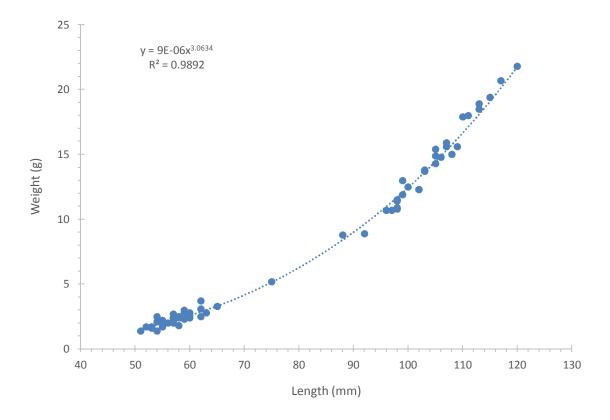


Fig 12. Length weight relationship of salmon n = 68

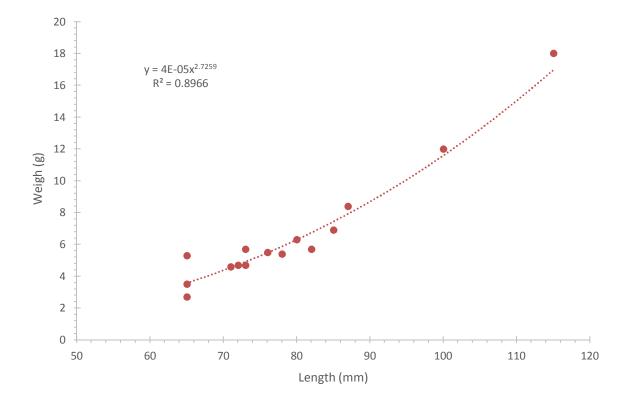


Fig 13. Length weight relationship of all trout caught n = 15

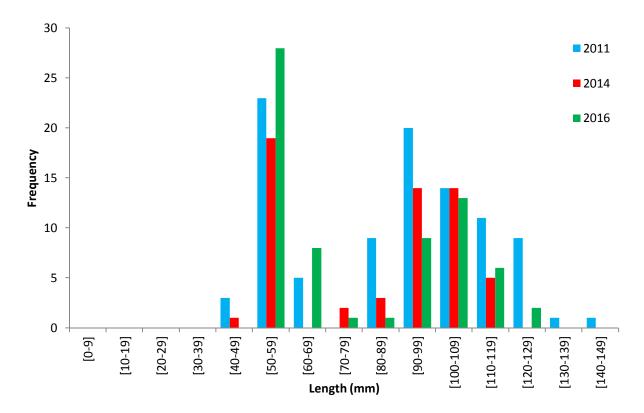


Fig 14. Length frequency distribution for juvenile salmon caught (this can be used to assess the presence of different age classes/cohorts). 2016 n = 68, 2014 n = 58, 2011 n = 96. * Note 2016 was single pass electrofishing survey only previous surveys were multi method.

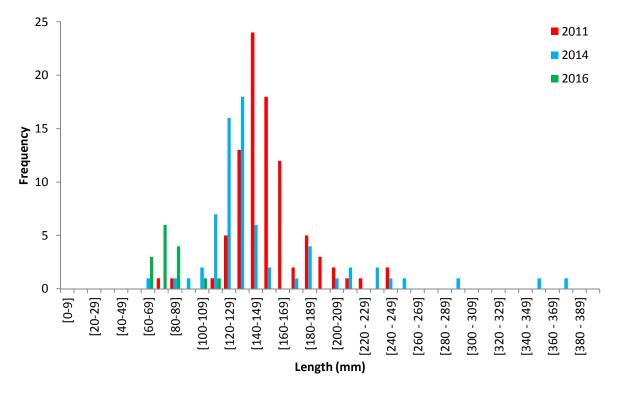


Fig 15. Length frequency distribution for trout. 2016 n = 15, 2014 n = 69, 2011 n = 91. * Note2016 was single pass electrofishing survey only, previous surveys were multi method.

This site is composed predominantly of grade 2 nursery habitat (80%) with grade 3 spawning habitat (10%) and grade 3 holding habitat (10%).

Additional biological information is available in the spreadsheets provided.







3.22 Proposed Programme of Measures

This water body generally has good channel structure. It is a high energy gravel river. Local impacts within this waterbody include the presence of Himalayan balsam. Water crowfoot (*Ranunculus penicillatis spp*) is present at this site and is one of the primary habitat features for the rivers designation as an Area of Special Scientific Interest (ASSI) and Special Area of Conservation (SAC). There is evidence of some bank protection works which has the potential to disconnect the river from its natural floodplain. The surrounding land use is silage production and grazing with some arable crop rotation. Potential programmes of measure could include riparian fencing set back from the left hand bank and control of invasive species.



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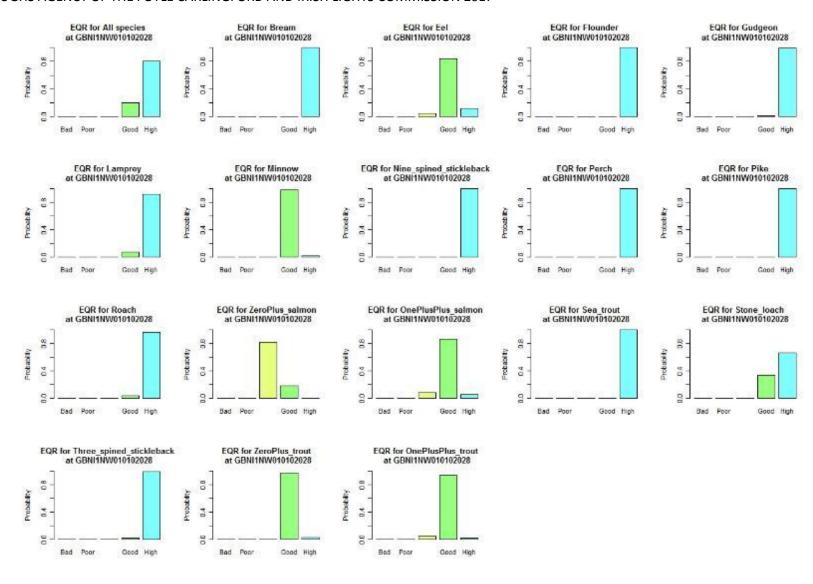


Fig 16. FCS2 (Ireland) output. Bar charts of the probability of class

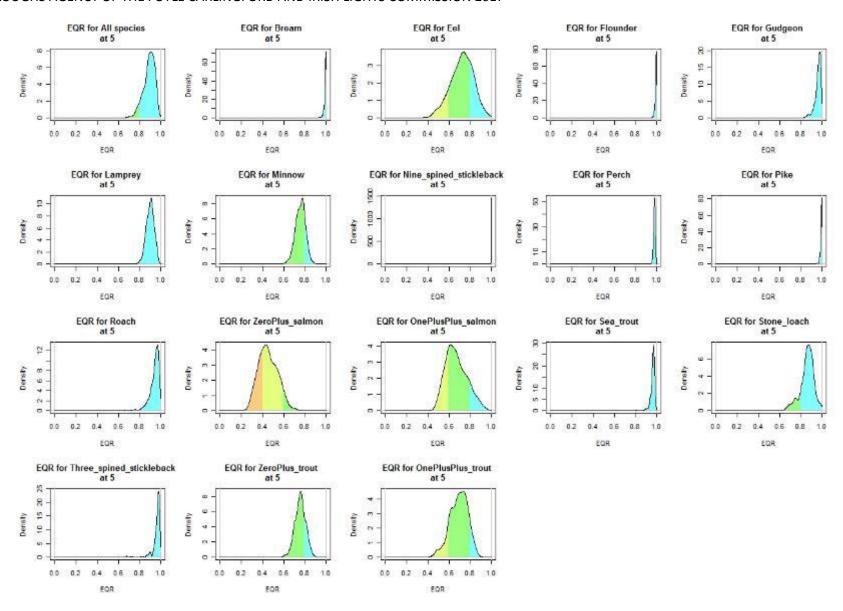


Fig 17. FCS2 (Ireland) output. Density estimates of the EQR variables

3.3 F10089 Cappagh Burn at Tattynure Br Strule WFD Fish Classification 2016

GBNI1NW010102021

MODERATE

FISHING	Sal 0+	Sal 1+	Tro 0+	Tro 1+	Eel	Lamprey	Stoneloach	Total
1st	0	0	0	3	0	2	38	43
2nd	1	1	0	4	1	7	28	42
3rd	0	2	0	2	2	1	10	17
TOTAL	1	3	0	9	3	10	76	102

Table 4. Sampling results

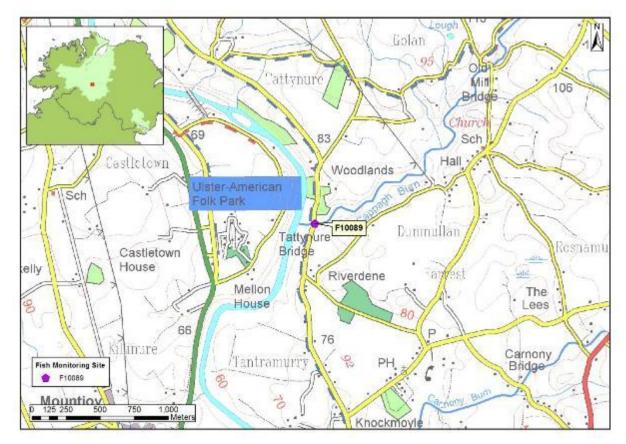


Fig 18. Site F10089

3.31 Results

Site F10089 was surveyed using a quantitative electrofishing method. This involved three passes between stop nets. From this data, minimum density estimates have been calculated for all species and age classes present.

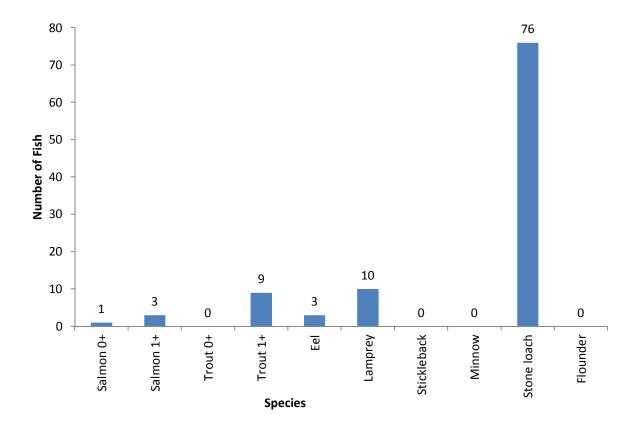


Fig 19. Total catch

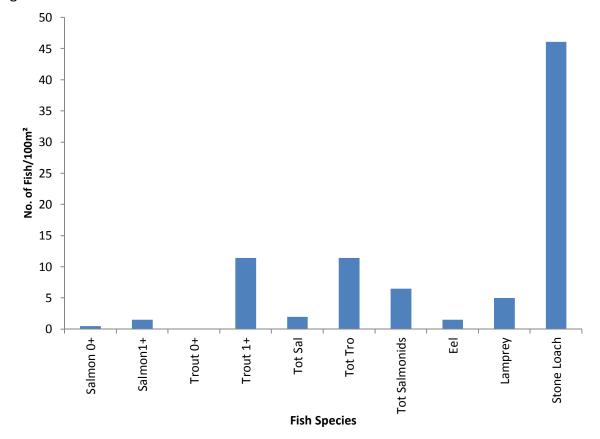


Fig 20. Minimum density estimate/100m²

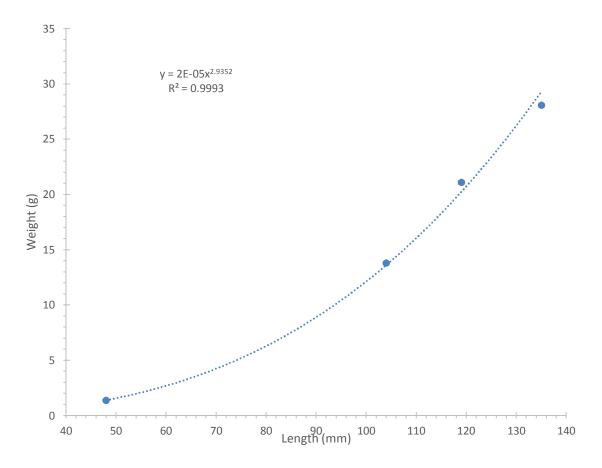


Fig 21. Length weight relationship of all juvenile Salmon caught n = 4

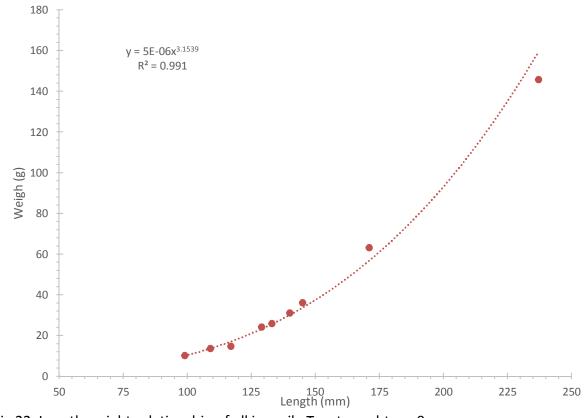


Fig 22. Length weight relationship of all juvenile Trout caught n = 9

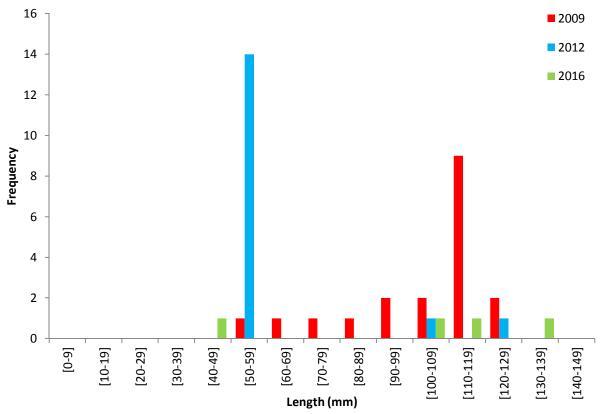


Fig 23. Length frequency distribution for all salmon caught 2016 n=4, 2012 n=16 & 2009 n=19

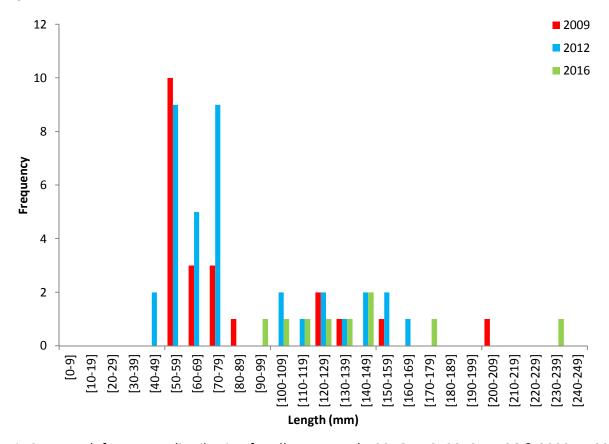


Fig 24. Length frequency distribution for all trout caught 2016 n= 9, 2012 n = 36 & 2009 n = 22

This site is composed of grade 1 nursery habitat (85%), grade 3 spawning habitat (10%) and grade 3 holding habitat (5%). This site is located just upstream from the confluence with the River Strule.







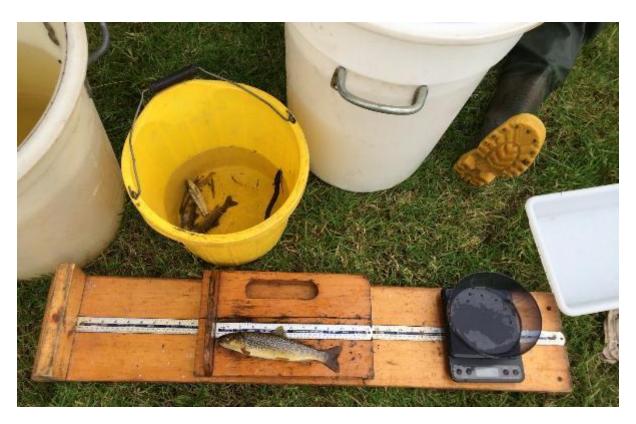


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3.32 Proposed Programme of Measures

Potential programmes of measures could include riparian fencing to exclude livestock from the watercourse on the left hand bank, control of Himalayan balsam. Access for cattle to drinking water could be supplied by the installation of a pasture pump.





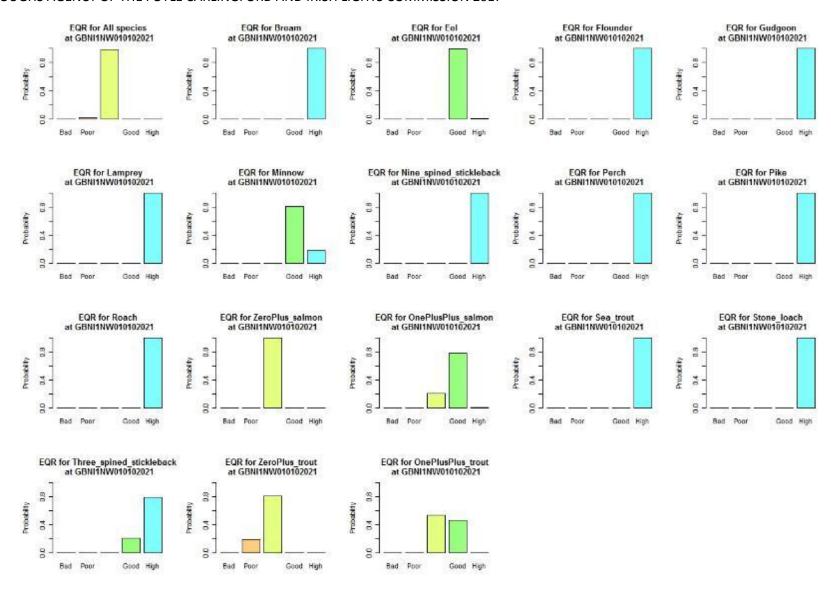


Fig 25. FCS2 (Ireland) output. Bar charts of the probability of class

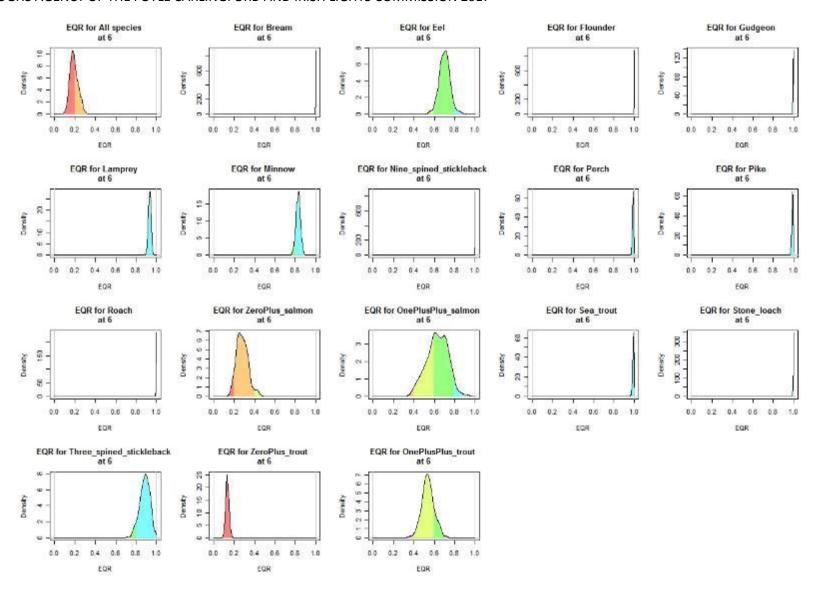


Fig 26. FCS2 (Ireland) output. Density estimates of the EQR variables

3.4 F10115 Cloghfin R at Lisboy Br Camowen WFD Fish Classification 2016

GBNI1NW010102035

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•	u		4 -

FISHING	Sal	Sal	Tro	Tro	Eel	Lamprey	SB	Minnow	Stoneloach	Total
	0+	1+	1+	1+						
1st	89	0	8	1	0	6	3	11	27	145
TOTAL	89	0	8	1	0	6	3	11	27	145

Table 5. Sampling results

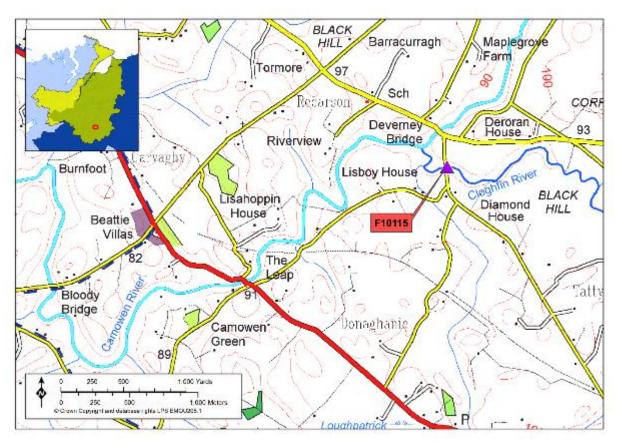


Fig 27. Site F10115

3.41 Results

Site F10115 was surveyed using a single pass electrofishing method. The FCS2 (Ireland) model can accept data from a single pass electrofishing survey within a defined area. Minimum density estimates were calculated for all species and age classes present based on the single pass electrofishing results and the area surveyed.

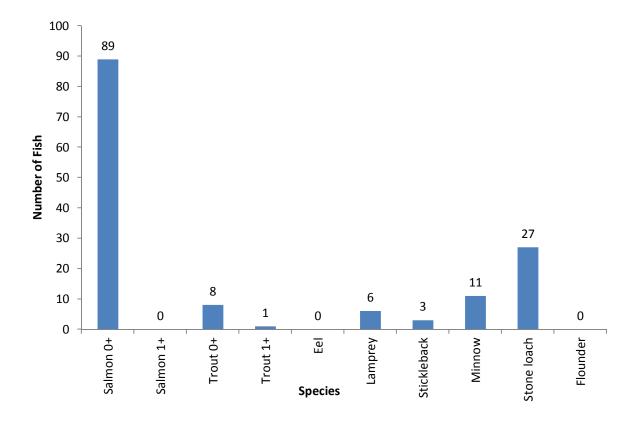


Fig 28. Total catch

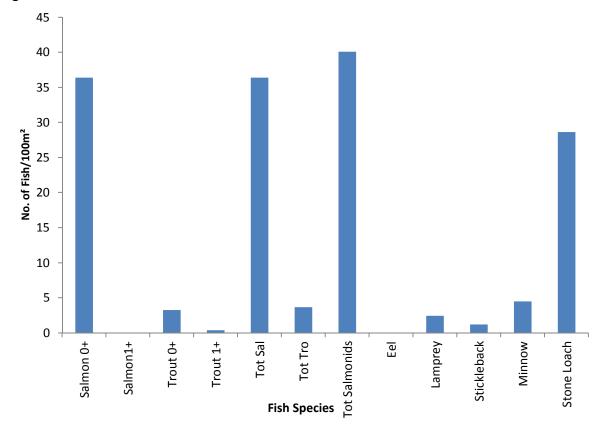


Fig 29. Density estimate/100m²

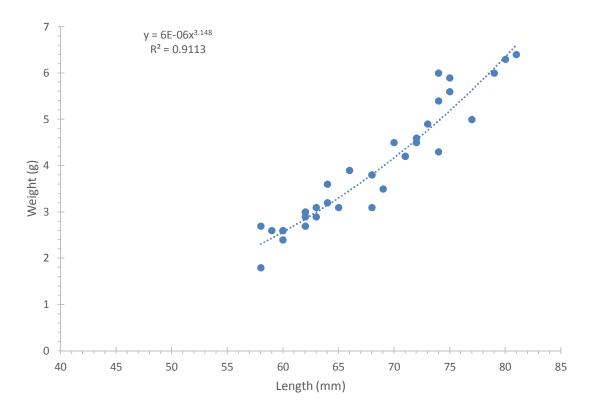


Fig 30. Length weight relationship of all Salmon caught n = 35

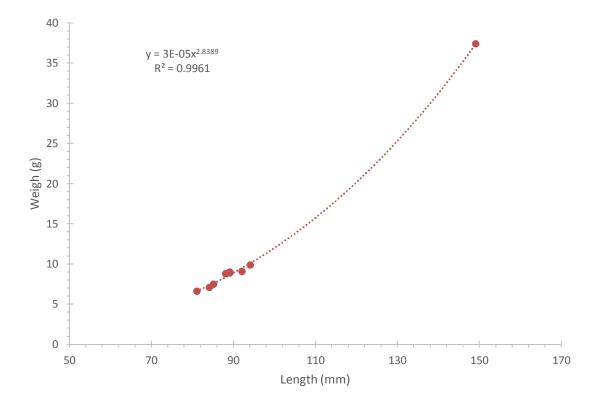


Fig 31. Length weight relationship of all trout caught n = 9

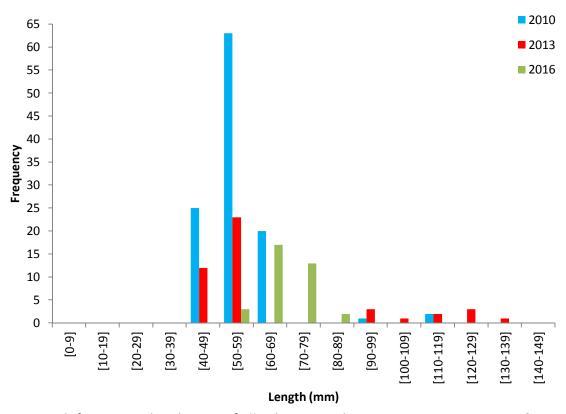


Fig 32. Length frequency distribution of all Salmon caught 2016 n = 35, 2013 n = 45 & 2010 n = 111

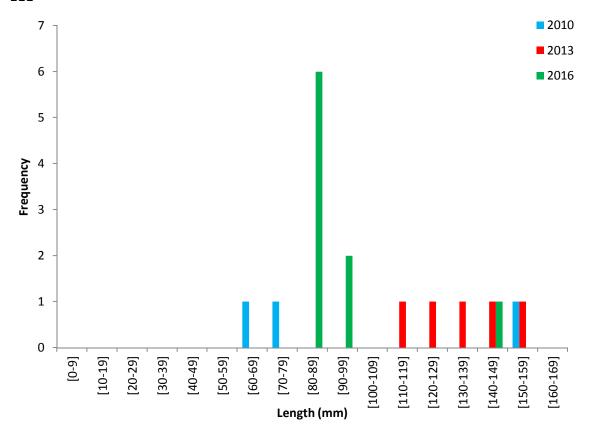


Fig 33. Length frequency distribution of all trout caught 2016 n = 9, 2013 n = 5 & 2010 n = 3

This site is composed of grade 3 nursery habitat (65%), grade 3 spawning habitat (20%) and grade 3 holding habitat (15%). This site lies within a major maintained channel. There is some trampling by cattle on the left hand bank with Himalayan Balsam also present. Heavy aquatic weed growth is evident at this site. Due to the poor quality habitat present at this site recruiting fish may pass quickly through this area.







3.42 Proposed Programme of Measures

Potential programmes of measures could include in channel habitat unit creation, control of riparian invasive species and improvements to stock proof fencing.





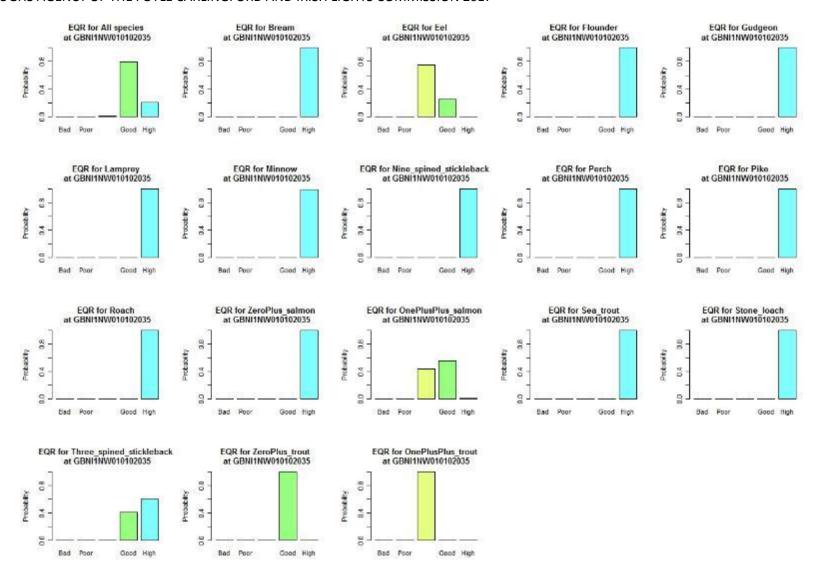


Fig 34. FCS2 (Ireland) output. Bar charts of the probability of class

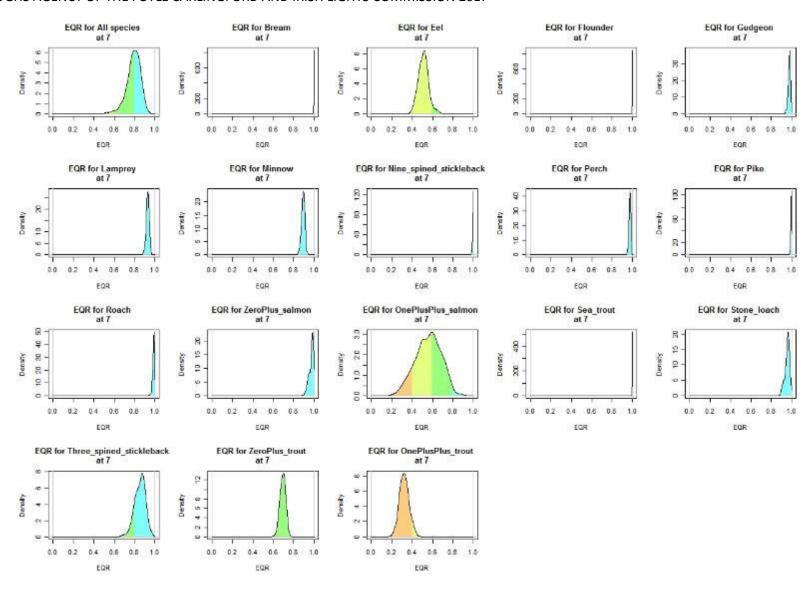


Fig 35. FCS2 (Ireland) output. Density estimates of the EQR variables

3.5 F10626 Jerretspass River at Jerretspass GBNI1NB060604047 Clarrye WFD Fish Classification 2016

POOR

METHOD	Sal 0+	Sal 1+	Tro 0+	Tro 1+	Eel	Stickleback	Minnow	Stoneloach
1 ST	0	0	0	0	4	8	11	4
TOTAL	0	0	0	0	4	8	11	4

Table 6. Sampling results

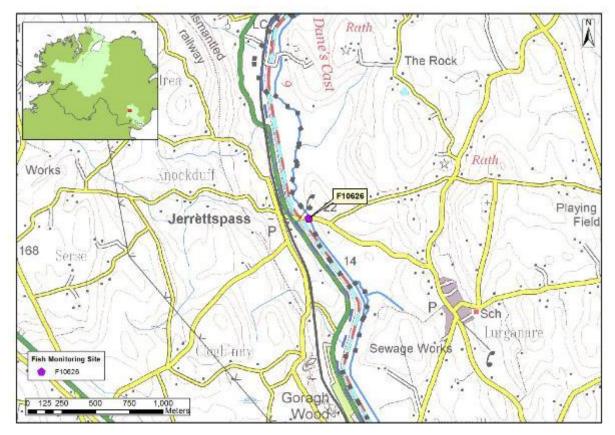


Fig 36. Site F10626

3.51 Results

Site F10626 was surveyed using a single pass quantitative electrofishing method. From this data minimum density estimates have been calculated for all species and age classes present. No salmonids were recorded at this site. Significant impacts were noted including excessive drainage which has left the watercourse devoid of suitable salmonid habitat. Excessive weed and plant growth has choked the watercourse from the bridge upstream. The gradient of the channel

has been altered to such a degree from drainage that there is little to no flow in lower water conditions.

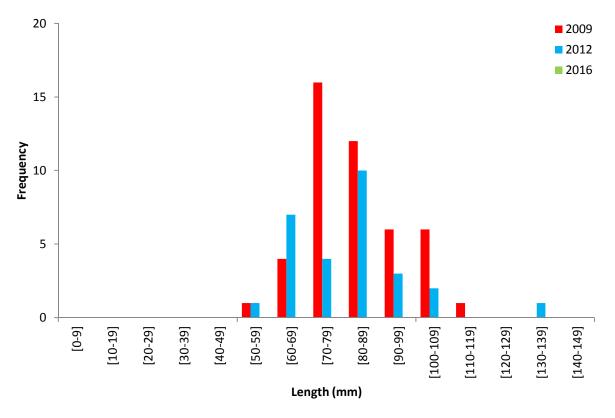


Fig 37. Length frequency distribution for trout. 2009 n = 46, 2012 n = 28 & 2016 n = 0.

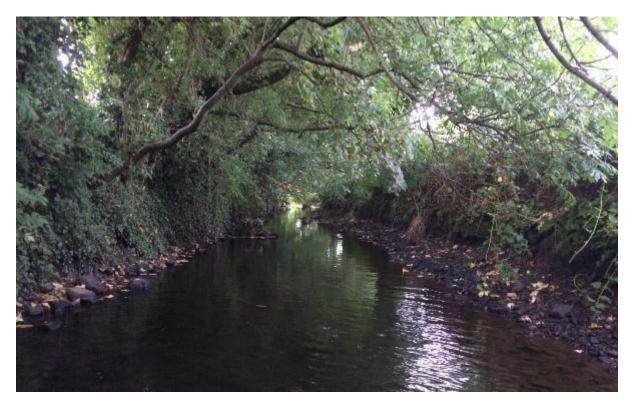
This site has been left unclassified for channel habitat due to its recent extensive and intensive drainage below bed level. This site was previously of higher value with more natural channel structure throughout.

Impacts at the site included extensive and intensive drainage below bed levels resulting in low flow velocities and extensive in channel vegetation upstream of the dredged area. This manifests itself in a number of ways including featureless river habitat unsuitable for salmonid species and choking of the watercourse which would prevent salmonid migration. The site is also extensively tunnelled throughout.

3.52 Proposed Programme of Measures

Potential programmes of measures include the development of catchment initiatives to ensure water quality and habitat quality are maintained or improved. Bush and tree trimming is required to permit some dappled shade.

Extensive in channel habitat unit creation is also required to replace the lost salmonid habitat through the excessive drainage works.









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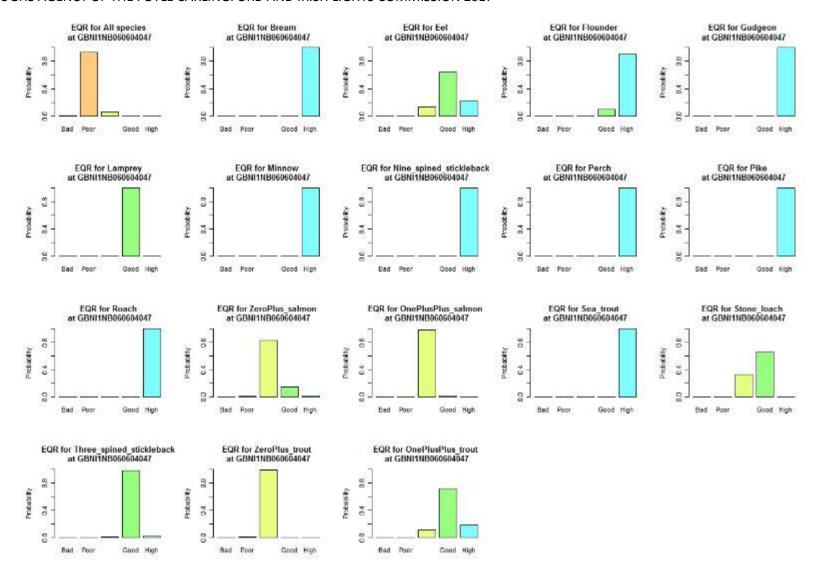


Fig 38. FCS2 (Ireland) output. Bar charts of the probability of class

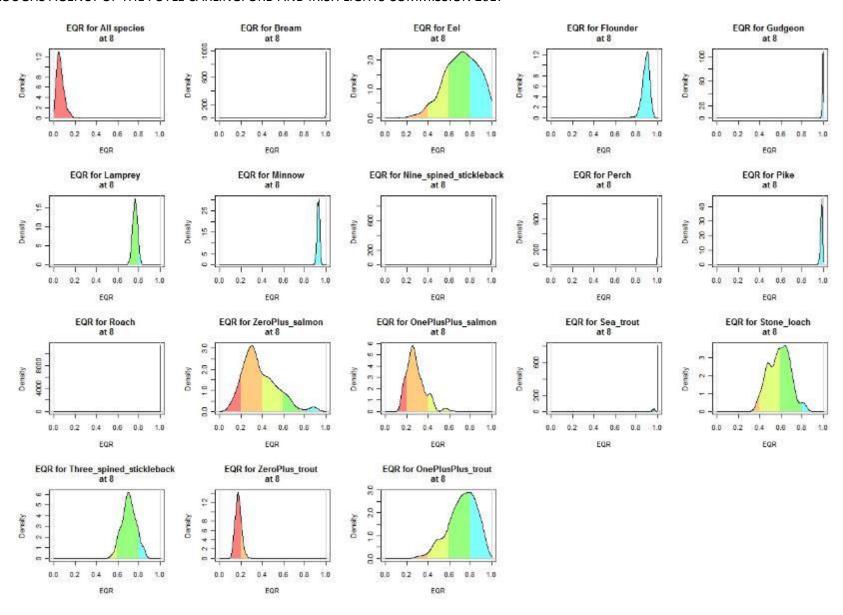


Fig 39. FCS2 (Ireland) output. Density estimates of the EQR variables

3.6 F11204 Newry River GBNI1NB060604046
Newry WFD Fish Classification 2016

GOOD

FISHING	Salmon	Salmon	Trout	Trout	Eel	Lam	SB	Minn	Stoneloach	Total
	0+	1+	0+	1+						
1st	9	3	4	17	9	23	4	2	26	97
TOTAL	9	3	4	17	9	23	4	2	26	97

Table 7. Sampling results

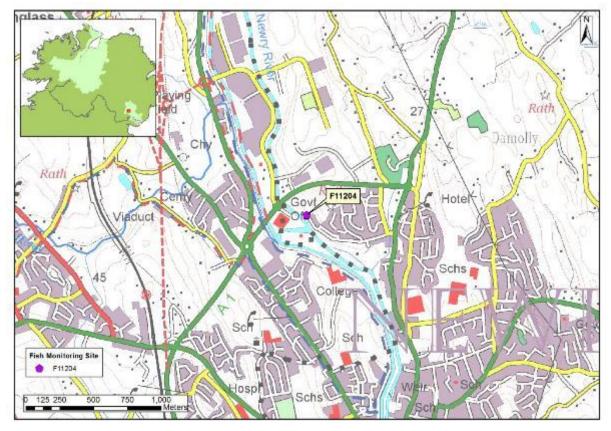


Fig 40. Site F11204

3.61 Results

Site F11204 was surveyed using a single pass quantitative electrofishing method. From this data minimum density estimates have been calculated for all species and age classes present.

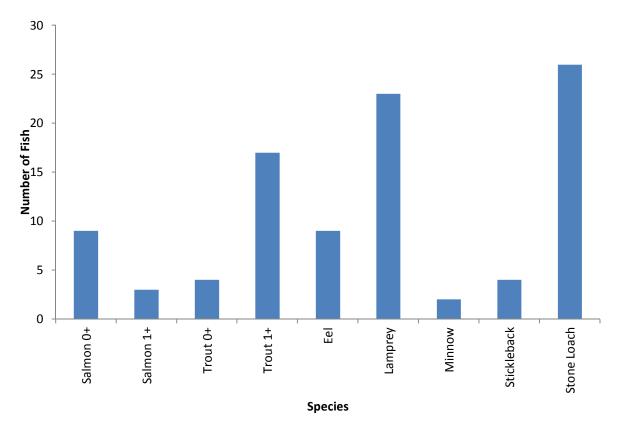


Fig 41. Total catch

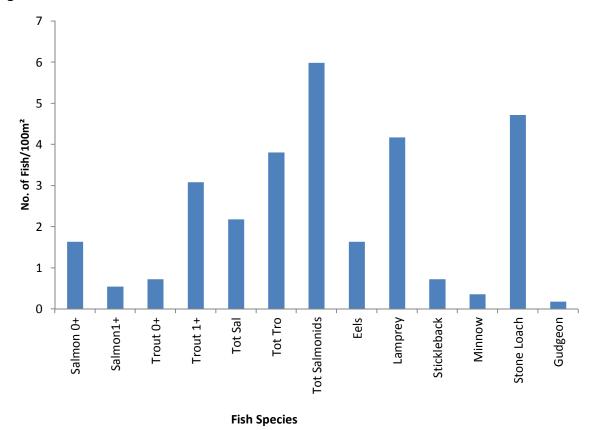


Fig 42. Density/100m²

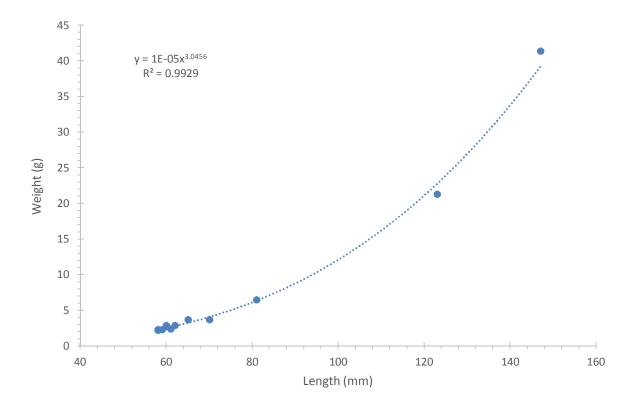


Fig 43. Length weight relationship of all juvenile salmon caught n = 12

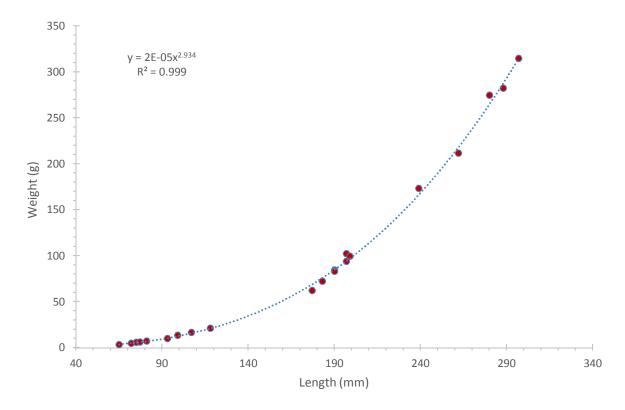


Fig 44. Length weight relationship of all juvenile trout caught n = 21

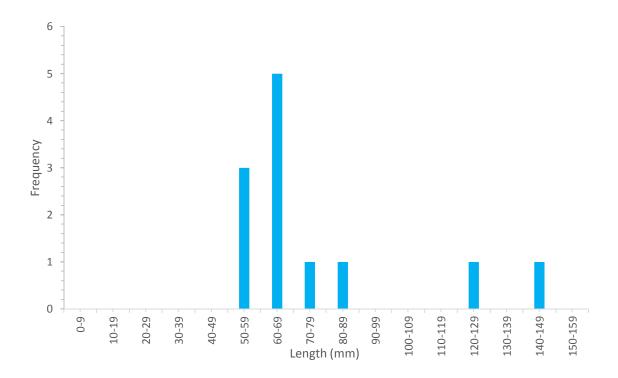


Fig 57. Length frequency distribution for all juvenile salmon caught (this can be used to assess the presence of different age classes/cohorts). 2016 n = 12, 2012. Salmon were not caught at this site in 2012.

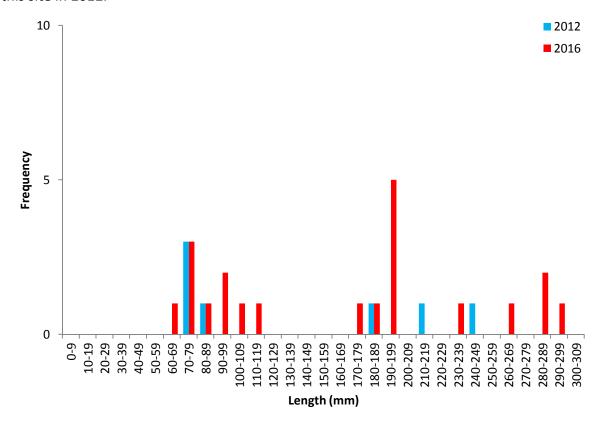


Fig 58. Length frequency distribution for all trout caught. 2012 n = 7 & 2016 n = 21

This site is composed predominantly of grade 1 holding habitat (30%) with grade 3 spawning habitat (15%) and grade nursery habitat (5%). The remainder of the habitat is unclassified.

Additional biological information is available in the spreadsheets provided.

This water body has previously been improved. There is generally poor salmonid nursery habitat. There is a good riparian buffer zone, good elver habitat and optimal Lamprey habitat. The unclassified habitat forms a rather uniform featureless stretch holding few fish of any species.









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3.72 Proposed Programme of Measures

Potential programmes of measures could include introduction of nursery and spawning substrate suitable for native fish species and the creation of habitat units and low level deflectors to narrow an over widened section under the bridge.





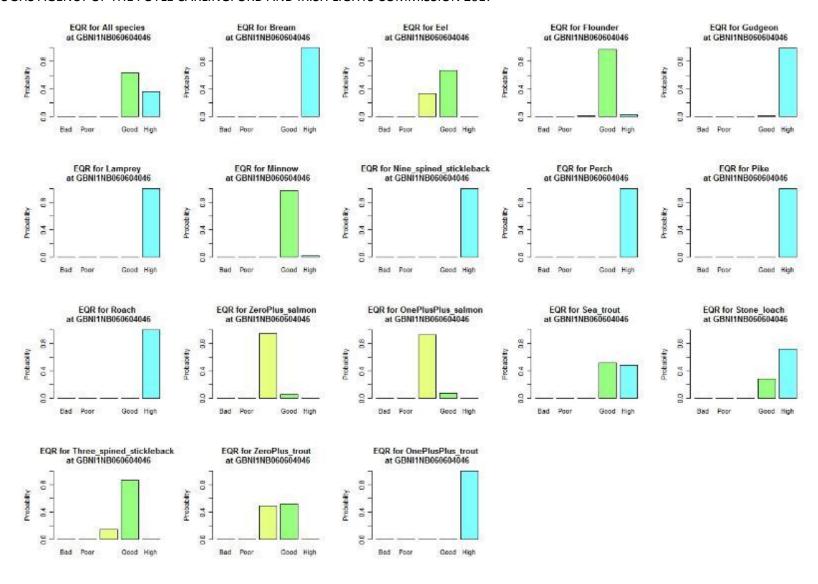


Fig 59. FCS2 (Ireland) output. Bar charts of the probability of class

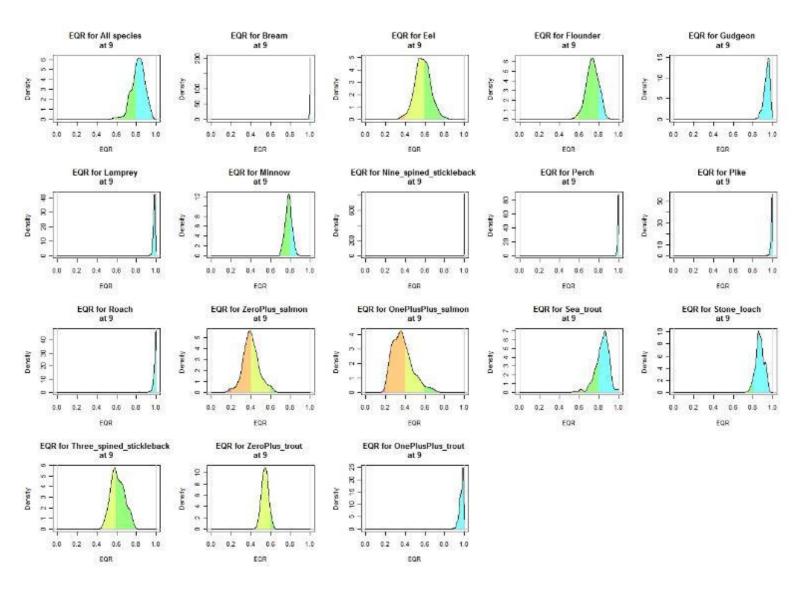


Fig 60. FCS2 (Ireland) output. Density estimates of the EQR variable

3.7 01M010100 Red Burn IENW01691
Derg WFD Fish Classification 2016

POOR

FISHING	Salmon 0+	Salmon 1+	Trout 0+	Trout 1+	Eel	Pike	Total
1st	0	0	1	4	5	2	12
TOTAL	0	0	1	4	5	2	12

Table 8. Removal sampling results

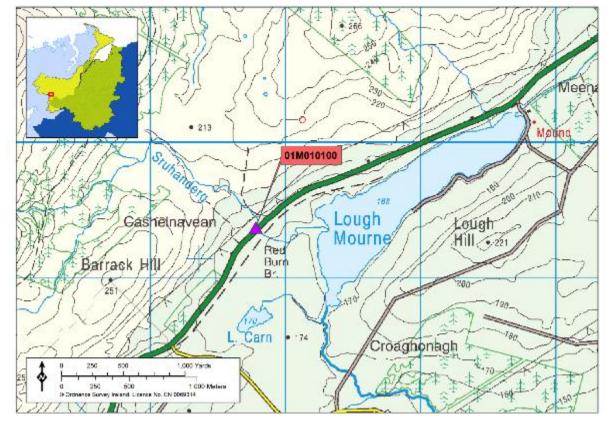


Fig 61. Site 01M010100

3.71 Results

Site 01M010100 was surveyed using a single pass quantitative electrofishing method. From this data minimum density estimates have been calculated for all species and age classes present.

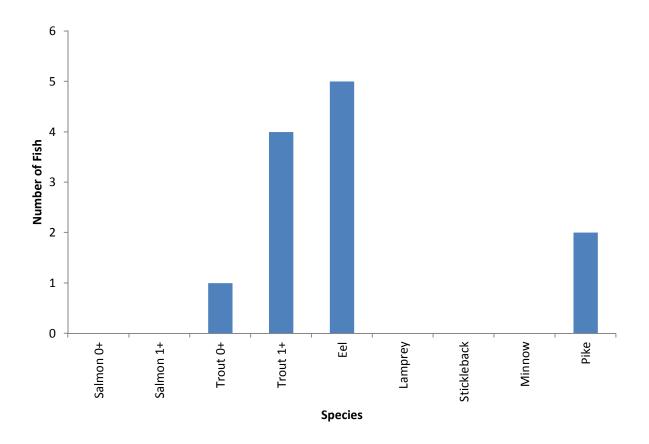


Fig 62. Total catch

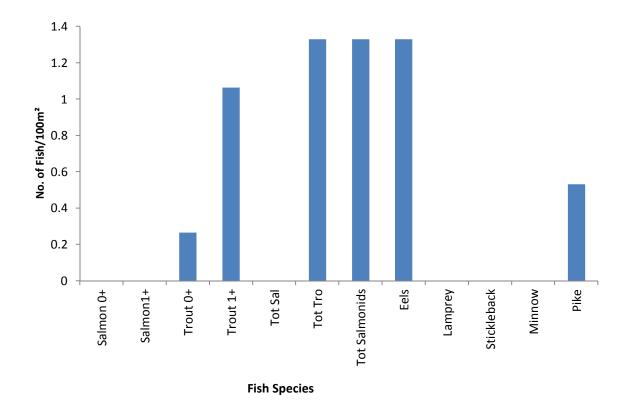


Fig 63. Density/100m²

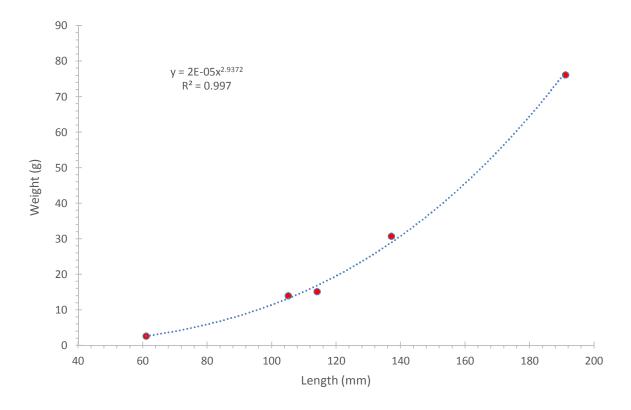


Fig 64. Length weight relationship of all trout caught n = 5

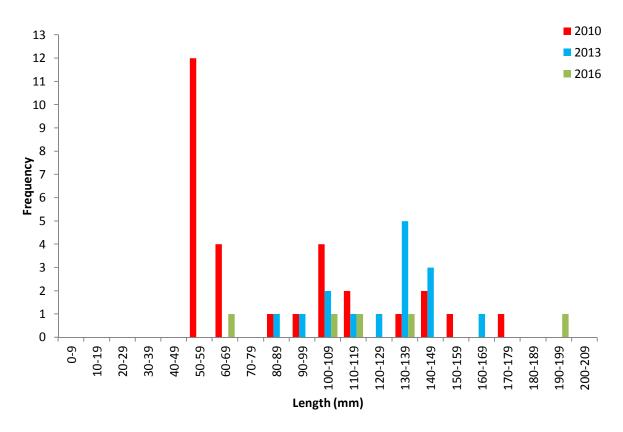


Fig 65. Length frequency distribution for all trout caught. 2010 n = 29, 2013 n = 15 & 2016 n = 5

This site is composed predominantly of grade 2 nursery habitat (60%) with grade 1 holding habitat (30%) and grade 3 spawning habitat (10%).

Additional biological information is available in the spreadsheets provided.

This water body forms an inflowing tributary to Lough Mourne which is an impounded lough used as a public water supply. A "V" notch weir is located immediately downstream from Lough Mourne which may impede migratory fish species from routinely moving between the Mournebeg River downstream and Lough Mourne. There is also and natural barrier at the upstream limit of the site which would prevent the upstream migration of salmonids.









3.72 Proposed Programme of Measures

Potential programmes of measures could include ensuring fish passage provision is appropriate at the outflow of Lough Mourne to the Mournebeg River. Plans to increase the size of Lough Mourne and to increase the size of the impoundment are being developed to secure a public water supply for a growing regional population with increased demands for water.





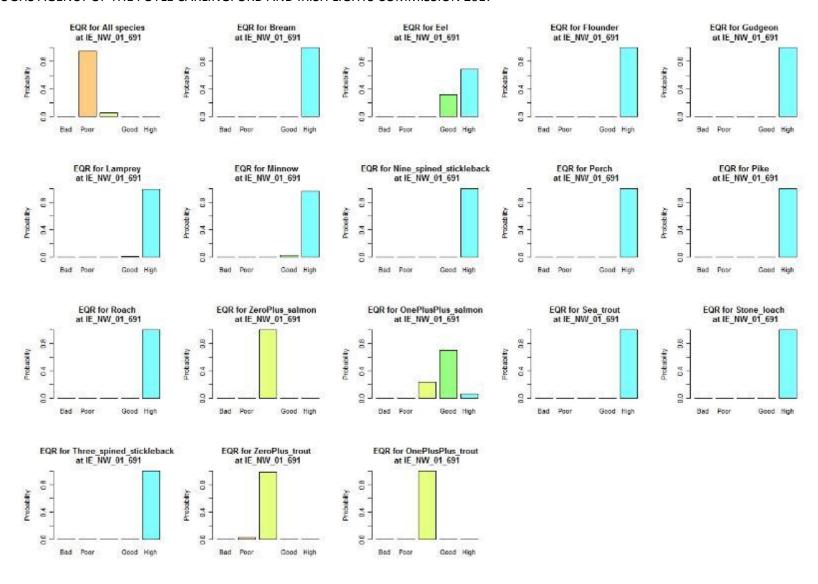


Fig 66. FCS2 (Ireland) output. Bar charts of the probability of class

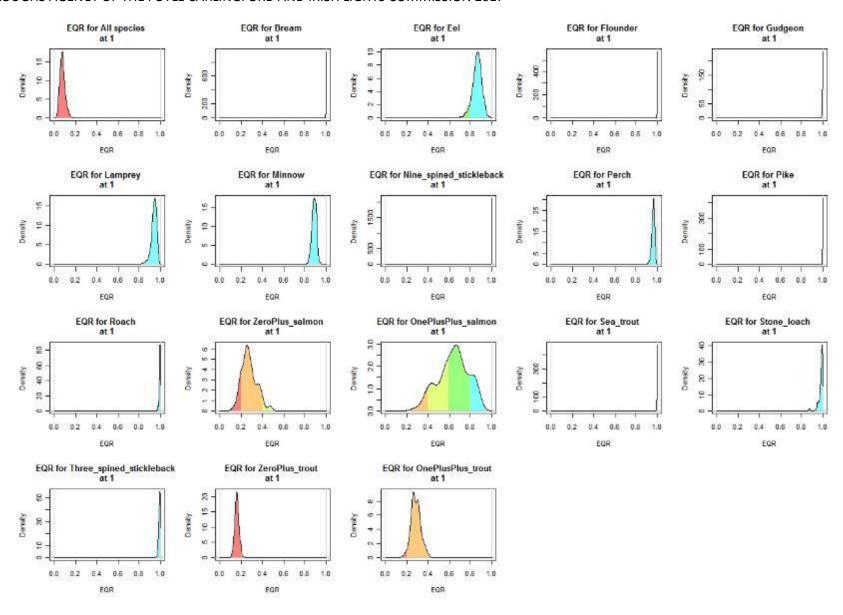


Fig 67. FCS2 (Ireland) output. Density estimates of the EQR variable

3.7 01S020200 Stranagoppoge IENW01610
Finn WFD Fish Classification 2016

MODERATE

FISHING	Salmon 0+	Salmon 1+	Trout 0+	Trout 1+	Eel	Total
1	30	11	0	1	1	43
TOTAL	30	11	0	1	1	43

Table 8. Removal sampling results

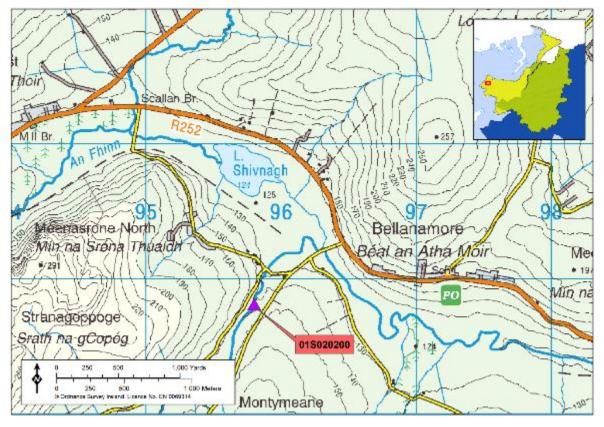


Fig 68. Site 01S020200

3.81 Results

Site 01S020200 was surveyed using a single pass quantitative electrofishing method. From this data minimum density estimates have been calculated for all species and age classes present.

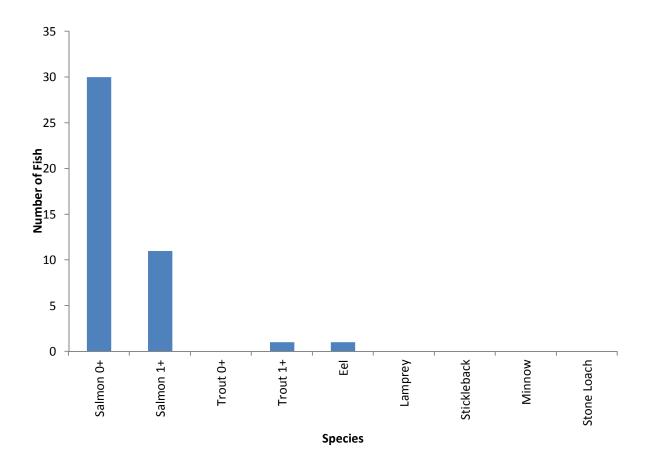


Fig 69. Total catch

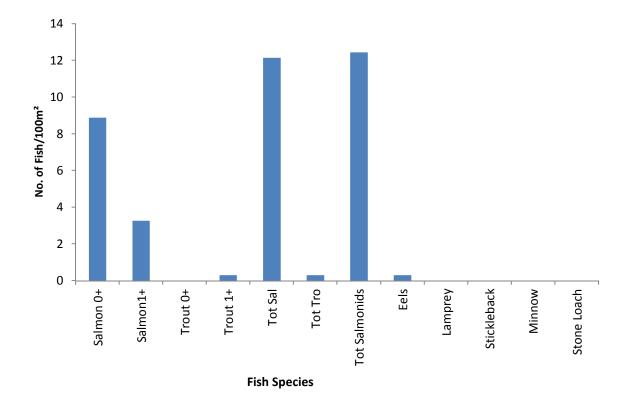


Fig 70. Density/100m²

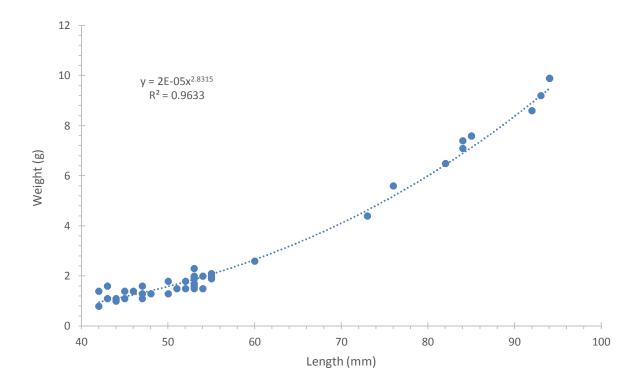


Fig 71. Length weight relationship of all salmon caught n = 41

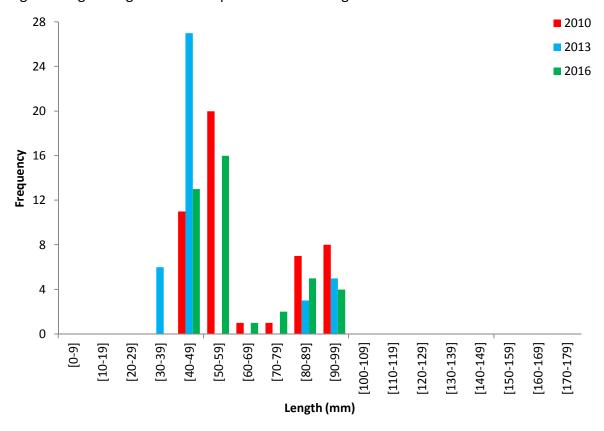


Fig 72. Length frequency distribution for all salmon caught. 2010 n = 29, 2013 n = 15 & 2016 n = 5

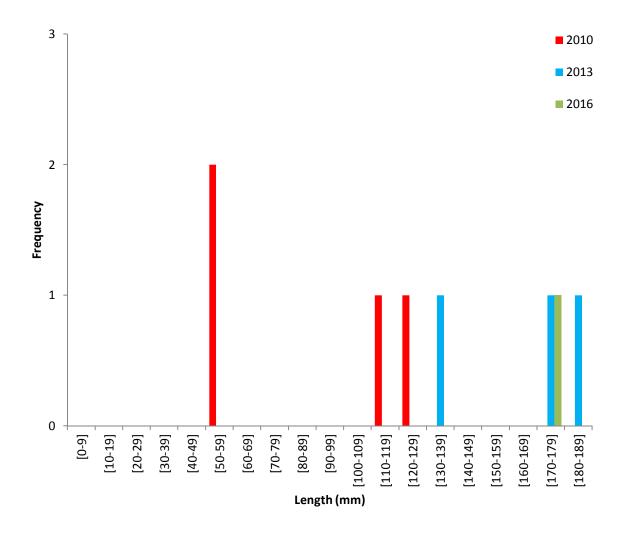


Fig 73. Length frequency distribution for all trout caught. 2010 n = 4, 2013 n = 3 & 2016 n = 1

This site is composed predominantly of grade 3 nursery habitat (70%) with grade 2 holding habitat (15%) and grade 3 spawning habitat (15%).

Additional biological information is available in the spreadsheets provided.

This water body experiences high water temperatures periodically during summer due to poor riparian shading and the present of dark macrophytes on the bed of the river which absorb heat readily. There is no riparian fencing on either bank but there are at present no signs of trampling by livestock. There is a significant quantity of exposed bedrock on the channel bed which limits the productive capacity at this site. There is some tunnelling by trees downstream and there is some potential for establishing riparian trees throughout the water body.





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3.72 Proposed Programme of Measures

Potential programmes of measures could include bush and tree cutting downstream of the site and riparian tree planting to create shade throughout the waterbody.



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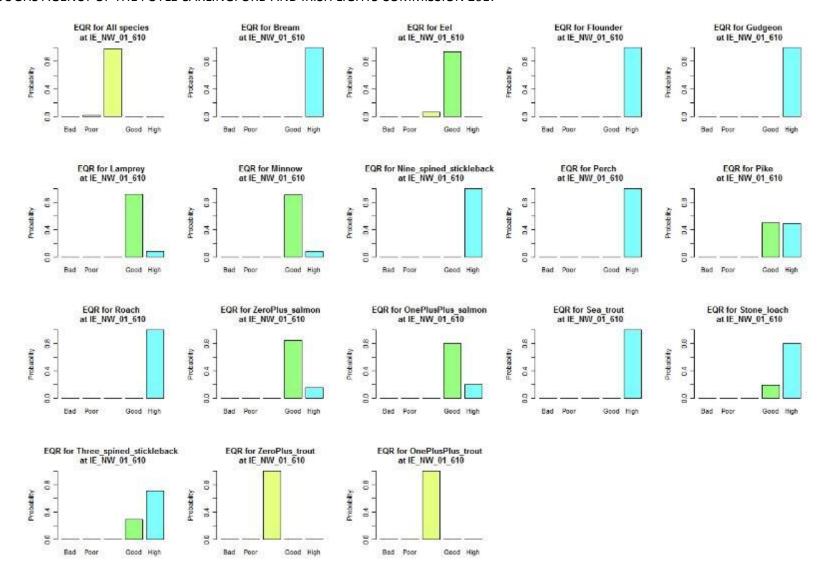


Fig 74. FCS2 (Ireland) output. Bar charts of the probability of class

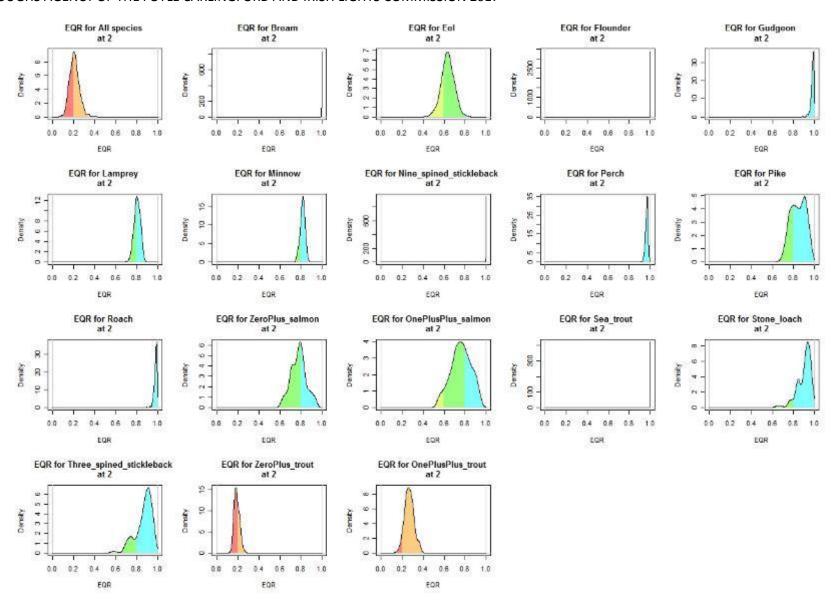


Fig 75. FCS2 (Ireland) output. Density estimates of the EQR variable

3.7 40B020400 Bredagh IENW40516
Bredagh WFD Fish Classification 2016

MODERATE

FISHING	Salmon 0+	Salmon 1+	Trout 0+	Trout 1+	Eel	Total
1st	0	2	16	26	6	50
2nd	0	2	2	36	4	44
3rd	0	1	6	6	2	15
TOTAL	0	5	24	68	12	109

Table 9. Removal sampling results

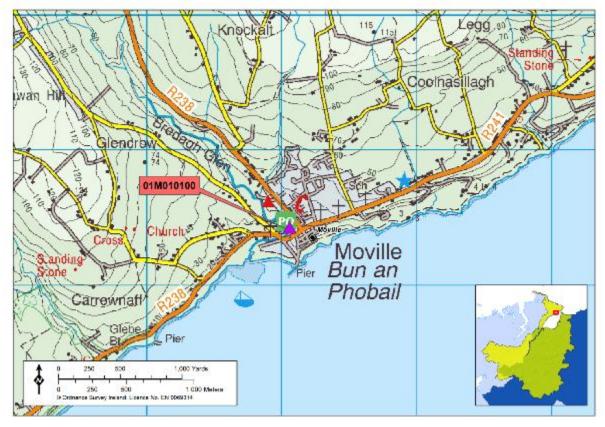


Fig 76. Site 40B020400

3.91 Results

Site 40B020400 was surveyed using a multiple pass quantitative electrofishing method. From this data density estimates have been calculated for all species and age classes present.

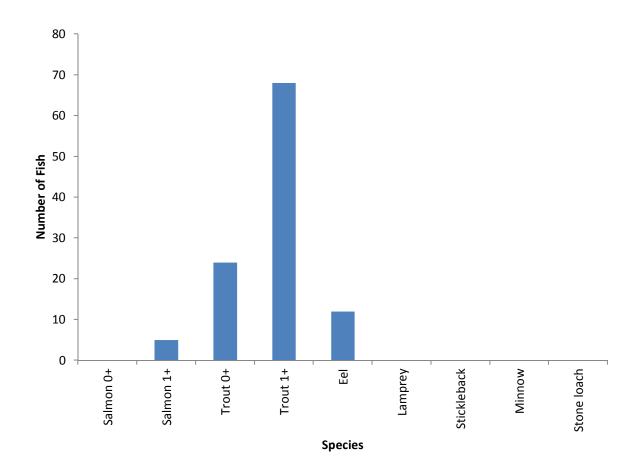


Fig 77. Total catch

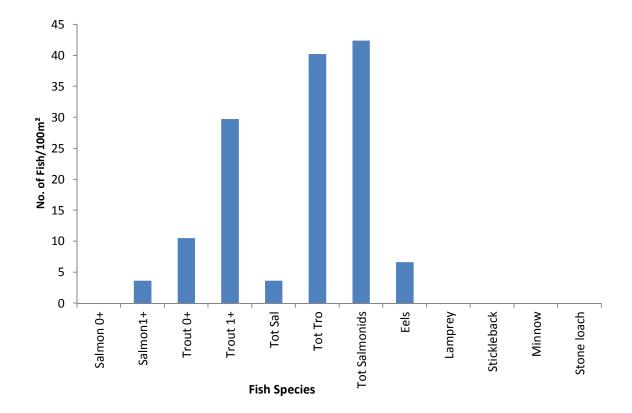


Fig 78. Density/100m²

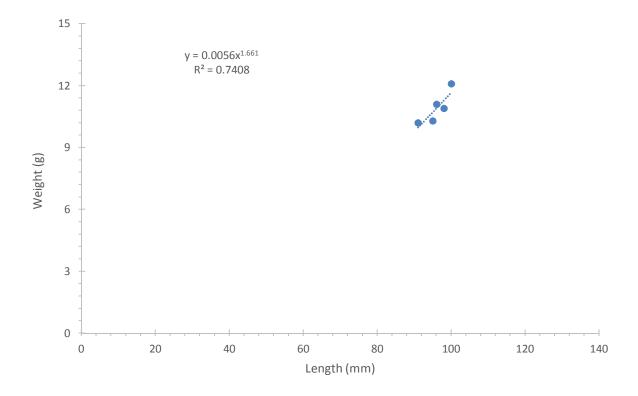


Fig 79. Length weight relationship of all salmon caught n = 5

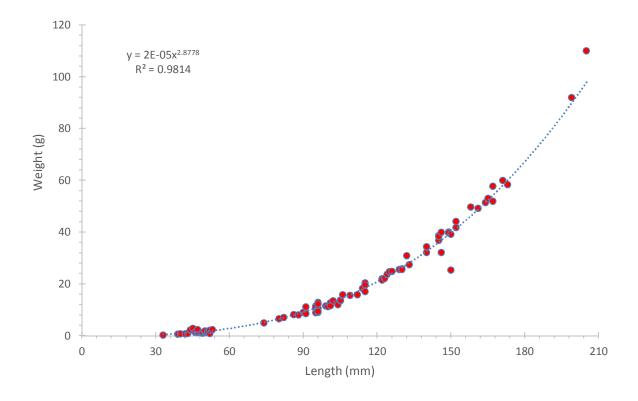


Fig 80. Length weight relationship of all trout caught n = 91

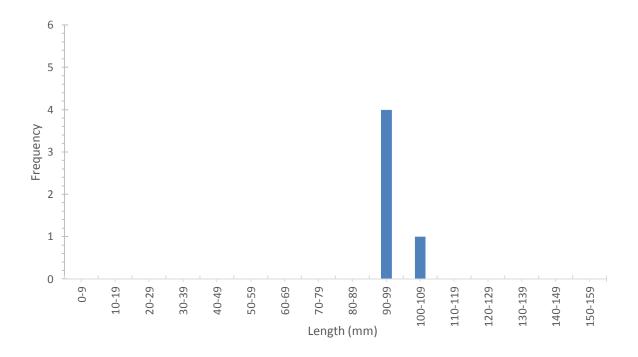


Fig 81. Length frequency distribution for all salmon caught. 2016 n = 5. *note salmon were not caught in the Bredagh during the 2013 or 2010 WFD fish surveys.

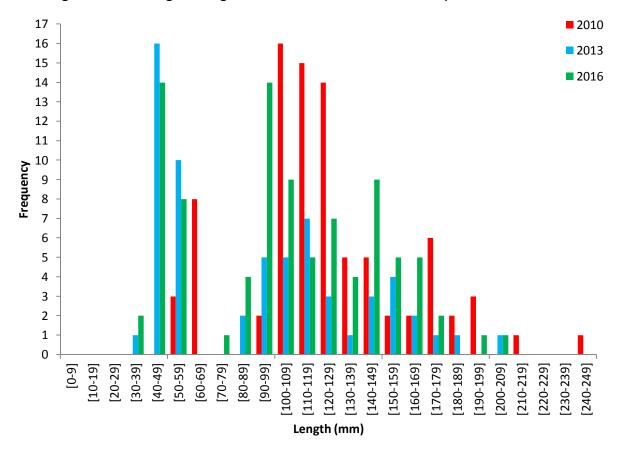


Fig 82. Length frequency distribution for all trout caught. 2010 n = 85, 2013 n = 62 & 2016 n = 91

This site is composed predominantly of grade 2 nursery habitat (40%) with grade 2 holding habitat (35%) and grade 3 spawning habitat (25%).

Additional biological information is available in the spreadsheets provided.

The sampling site is located upstream of the main settlement of Moville. The site has good in channel habitat diversity. *Rhodendron ponticum* is present on both banks and there is historic bank protection works. This waterbody has been modified in the past with the creation of weirs and other associated infrastructure upstream and downstream of this location. Atlantic salmon were recorded at this site in 2016 having previously been absent in the 2010 and 2013 surveys. Water quality, bank erosion, invasive riparian species and barriers to fish migration are all issues within this waterbody.



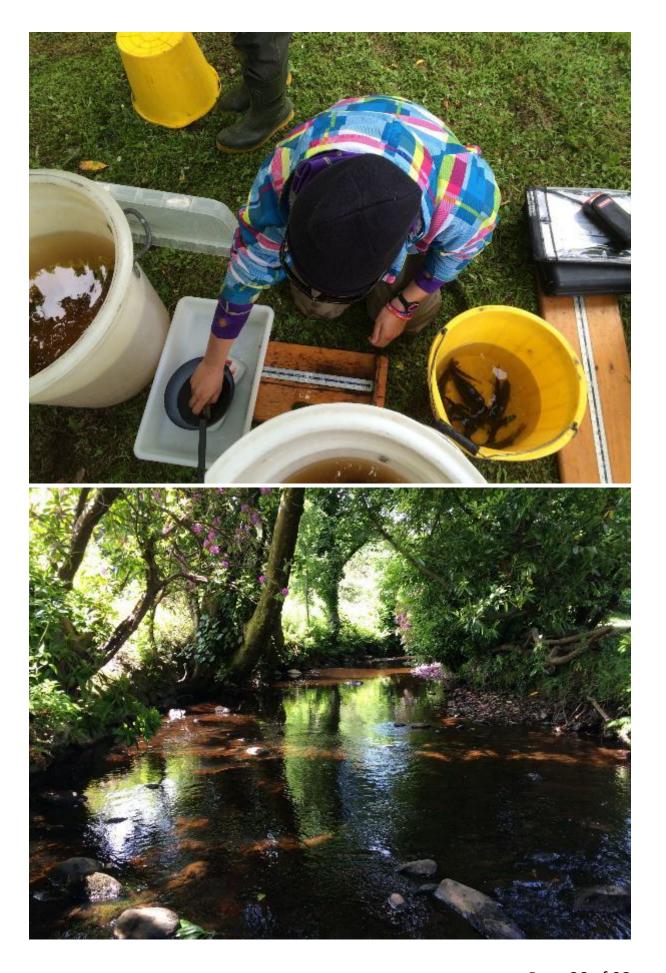




3.72 Proposed Programme of Measures

Potential programmes of measures could include invasive species control, soft bank protection, bush/tree trimming, barrier easement/removal and water quality improvements.





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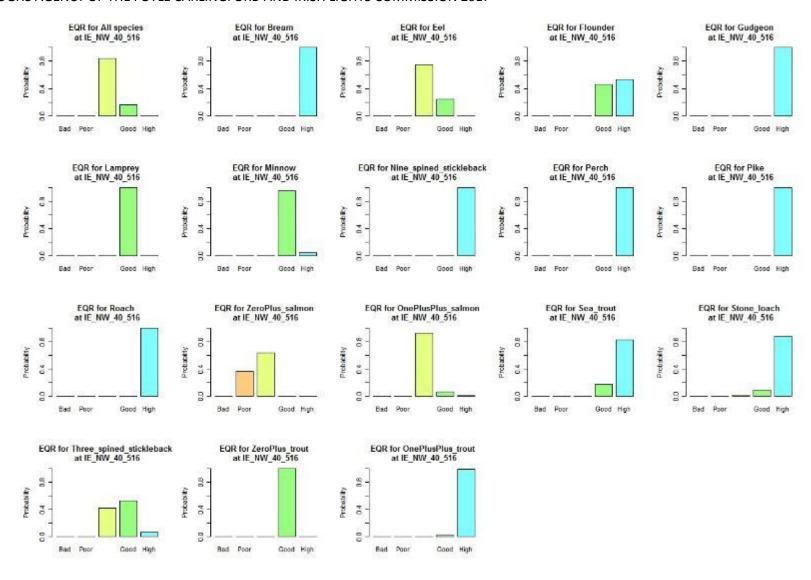


Fig 83. FCS2 (Ireland) output. Bar charts of the probability of class

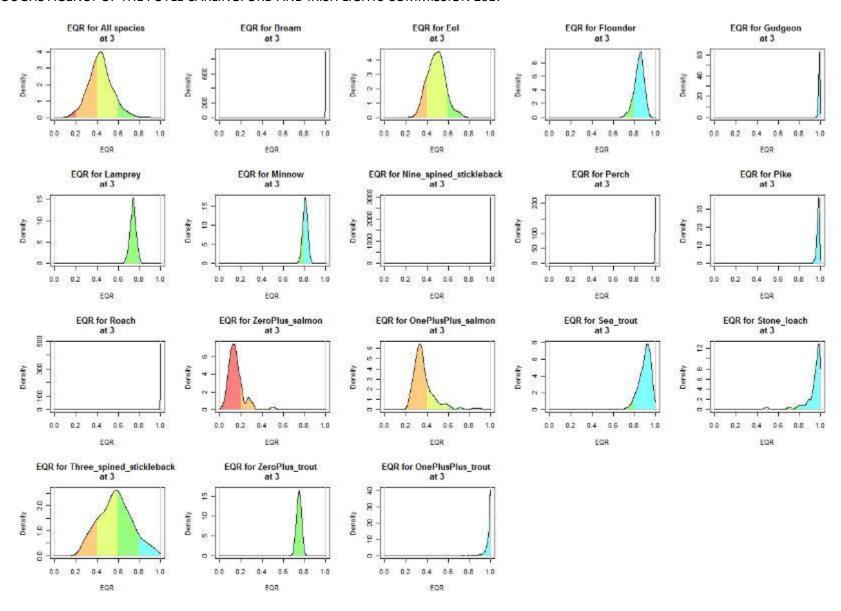


Fig 84. FCS2 (Ireland) output. Density estimates of the EQR variable

4.0 OVERVIEW OF WFD FISH SURVEILLANCE RESULTS

The results for WFD river fish monitoring within the Loughs Agency areas for 2016 are outlined in the table below. In 2016 a total of nine WFD river fish surveillance monitoring stations were monitored. Six were in Northern Ireland and three in Ireland. Classifications are outlined in the figure below. FCS2 (Ireland) was the primary classification tool from 2012, prior to this classifications were based on professional opinion. No additional waterbodies were classified using FCS2 in 2016.



Site Code	Year	Catchment	Classification								
	of 1st		2008	2009	2010	2011	2012	2013	2014	2015	2016
	Survey										
F10086	2008	Strule	Good				Good				
F10089	2009	Strule		Mod			Good				Mod
F10076	2009	Owenkillew		Good			Mod			Good	
F10020	2009	Burndennet		Good			High			High	
F10014	2009	Glenmornan		Mod			Good			Mod	
F10626	2009	Newry		Mod			Good				Poor
F10644	2009	Killbroney		Mod			Poor				
F10077	2009	Owenkillew		Good			Good			Good	
F10763	2009	Skeoge		Poor			Poor			Mod	
F10022	2010	Burndennet			Good			Mod		Mod	
F10049	2010	Derg			Good			Good			
F10079	2010	Glenelly			Good			Mod		High	
F10115	2010	Camowen			Good			Good			Good
F10170	2010	Roe			Good						
F10029	2013	Mourne						Poor			

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Site Code	Year	Catchment		Classification							
	of 1 st Survey		2008	2009	2010	2011	2012	2013	2014	2015	2016
40B020400	2010	Bredagh			N/A			Mod			Mod
01M010100	2010	Derg			N/A			Poor			Poor
01S020200	2010	Finn			N/A			Mod			Mod
F10111	2011	Camowen				Good			Good		
F10045	2011	Derg				Good			High		
F10128	2011	Drumragh				Good			High		
F10101	2011	Fairywater				Good			Mod		
F10148	2011	Faughan				Good			Poor		
F10072	2011	Owenkillew				Good			High		High
F10171	2011	Roe				Good			Good		
F10025	2012	Finn					Mod				High
F11204	2012	Newry					Mod				Good

Table 10. WFD fish surveillance stations surveyed by the Loughs Agency 2008-2016

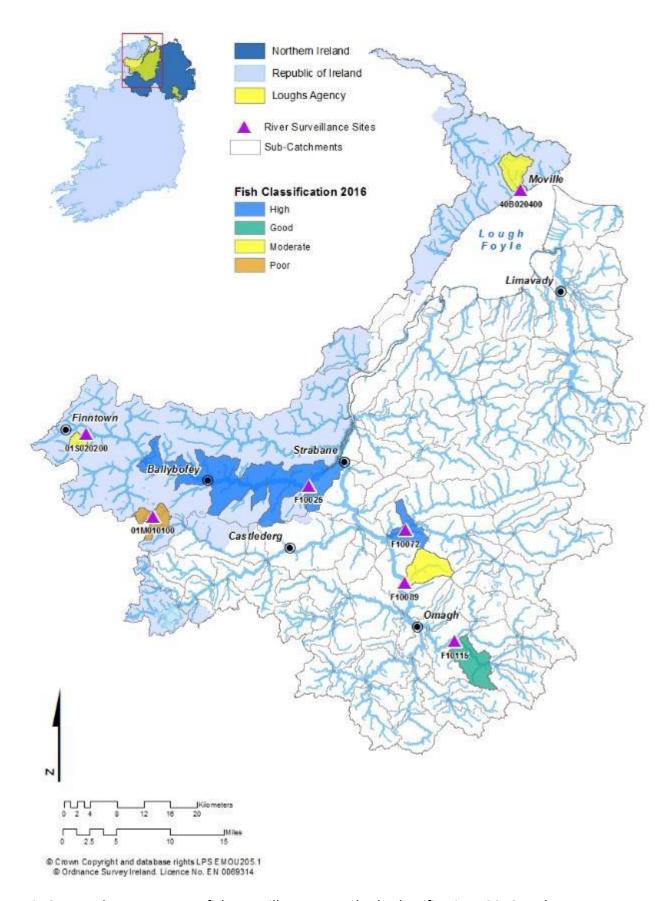


Fig 85. Loughs Agency WFD fish surveillance water body classifications 2016 Foyle area

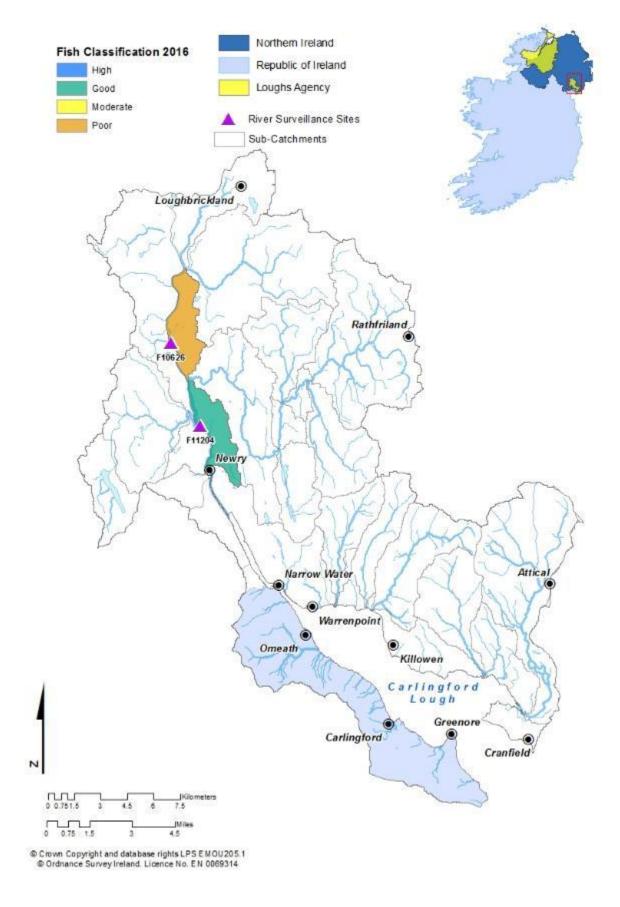


Fig 86. Loughs Agency WFD fish surveillance water body classifications 2016 Carlingford area

5.0 SEMI QUANTITATIVE/SALMON MANAGEMENT PLAN CLASSIFICATIONS

For classification in 2016 the NI WFD Fish Group continued to adopt the set of rules for deriving indicative fish classifications for waterbodies in which annual semi quantitative/salmon management plan electrofishing surveys are conducted. Within the Foyle and Carlingford areas approximately 500 sites are semi quantitatively surveyed annually. The ability to derive indicative classifications greatly facilitates the ability to highlight pressures within specific waterbodies and can assist with the development of programmes of measures. The refined rules as of January 2013 are listed below.

- Only use if there are a minimum of three sites per water body suggest a minimum of the three largest rivers for which data is available – important to record the stations used.
- 2. Classify according to the dominant salmonid species within the water body where adequate historical data is available.
- 3. Classify if ≥ 66% of sites agree
- 4. Classify as Good or better, moderate or Poor or worse

5.	Use	the	most	recent	t yea	ars data
----	-----	-----	------	--------	-------	----------

Site	In Agreement	SMP Class	WFD Class
Red Burn	N/A	Unclassified	Poor
Stranagoppoge	N/A	Unclassified	Moderate
Bredagh	N/A	Unclassified	Moderate
Finn	No	Moderate	High
Owenkillew	No	Unclassified	High
Cappagh	Yes	Moderate	Moderate
Cloghfin	No	Moderate	Good
Jerretspass	N/A	Unclassified	Poor
Newry	N/A	Unclassified	Good

Table 11. 2016 method comparisons

The maps below provide an overview of results for the application of this method within the Foyle and Carlingford areas in 2016. GIS shape files containing the raw data behind these maps including site id's has been provided to NIEA.

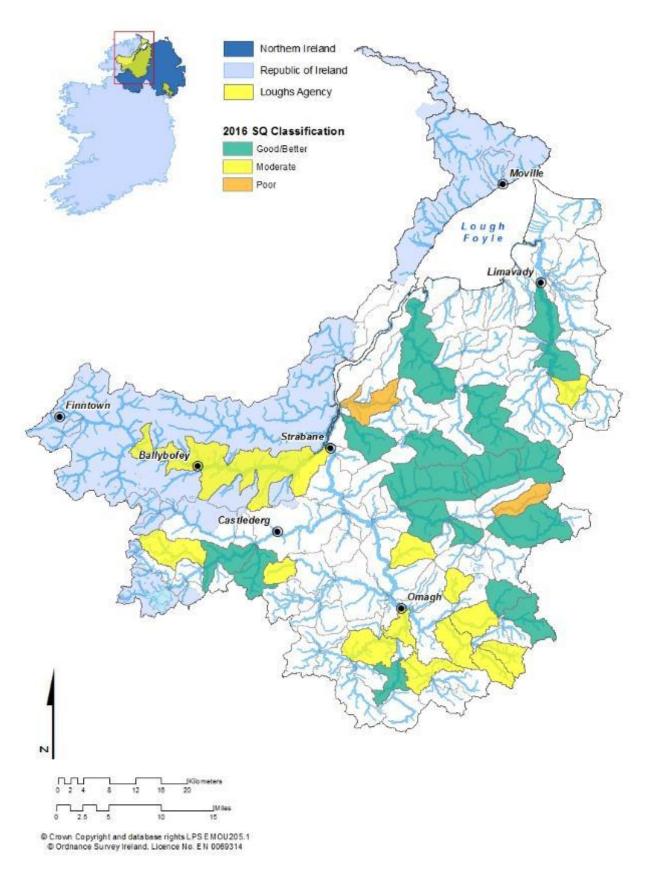


Fig 87. Foyle area Semi quantitative/salmon management plan derived indicative water body classifications 2016

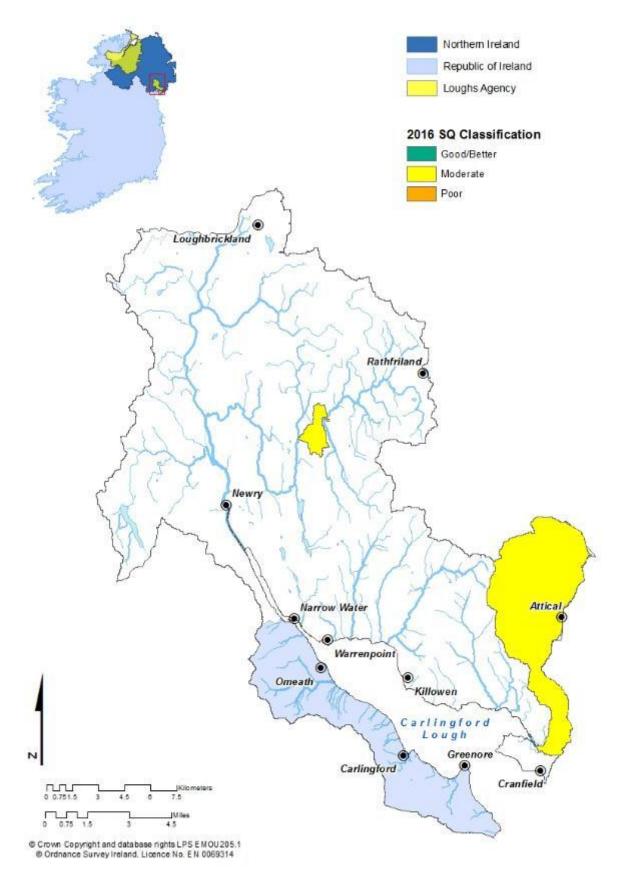


Fig 88. Carlingford area Semi quantitative/salmon management plan derived indicative water body classifications 2016

6.0 CONCLUSION

From 2012 classification has been predominantly based on the FCS2 (Ireland) model. This has replaced the professional opinion classification method as the dominant classification method. A professional opinion over ride exists to correct classifications based on a paucity of information including the presence of barriers downstream to a monitored site. The professional opinion override was not utilised in 2016.

2016 marked the second year in the second monitoring period/cycle of the Water Framework Directive. In 2016 a number of sites were surveyed using a single pass electrofishing survey. When it was not possible to install stop nets due to excessive flow, depth and or width a single pass survey within a defined area was conducted. This approach was instead of the previously utilised multi method approach.

The FCS2 (Ireland) tool has passed the intercalibration process and has now been fully adopted for use across the island of Ireland. Further refinements may be made to the model in the future to incorporate issues such as full consideration of barriers downstream and acceptance of different types of survey data. During the second cycle of the WFD more emphasis will be placed on reasons for waterbody failures and the development of appropriate programmes of measures to address these. This approach will involve wider utilisation of existing fisheries data sets, additional empirical data collection and expert analysis of this information.

A degree of flexibility will need to be maintained in collecting and analysing fisheries data which can be utilised for WFD classification purposes. Early consultation on any potential developments to the FCS2 (Ireland) model should be encouraged through the relevant technical advisory group.

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