Report on Salmon Monitoring Programmes 2019 funded under the Salmon Conservation Fund.

IFI/2020/1-4519

Iascach Intíre Éireann
Inland Fisheries Ireland

Iascach Intíre Éireann
Inland Fisheries Ireland

Report on Salmon Monitoring Programmes 2019 funded under the Salmon Conservation Fund.

Report on projects to assess attainment of Conservation Limit for Atlantic Salmon in Ireland in 2019

Project personnel:

This report was written and researched by Tony Holmes of Aquest Environmental, Dr. P. Gargan, Dr. W. Roche and Dr. M. Millane of the Salmonid Section, Research Division of Inland Fisheries Ireland.

Acknowledgements.

Much of the catchment wide electro-fishing programme was undertaken by the staff of the River Basin Districts (formerly the seven Regional Fisheries Boards). The excellent contribution and cooperation of the staff of each of the Boards during the fieldwork element of these projects is greatly appreciated.

Contents

Executive Summary.

- Funding was provided under the Salmon Conservation Fund to assess the status of salmon in selected catchments. There were three separate elements in the 2019 programme - Catchment-Wide Electro-Fishing (CWEF), estimation of salmon smolt to adult return survival rates and determination of the life history characteristics of adult salmon in selected catchments.

- CWEF is undertaken to assess distribution and abundance of salmon fry in selected catchments nationally. The method consists of broad-scale electrofishing at disparate riffled sites in a given catchment. Timed electrofishing (5 min duration) is undertaken at each site and an average catchment value (no. 0+ salmon fry/5min -all sites) is calculated. The immediate objective of the catchment-wide electro-fishing (CWEF) programme is to determine if mean salmon fry abundance exceeds a catchment threshold value of 17 salmon fry/5-min (computed by SSCS from annual CWEF results). This is deemed a qualifying value for managers to allow rivers to open for angling on a catch and release basis for systems where information on adult returns is otherwise not available or limited. Analysis has shown that the majority of rivers known to be meeting and exceeding their Conservation Limit have a salmon fry index of 17 or higher.

- CWEF was undertaken in 28 catchments nationally in 2019 (July – September). A total of 566 sites were visited. 27 catchments or sub-catchments, mostly in the South and East of the country, were surveyed completely. Persistently high water levels throughout the later summer prevented the completion of several surveys in catchments, primarily in the West and Northern areas of the country. Abundance for this year alone ranged from an average of Zero fry/5min on the Erne, to a catchment average of 35.68 salmon fry per 5 min on the Old Shannon main channel. The Cloonee, Erriff, Leannan, and Bride recorded an annual catchment wide average of >17 fry in 2019. The Carrownisky and the Barrow recorded an annual catchment wide average of >15 fry. The Erriff, IFI's National Salmonid Index Catchment, recorded an annual catchment wide average of >17 fry. The Erriff is a CWEF index catchment which is surveyed annually.

- In general, rivers where the CWEF threshold value was ≥ 17 over the 2007-2019 period, (based on an average of the most recent five CWEF surveys), are open as catch and release fisheries. Overall good agreement was observed between rod catch or counter data (from index or well monitored catchments) and the results of the catchment-wide electro-fishing surveys.

- The long-term objective of the CWEF programme is to develop a robust index of juvenile salmon abundance (0+ salmon fry) to support assessment of attainment of a salmon conservation limit (CL) on an individual river. Fry abundance is assumed to be an appropriate proxy for adult salmon abundance in the previous spawning period. Results to date suggest that the CWEF technique has good potential for initial or ongoing salmon stock assessment. Where sufficient data can be accumulated in catchments with an independent adult stock monitoring system it is intended to analyse the potential of building fry and adult return relationship models. The technique and associated models are likely to provide the best estimate of salmon

stock status in closed rivers and in small rivers where rod catch was historically low (<10 salmon annual rod catch) and no other status assessment method is available.

- CWEF data are also important in providing managers with detailed information on salmon fry distribution and abundance. The absence or low density of salmon fry may be related to water quality issues, obstructions, or habitat damage and areas of low abundance can be investigated. These data can be used to target any remediation works that may be required.

- Qualitative distribution data for all other fish species and some other aquatic biota recorded during CWEF sampling is mapped at catchment level.

- In order to enhance smolt to adult marine survival data for wild salmon in Irish rivers, a PIT tag recording system was installed in the River Erriff (National Salmonid Index Catchment) in 2016 to provide a direct count of the numbers of returning tagged adult fish. Up to 3000 adult salmon run the system annually and its research facilities include a full upstream trap/counter at the head of the tide which allows for full counts of upstream migrating fish. Wild salmon smolts were captured and PIT tagged annually since spring 2016 at two sites on the system. A corresponding programme also commenced in the Corrib system in 2017, with smolts tagged annually at the Galway weir in advance of the installation of a similar PIT tag reader in the Denil fish pass and associated submersible PIT tag antenna.

- In 2019, a total of 32 PIT tagged adult salmon returned to the Erriff representing a provisional marine survival of 3.5% for the cohort tagged in 2018. Any multi-sea-winter fish which will return in 2020 will have to be considered when finalising this estimate. Although no additional fish were detected returning as two-sea-winter salmon from the cohort tagged in 2017, a repeat spawner, tagged in 2016 was detected re-entering the river again in 2019 a year after its initial return in 2019. Marine survival of PIT tagged fish in the Corrib from the cohort tagged in 2018 was provisionally estimated as 3.9%. The Corrib rates are considered to be minimum marine survival estimates as some fish may avoid detection on return by ascending the Corrib through open gates rather than ascending through the denil fish pass. In addition, any multi-sea-winter fish which will return in 2019 have to be considered. A more comprehensive picture of salmon marine survival trends will become available when a more long-term time series of results from both the Erriff and Corrib are available.

- Salmon scales were collected and analysed for life history information from a range of recreational and commercial fisheries; 1015 samples were received from 28 different catchments. Large numbers were received from the Corrib, Moy, Owenmore and Erriff rivers, fewer fish were received from a range of other catchments around the country. A sample of 458 scales were read to determine life history. Of those read 234 (51%) were grilse, 220 (48%) MSW and 4 (1%) PSG. The size of fish ranged from a 500-gram (1lb) grilse returned on the Owenmore in Mayo to a 9 kg (20lbs) previously spawned multi-sea winter fish from the Boyne.

1. Assessment of Attainment of Conservation Limits for Atlantic Salmon in Irish Rivers in 2019: Report on Activities.

1.1. Introduction

In spring 2009, scientists from the Standing Scientific Committee of the National Salmon Commission identified appropriate methods for assessment of attainment of salmon conservation limits (CL) on an individual river basis nationally. They also proposed a strategy for prioritisation of rivers for assessment of attainment of Conservation limits. This assessment was based on the feasibility of inserting new counters, undertaking redd counts, use of electro-fishing as an index of spawning, obtaining full counts from partial counters by tagging etc. on catchments and was linked to the current status of salmon stocks in each river (Anon 2009). Other data such as salmon rod catch, commercial catch by river, micro-tagging data, marine survival and fishery exploitation data are used annually by the Standing Scientific Committee to assess salmon stock status.

A successful application was made by Inland Fisheries Ireland to the Salmon Conservation Fund (SCF) for funding for 2019/2020 to assess attainment of salmon conservation limits nationally. This report presents the results of activities undertaken in 2019 & early 2020 to assess attainment of salmon conservation limits nationally consistent with some of the assessment methods identified by SSCS scientists. The project had three elements and activity was conducted between June 2019 and June 2020:

1. Catchment wide Electro-Fishing Programme:

Undertake catchment-wide electro-fishing in selected catchments to assess abundance and distribution of salmon fry and to further develop an index of juvenile salmon abundance which can be used to assess attainment of salmon conservation limit. Resources and training in the catchment wide electro-fishing technique were also provided to IFI staff nationally.

2. Use of telemetry (PIT tagging) to develop salmon stock assessment metrics

a. Estimate salmon smolt to adult return survival rates

The salmon smolt to adult return rate is widely used for scientific assessments of salmon status (e.g. ICES, NASCO etc) to support species management. Reduced survival in this phase is the major pointer towards likely reduced population size and understanding the reason for these losses is driving several marine phase research programmes. In order to enhance these data for wild salmon in Irish rivers a PIT tag recording system was installed in the River Erriff (National Salmonid Index Catchment) to provide a direct count of the numbers of returning tagged adult fish. Up to 2000 adult salmon run the system annually and its research facilities include a full upstream trap/counter at the head of the tide which allows for full counts of upstream migrating fish. Up to 1000 wild smolts per annum will be PIT tagged per annum (depending on smolt output) and the proportion of returning tagged fish will provide a direct estimate of survival. It is envisaged that this installation will subsequently be supported by a medium-term tagging programme (at least 5 years) to develop a meaningful dataset.

3. Biological Assessment of Salmon Populations

Knowledge of salmon life history strategies is required to understand and model salmon populations in different systems. Biological data on salmon including sea age, run-timing, sex ratio and fecundity are necessary to understand population dynamics within a river. Changes to any of these inputs can influence the outcome of the production models used to predict the likely returns to a river and potential fishery performance. Life history traits such as smolt age, sea age, growth and frequency of spawning can be determined from scale reading. Combined with data on time of entry into the system, sex ratio and fecundity, which can be collected from any killed fish, the often complex make up of a population can be established and the models can be adjusted accordingly. Scales were collected from a range of commercial and rod fisheries in 2019.

2. Catchment wide electrofishing programme 2019.

Sampling Methodology

The sampling methodology was similar to that described in Gargan, P., Roche, W., Keane, S. & Stafford, T. 2009. Report on Salmon Monitoring Programmes 2008 (June 2009), Central & Regional Fisheries Board.

2.1.Results 2019

During 2019, catchment-wide electro-fishing was undertaken in 28 catchments or sub-catchments to assess abundance and distribution of salmon fry. Persistently high water levels throughout august and September in the west and northwest, prevented the commencement or completion of several surveys. Despite poor fishing conditions for much of the summer 27 catchments were surveyed completely (Figure 2.1.1). Planned surveys of certain sub-catchments were also completed as follows: Bann and Urrin on the Slaney, the old main channel in the vicinity of Castleconnell on the Lower Shannon and the Aghacashlaun, Bruskey, Bunnoe and Yellow on the upper Erne.

For the catchments surveyed in 2019, the salmon fry abundance for this year alone ranged from an average of Zero fry/5min on the Erne, to a catchment average of 35.68 salmon fry per 5 min on the Old Shannon main channel. The Cloonee, Erriff, Leannan, and Bride recorded an annual catchment wide average of >17 fry in 2019.

Figure 2.1: Summary of CWEF results (for 2019) for the Catchments Surveyed in 2019.

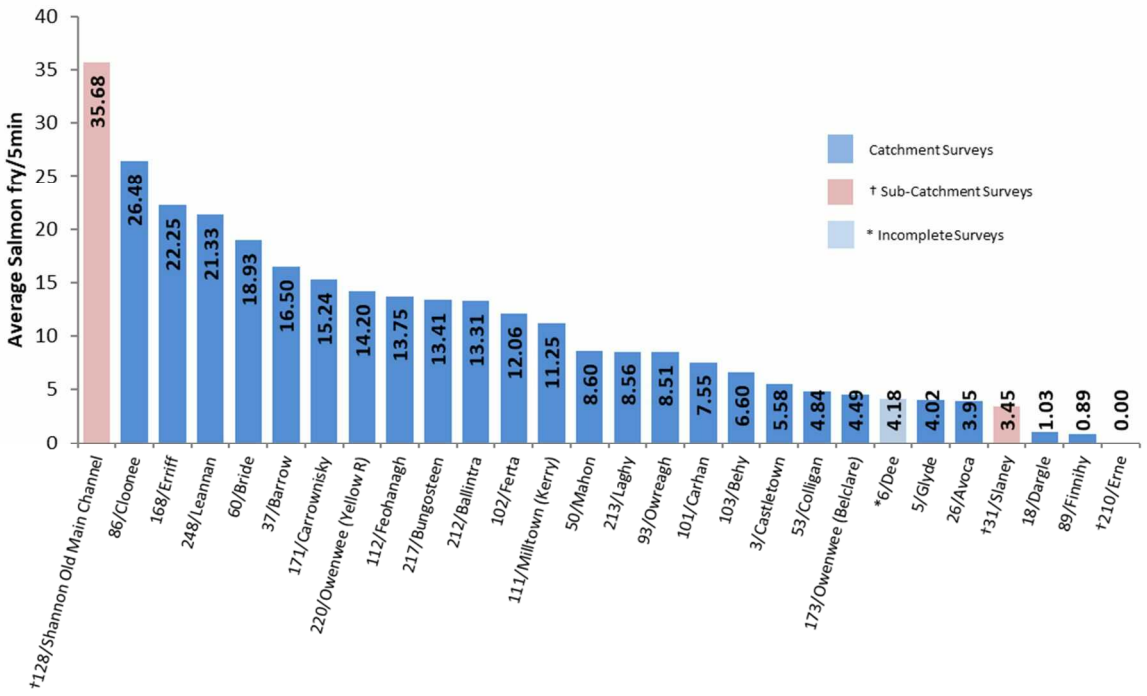
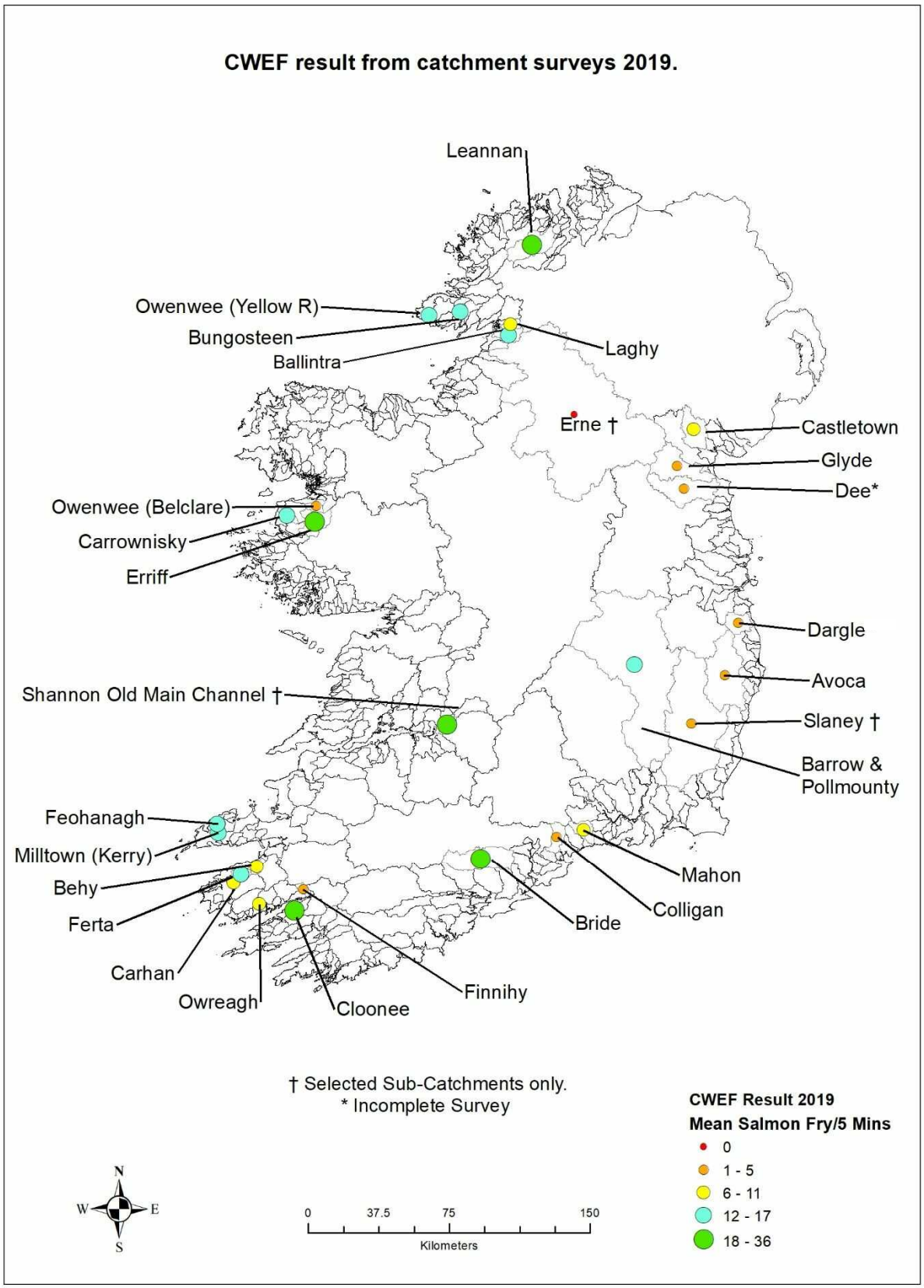


Table 2.1: Summary of Annual results (2008-2019) and current CWEF indices for Catchments surveyed in 2019.

	Fry Year												Most recent 5 surveys		Most Recent 5yrs Data	
Code/River	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**CWEF**	**#Surveys**	**CWEF**	**#Surveys**
003/Castletown		**26.41**				**22.96**	**13.59**					**5.58**	17.13	4	5.58	1
005/Glyde	**2.49**	**17.08**	**31.61**					**5.19**				**4.02**	12.08	5	4.61	2
006/Dee	**8.55**	**16.92**	**21.72**	**20.13**				**10.51**				*4.17	15.57	5	10.51	1
018/Dargle		**1.40**	**2.53**	**7.52**				**4.19**				**1.03**	3.33	5	2.61	2
026/Avoca	3.79	5.56	**5.20**	**18.88**	**5.15**				**1.89**		*8.37	**3.95**	7.01	5	2.92	2
031/Slaney		15.94	18.42				17.68		8.70	14.30		†3.45	15.01	5	11.50	2
037/Barrow		10.93	**8.71**	**21.23**	**26.72**				*8.93	**11.54**		**16.50**	16.94	5	14.02	2
050/Mahon	**2.11**						**10.72**	**3.92**				**8.60**	6.34	4	6.26	2
053/Colligan				**29.32**			**9.50**		**3.62**			**4.84**	11.82	4	4.23	2
060/Bride	**10.40**		**24.70**				**19.85**			**7.65**		**18.93**	16.31	5	13.29	2
086/Cloonee					**16.18**	**33.06**				**24.09**		**26.48**	24.95	4	25.29	2
089/Finnihy					**8.61**	**0.00**				**0.58**		**0.89**	2.52	4	0.73	2
093/Owreagh						**2.07**	**2.81**					**8.51**	5.58	4	8.51	1
101/Carhan						**6.05**	**8.61**					**7.55**	9.49	4	7.55	1
102/Ferta							**10.74**			**6.88**		**12.06**	12.27	4	9.47	2
103/Behy	6.14	**4.03**	**8.71**	**7.17**					**2.89**			**6.60**	5.88	5	4.75	2
111/Milltown (Kerry)	**15.33**		**26.44**			**13.02**		**8.76**				**11.25**	14.96	5	10.01	2
112/Feohanagh		**16.61**				**3.20**	**11.93**					**13.75**	11.37	4	13.75	1
128/Shannon Old MC										†*5.50	†*18.25	†**35.68**	35.68	1	35.68	1
168/Erriff	24.10	16.03	20.43	20.86	24.45	27.45	24.90	**28.52**	**21.72**	**13.69**	**22.81**	**22.25**	21.80	5	21.80	5
171/Carrownisky	**18.25**				**20.60**	**18.22**				*4.25		**15.24**	18.08	4	15.24	1
173/Owenwee (Belclare)			**8.47**	**7.25**	**15.27**							**4.49**	8.87	4	4.49	1
210/Erne	7.37	0.17	0.08	0.00	0.00	0.00	1.60	**1.16**	**1.25**	**0.00**	**0.49**	**0.00**	0.58	5	0.58	5
212/Ballintra		**10.27**				**13.40**	**19.82**					**13.31**	14.20	4	13.31	1
213/Laghy		**8.58**				**14.97**	**11.02**					**8.56**	10.78	4	8.56	1
217/Bungosteen				**27.91**		**19.23**				**13.17**		**13.41**	18.43	4	13.29	2
220/Owenwee (Yellow R)	**5.00**	**16.93**			**20.31**	**21.05**						**14.20**	15.50	5	14.20	1
248/Leannan	7.68	9.73	17.30	12.82	22.30	19.51	**20.87**	**15.27**	*15.05	**18.66**	**20.11**	**21.33**	19.25	5	18.84	4

*** - Surveys not completed, † -Sub catchment surveys. Bold annual figures indicate years included in calculation of current CWEF index.**

2.2.Results 2007 to 2019



Map 2.1: For rivers surveyed in 2019 the mean salmon fry per 5 minutes found in 2019 is indicated.

Update for 2019.

From 2007 to 2019 a total of 148 separate catchments or sub-catchments have been sampled. Repeat surveys have been carried out in multiple catchments to monitor fry levels for management and to fulfil other obligations (e.g. Article 17 reporting under the EU Habitats Directive). Over this period a total of 476 full or partial catchment surveys amounting to 10467 individual site surveys have been conducted nationally. To facilitate assessment of status based on fry abundance mean annual abundance values for the most recent five surveys, where data are available, is calculated. This approach is consistent with the SSCS approach to other datasets and reduces the potential of an extreme result influencing the data disproportionately. The current catchment-specific CWEF indices presented in this document are based on the most recent 5 CWEF surveys CWEF data collated from survey activity since 2007. Annualised CWEF results 2007 to 2019 for all catchment surveyed are presented in Appendix C.

Trends in Salmon Fry Abundance over Time

Data in figure 2.2 presents the CWEF annual mean abundances of salmon fry in 150 catchments where electro-fishing results are available; Figure 2.4 shows the current average salmon index for all catchments surveyed to date. 46 catchments have only one survey within the period used to calculate the CWEF index.

Highest salmon fry numbers were recorded in rivers in the Southwest and Connemara. Generally, rivers along the east and south east coast recorded low salmon fry abundance. Low fry numbers were also recorded for rivers in the north-west and Donegal Bay; many of the smaller catchments along the west coast also had low numbers of fry.

A catchment-wide salmon fry average for rivers electro-fished from 2007 to 2019 is presented (Map 2.2).

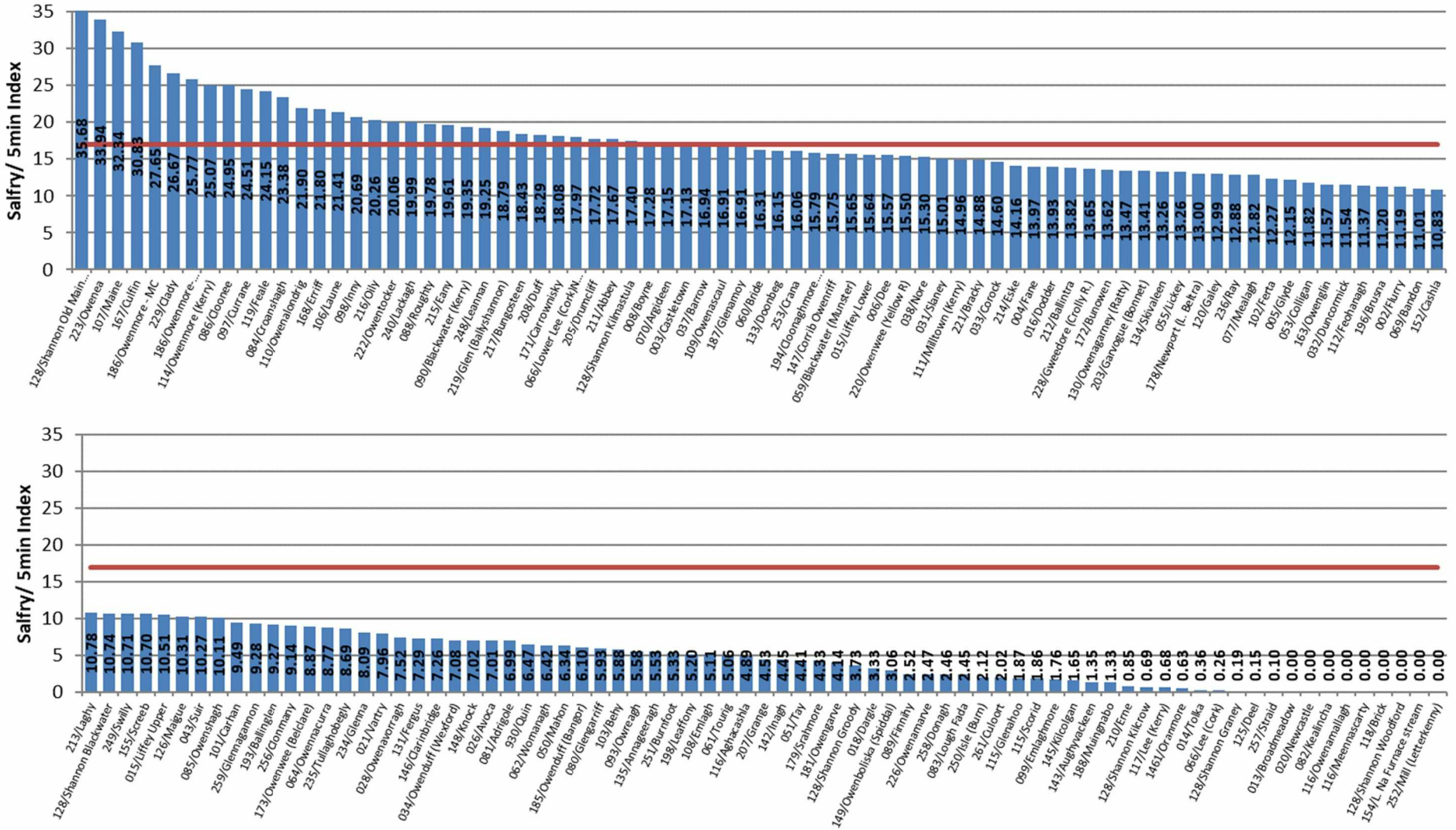
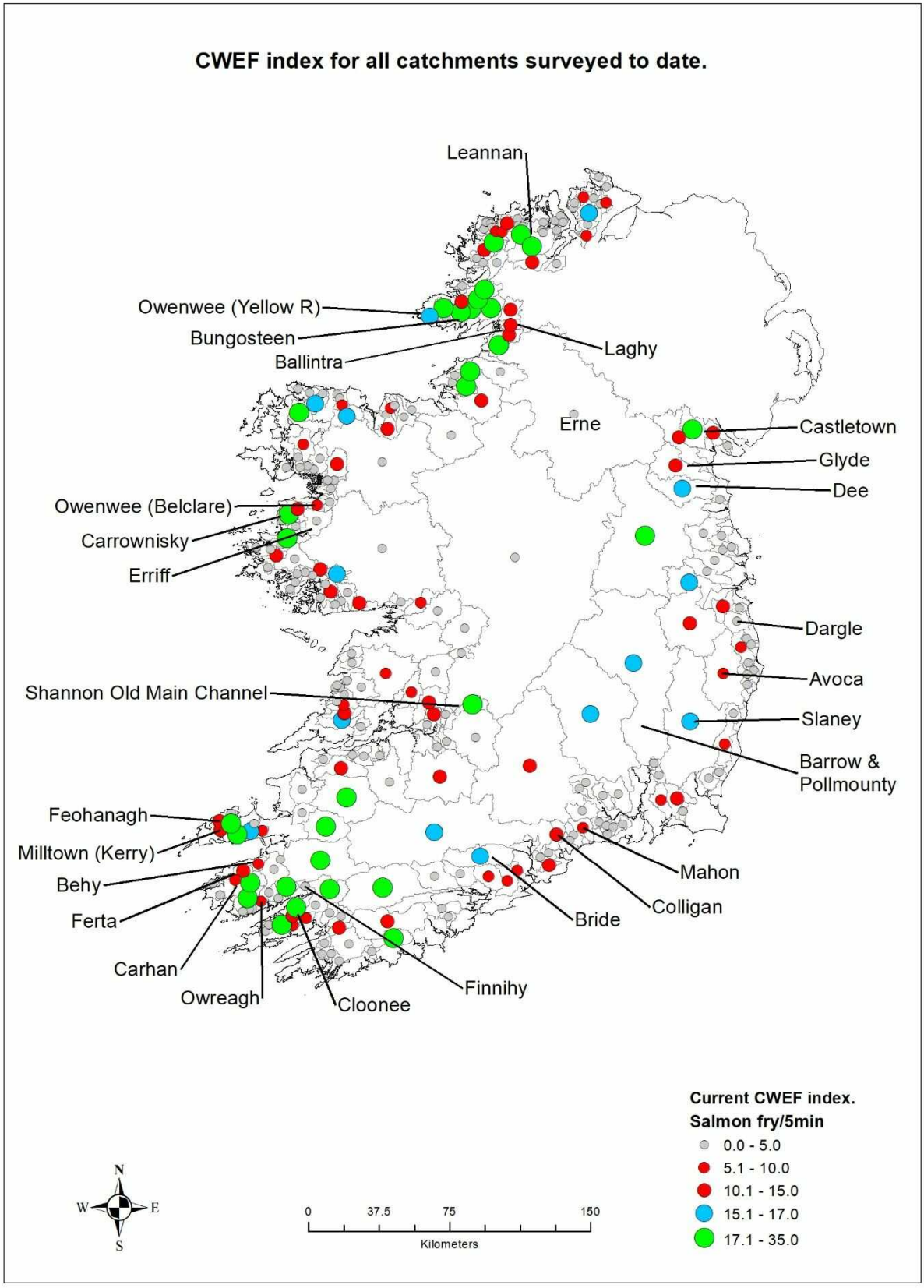


Figure 2.2: Current CWEF index (mean salmon fry per 5 minutes) for all catchments surveyed to date.



Map 2.2: Current CWEF index for all catchments surveyed to date.

3. Use of telemetry (PIT tagging) to develop salmon stock assessment metrics

Telemetry is a technology that can be used to track fish in the aquatic environment. Many different options exist to tag fish which is dependent on the species management requirements and the habitat type in which the species occurs. For salmon, the marine phase is often the focus of recent research and management studies given that considerable losses occur at sea resulting in smolt to adult survival rates in recent decades being recorded as single digit percentages. The salmon smolt to adult return rate is widely used for many scientific assessments of salmon (e.g. ICES, NASCO etc) for management. Reduced survival in this phase is the major pointer to reduced population size and understanding the reason for these losses is driving several marine phase research programmes. Existing programmes (coded wire tagging) generate data for wild and reared smolt survival from systems like Burrishoole and Corrib. These survival figures rely on retrieving tags from rod caught or a limited number of commercially caught fish and also recovery of tags from any broodstock captured in traps. Given that adult returns are low reliance on retrieving tags from returning fish, where capture rates are also low (10-20% of the population for rod caught fish), may compromise data quality particularly in years where rod catch is low.

Salmon typically spend one to two years at sea – tags which require a battery to power its function tend to be large due to the battery life required to operate such tag for this length of time. PIT (Passive Integrated Transponder) tags, which are miniature encased microchips, offer an ideal solution to the technological limitation imposed by large battery size in other electronic tags. Providing a lifetime barcode for the tagged animal a PIT tag can be easily inserted into the body cavity of a small fish (or mounted in an external floy tag to affix to a larger fish).

A PIT tag is a uniquely coded microchip (typically about 10mm in length and 2 mm in diameter). This tag type is available in different sizes and can be used to tag fish of all sizes. For fish studies a PIT tag scanner (antenna) is permanently positioned in or close to a chokepoint in a river system (often a fish counter location) and the scanner will read the tag code of any tagged fish passing within its range. A decoder linked to the antenna stores the tag number and the date and time of this event.

In order to enhance smolt to adult survival data for wild salmon in Irish rivers a PIT tag recording system was installed in the River Erriff (National Salmonid Index Catchment) to provide a direct count of the numbers of returning tagged adult fish. Up to 3000 adult salmon run the system annually and its research facilities include a full upstream trap/counter at the head of the tide which allows for full counts of upstream migrating fish.

In its simplest application, by determining the number of PIT-tagged adult salmon passing upstream through the counter relative to the total number of smolt PIT tagged initially, a smolt to adult survival index can be calculated. The basis for these types of studies is a variation of a mark-recapture application. IFI has developed a salmon smolt tagging programme based on this principle and funding from the SCF was used to install the infrastructure in February 2016. PIT tagging of smolts was initiated on the Erriff system in 2016. The majority of surviving adults were expected to return as 1 SW salmon

(grilse) in 2017. Results will inform understanding of salmon life history and complement ongoing short-term research work in the system based on acoustic tagging of outgoing salmon smolts.

Ultimately these data will contribute to refining adult salmon modelling at the SSCS because it is based on wild salmon which are returning to a research station with high quality trapping and monitoring instrumentation. Further understanding of potential pressures/threats/losses from various factors (e.g. sea lice emanating from an aquaculture facility in Killary Harbour, predators etc) will be further elucidated from this work. It is envisaged that this study will necessitate a medium-term tagging programme (at least 5 years) to build up a meaningful dataset.

PIT tagging projects to monitor marine survival

Following installation of the Biomark customised thin-walled shielded antenna and associated data logger in February 2016 (Fig 3.1) at the upstream fish trap in the River Erriff, a salmon smolt tagging project was initiated. Wild salmon smolts were captured and PIT tagged (Biomark HPT/APT 12 Pre-loaded) annually in spring since 2016 at two main sites on the system: 1) at Tawnyard trap located on the Black River tributary; and 2) on the main channel of the Erriff using a screw trap. A corresponding programme also commenced in the Corrib system in 2017, with smolts tagged at the Galway weir in advance of the installation of a similar PIT tag reader there in the Denil fish pass and associated submersible PIT tag antennae. The number of salmon smolts tagged in both systems and associated lengths data are presented in Table 3.1.

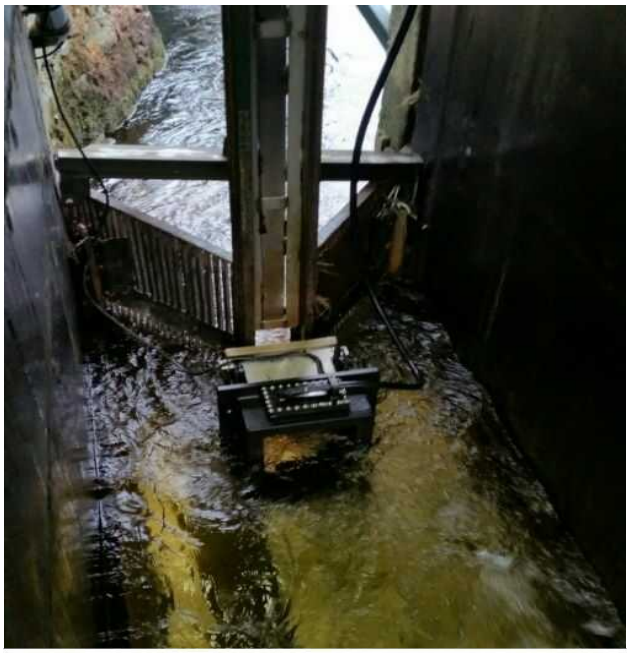


Fig 3.1. Erriff upstream trap with VAKI Riverwatcher counter and Biomark antenna (dark rectangular unit).

Smolt to adult salmon returns to the Erriff and Corrib systems

In 2019, a total of 32 PIT tagged adult salmon returned to the Erriff representing a provisional marine survival of 3.5% for the cohort tagged in 2019. Any multi-sea-winter fish which will return in 2020 will have to be considered when finalising this estimate. Although no additional fish were detected returning as two-sea-winter salmon from the cohort tagged in 2017, a repeat spawner, tagged in 2016 was detected re-entering the river again in 2019 a year after its initial return in 2019. Marine survival of PIT tagged fish in the Corrib from the cohort tagged in 2019 was provisionally estimated as 3.9%. The Corrib rates are considered to be minimum marine survival estimates as some fish may avoid detection on return when the majority of gates are open in the Galway weir. In addition, any multi-sea-winter fish which will return in 2019 have to be considered. A more comprehensive picture of salmon marine survival trends will become available when a more long-term time series of results from both the Erriff and Corrib are available.

Table 3.1. Number and lengths of salmon smolts PIT tagged in the Erriff and Corrib systems since 2016.

Year	Location	No. of fish tagged	Mean (cm)	SD (cm)	Min (cm)	Max (cm)
2016	Erriff	1022	12.5	1.5	8.7	18
2017	Erriff	553	12.8	1.6	10	21.6
2017	Corrib	1600	16.5	2.3	11.2	24.8
2018	Erriff	893	12.8	1.3	10	18.2
2018	Corrib	1988	14.6	2	11.1	26.5
2019	Erriff	912	12.3	1.1	10	19.2
2019	Corrib	2057	14.9	1.8	9.6	21.6

Table 3.2. PIT tag detections from returning adult salmon tagged in 2016.

Tagging year	Location	No. of smolts tagged	No. of returning adults detected	% marine survival
2016	Erriff	1022	36	3.5
2017	Erriff	553	11	2
2017	Corrib	1600	119	7.4
2018	Erriff	893	32	3.5
2018	Corrib	1988	78	3.9

Figures may be revised based on additional adult returns in following years.

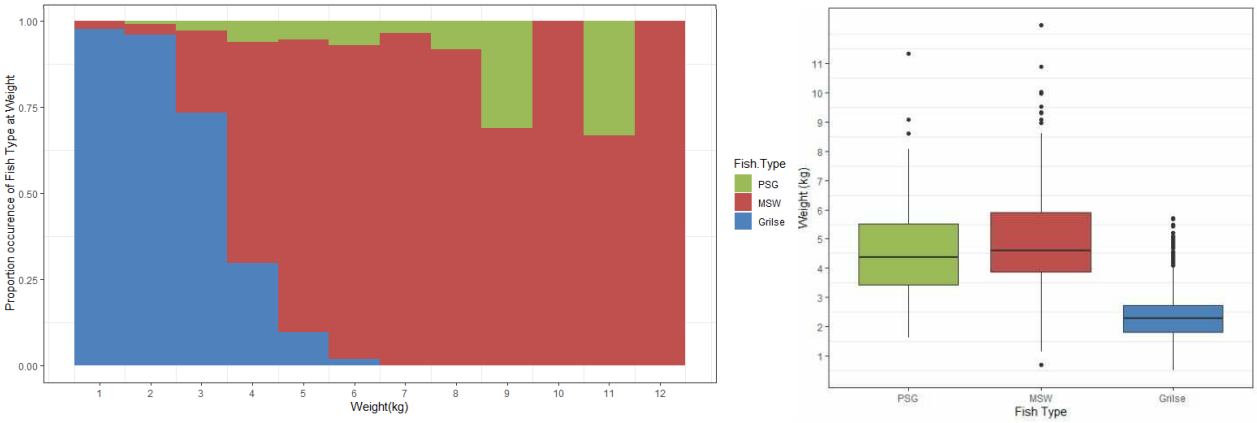
4. Biological Assessment of Salmon Populations.

Knowledge of salmon life history strategies is required to understand and model salmon populations in different systems. Biological data on salmon populations including sea age, run-timing, sex ratio and fecundity are necessary to understand population dynamics within a river. Changes to any of these inputs can influence the outcome of the production models used to predict the likely returns to a river and potential fishery performance. Life history traits such as smolt age, sea age, growth and frequency of spawning can be determined from scale readings. Combined with data on time of entry into the system, sex ratio and fecundity, which can be collected from any killed fish, the often complex make up of a population can be established and the models can be adjusted accordingly. For example, if the proportion of Multi-Sea-Winter (MSW) salmon entering a system is greater than previously known this would have the effect of reducing the CL as these fish are likely to have a higher female:male ratio and would transport a greater number of eggs into a catchment because of their greater size compared to grilse.

In order to enhance the quality of the existing models and to improve the quality of the scientific advice, particularly for rivers where the stock structure is complicated (e.g. river has significant spring salmon and a grilse component or other stock components) or has changed, it is important to obtain data on the stock. Run-timing of the different components may influence harvesting options. Sex ratio and fecundity may change in response to the composition of the total population. These data are required for the on-going scientific assessment of salmon fisheries in which IFI is intimately involved through the machinations of the Standing Scientific Committee.

In 2019 IFI initiated a citizen science project whereby anglers were encouraged to collect scales of Salmon captured and return them for analysis, including details of length, weight, sex, capture location and details of predation and net marks and lice presence.

Figure 4.1: Left: Occurrence of fish life history by weight (kg) to end 2019. Right: Boxplots of weights (kg) of individual fish of different types. (n: Grilse-1663, MSW-980, PSG- 90)



4.1.Salmon Life History.

Salmon scales have been collected from the commercial draft net fisheries, anglers and from research projects building up a scale collection for analysis. To date the collection consists of scales of 20711 fish from 61 fisheries around the country. A sample of scales of these fish has been read.

Of the 3254 fish for which age has been determined, 1072 of fish were Multi-sea winter fish (MSW), 2063 were grilse; the remaining 118 fish were previously spawned grilse (PSG). Of these fish types the MSW were on average the largest, with a mean weight of 4.95 kg, PSG had an average weight of 4.72kg and grilse an average weight of 2.40 kg. It can be seen on figure 4.1 that most of the grilse were below 4kg and all MSW and PSG were 4kg or above. MSW fish numbers peak earlier in the year than Grilse and PSG.

Table 4.1: Summary of Weights (kg) of fish for which age has been determined by scale reading 1982-2019.

Fish Type	Mean	SD	n
Grilse	2.36	0.81	1663
MSW	4.87	1.51	981
PSG	4.66	1.51	89
Total			2732

Figure 4.2: Occurrence of fish life history in samples received from different catchments 1982-2019. (Number of scales read/number of scales in database)

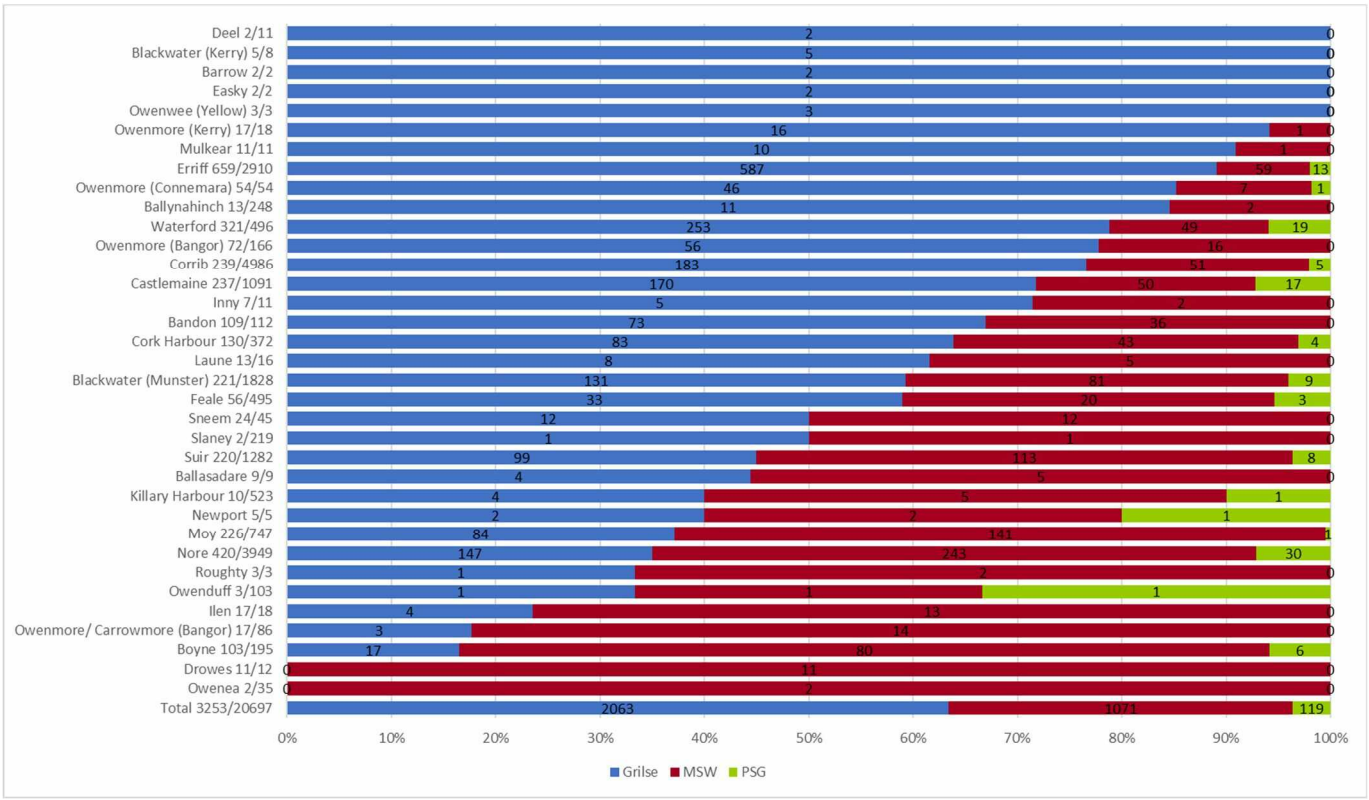
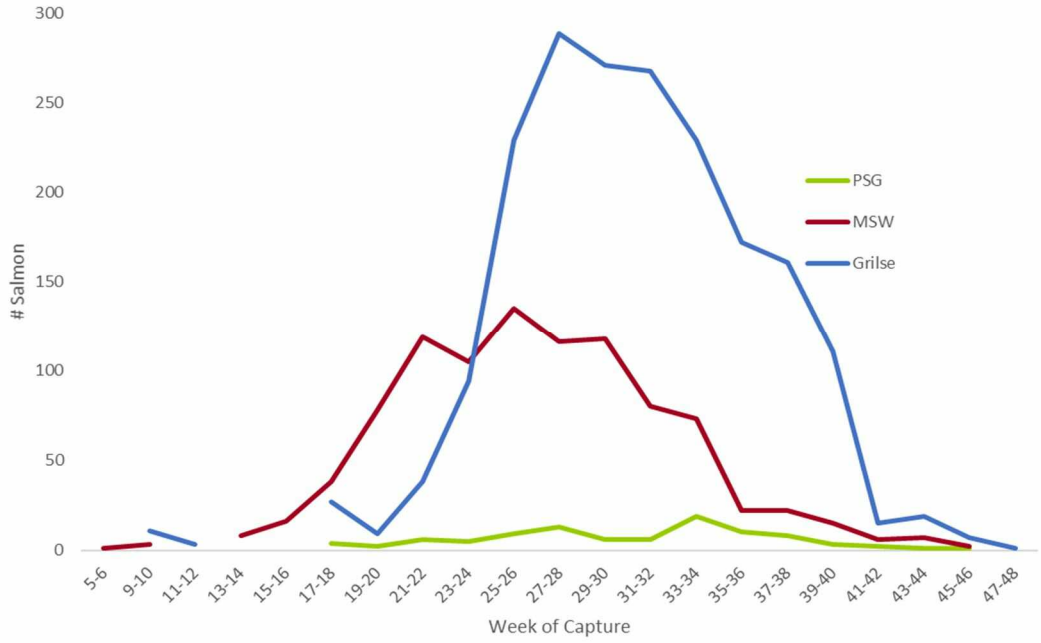


Figure 4.3: Life history of Fish by week of capture. MSW fish are more abundant earlier in the year, Grilse and PSG are more abundant later in the year. (all years, all rivers, grouped into 2 week periods).



Size and Age profile of 2019 sample.

Scale samples received in 2019 came from 28 different catchments. Overall, 1006 samples were received. Large numbers were received from the Corrib, Moy, Owenmore and Erriff rivers, fewer fish were received from a range of other catchments around the country. A sample of 457 scales were read to determine life history. Of those read 234 (51%) were grilse, 220 (48%) MSW and 4 (1%) PSG. The size of fish ranged from a 500-gram (1lb) grilse returned on the Owenmore in Mayo to a 9 kg (20lbs) previously spawned multi-sea winter fish from the Boyne.

Plate 1: Scale taken from 0.5kg/1lb salmon from the Owenmore landed on 7/9/19. Reading indicates a returning fish that has spent one winter at sea (2.1).

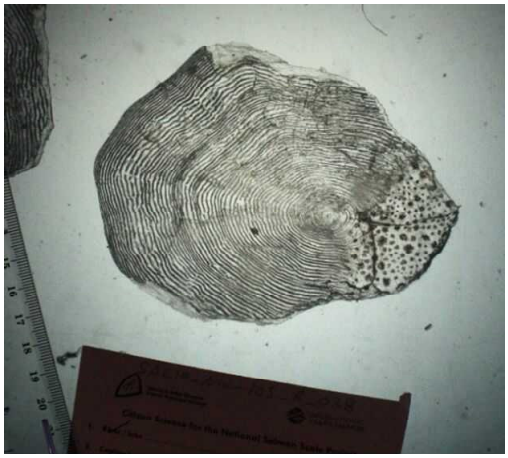
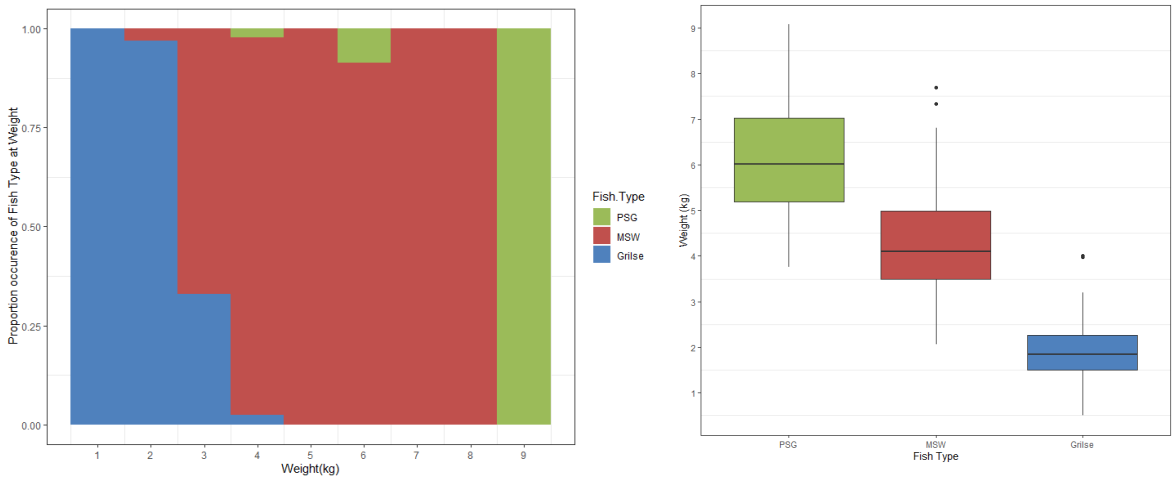


Plate 2: Scale taken from 9kg/20lb salmon from the Boyne landed on 4/4/19. Reading indicates a returning fish that previously spawned after 2 winters at sea (2.2+sm+1).

Table 4.4: Summary of Scales received 2019 from Citizen science, research projects and commercial fisheries.

Locale	Grilse	MSW	PSG	Not Read/ Unknown	Grand Total
Owenea		2			2
Owenwee (Yellow)	3				3
Cloonaghmore				3	3
Owenmore (Bangor)	50	16		1	67
Owenmore/ Carrowmore (Bangor)	3	14		1	18
Owenduff	1	1	1		3
Newport	2	3			5
Moy	85	139	1	6	231
Easky	2				2
Ballasadare	4	5			9
Drowes		11			11
Erriff	53			10	63
Corrib	1	9	1	531	542
Doonbeg				2	2
Boyne			1		1
Suir	2	4			6
Barrow	2				2
Nore	2	1		2	5
Blackwater (Munster)	3				3
Feale	2	4			6
Laune	4	1		1	6
Currane	1				1
Roughty	1	2			3
Sheen	1				1
Croanshagh	1				1
Cork Harbour	9				9
Bandon		3			3
Ilen		5			5
Deel	2				2
Grand Total	234	220	4	557	1015

Figure 4.4: Left: Occurrence of fish life history by weight from 2019 (kg). Right: Boxplots of weights (kg) of individual fish of different types from 2019. (n: Grilse-228, MSW- 217, PSG- 4)



Comparison of Size and Age profile of Moy Salmon over time.

Anglers on the River Moy returned scales from 230 fish; 193 had both length and weight information, these exhibited a well-defined length weight relationship. The age of 224 salmon was determined by scale reading, this found that 84 (37.5%) were grilse and 139 (62%) multi-sea winter salmon (MSW) and one (0.5%) was a previously spawned grilse (PSG). The mean weight of MSW salmon was 4.23kg (standard deviation 0.9kg, n=137), grilse had a mean weight of 1.83 kg (SD 0.53 kg, n=81). Comparison of weight profiles in 2019 with previous years (figure 4.5) showed that fish >3.5kg were more common this years' sample than in previous years, also notable is the large proportion of MSW fish in the scale sample. This is most likely not representative of the actual population of fish retuning to the Moy but rather just a disproportionate number of large fish in the scale sample itself. Most of the larger fish in the returned samples were caught in the earlier part of the year (figure 4.6), fish after week 160 were genrally below 3kg and were predominantly grilse.

Figure 4.5: Weight profile of Salmon sample returned in 2019 (n=226), compared with weight profile of all previous samples in the scale database (n=513).

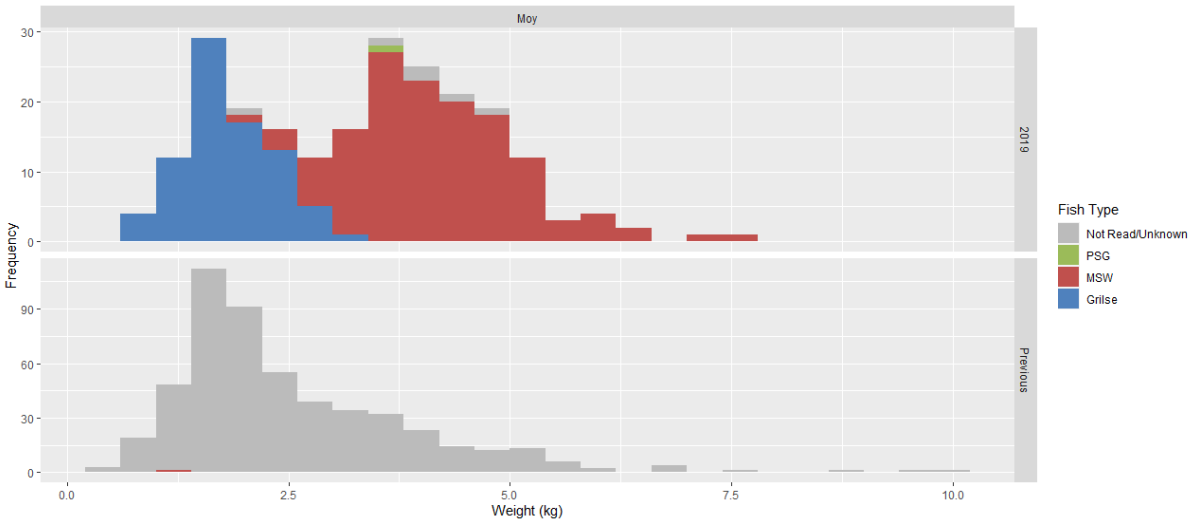


Figure 4.6: Weight and fish types of Salmon sample returned from the Moy in 2019 (n=226), by day number.

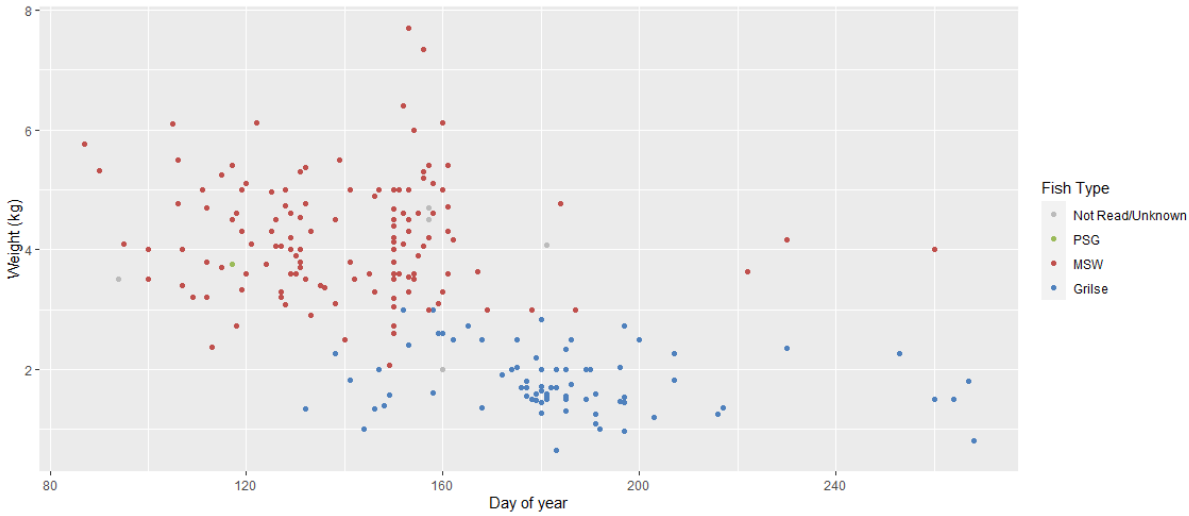
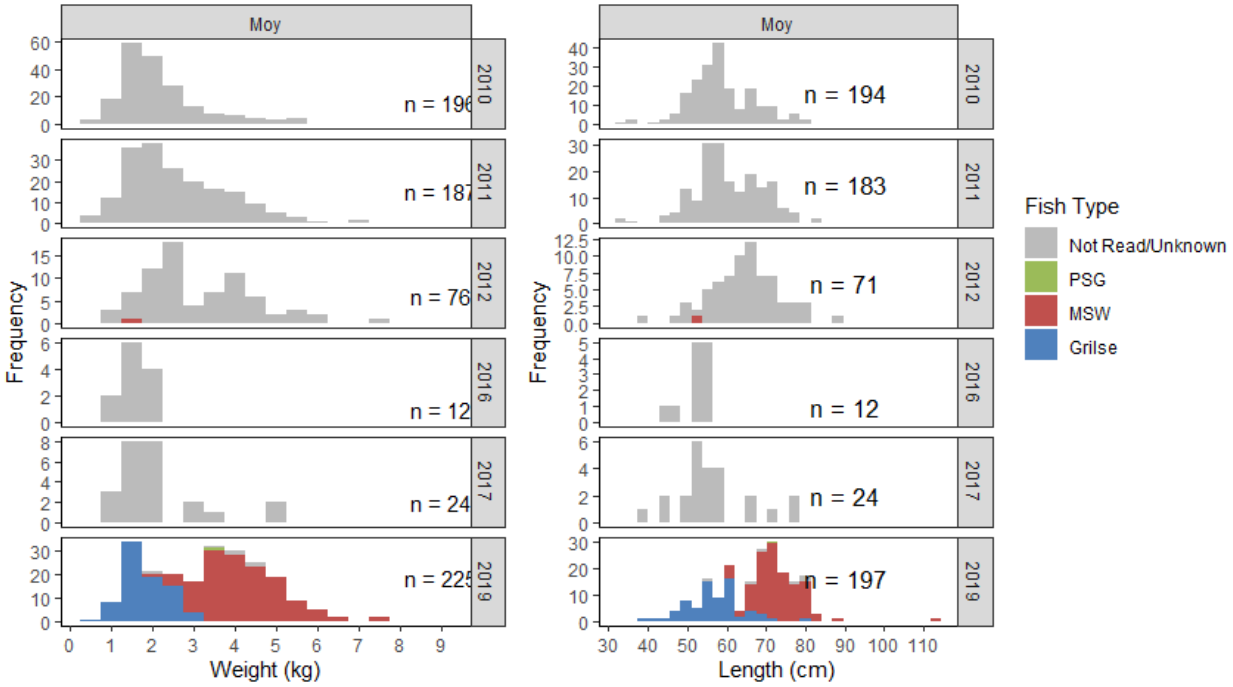
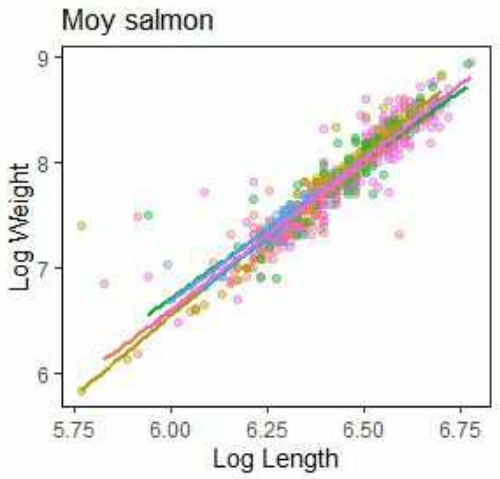


Figure 4.7: Weight and length profiles and length weight relationships of Salmon samples returned in 2019 and previous years.





Year	n
2010	194
2011	182
2012	69
2016	12
2017	24
2019	193

Comparison of Size and Age profile of Owenmore/ Carrowmore Salmon over time.

Anglers on the Owenmore returned scales from 83 fish: 17 from the Carrowmore Lake and 66 from the Owenmore river. Eighty-three of these fish had weight information. The age of 82 salmon was determined by scale reading, this found of the fish returned from the Carrowmore were 14 multi sea winter, 2 were grilse and one scale was unreadable; and that of the fish from the Owenmore 16 were grilse and 5 MSW. The mean weight of MSW salmon was 3.64kg (standard deviation 1kg, n=30), grilse had a mean weight of 2.07kg (SD 0.56kg, n=52). All but one of the fish samples returned from the Carrowmore in 2019 were below 4kg in weight, in samples from previous years (Figure 4.8) higher weight classes were more abundant. Most of the fish caught in the Carrowmore were caught before week 25 (mid-June) (Figure 4.9) and almost all the fish returned from the Owenmore were caught after week 22.

Figure 4.8: Weight profile of Salmon sample returned in 2019 (n=83), compared with weight profile of all previous samples in the scale database (n=132).

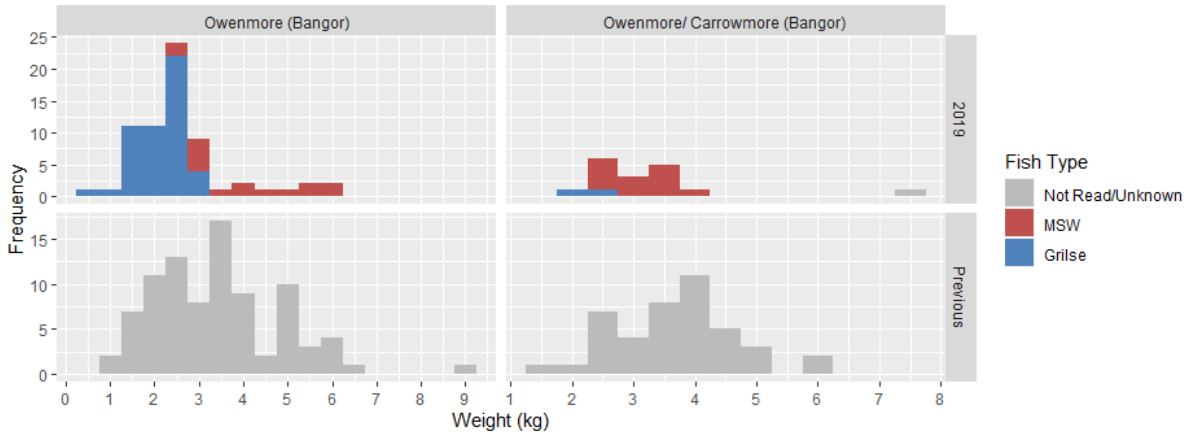


Figure 4.9: Weight and fish types of Salmon sample returned in 2019 from the Owenmore and Carrowmore rivers (n=83), by day number.

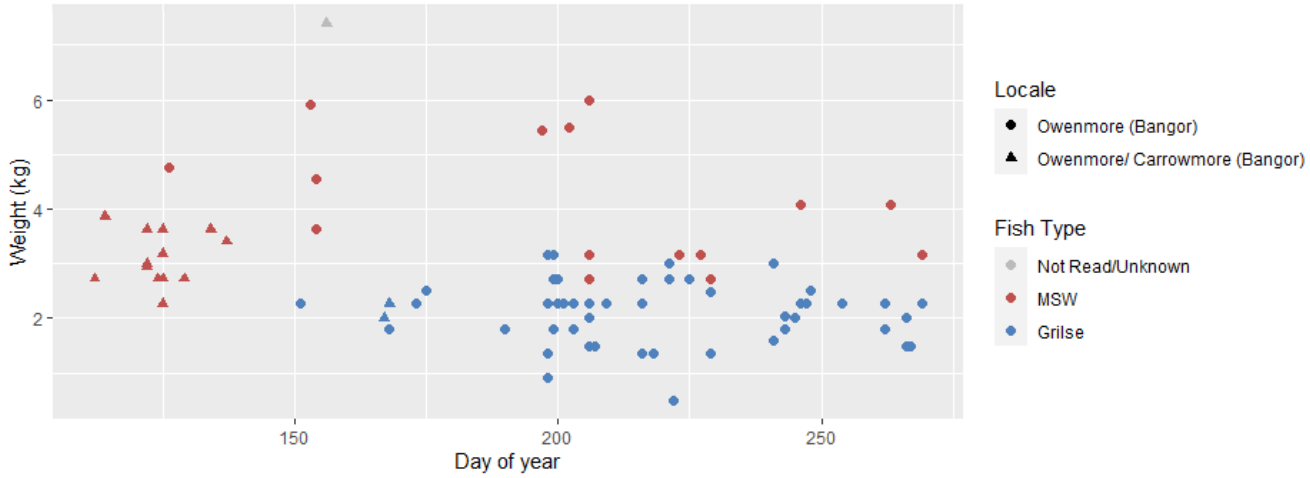
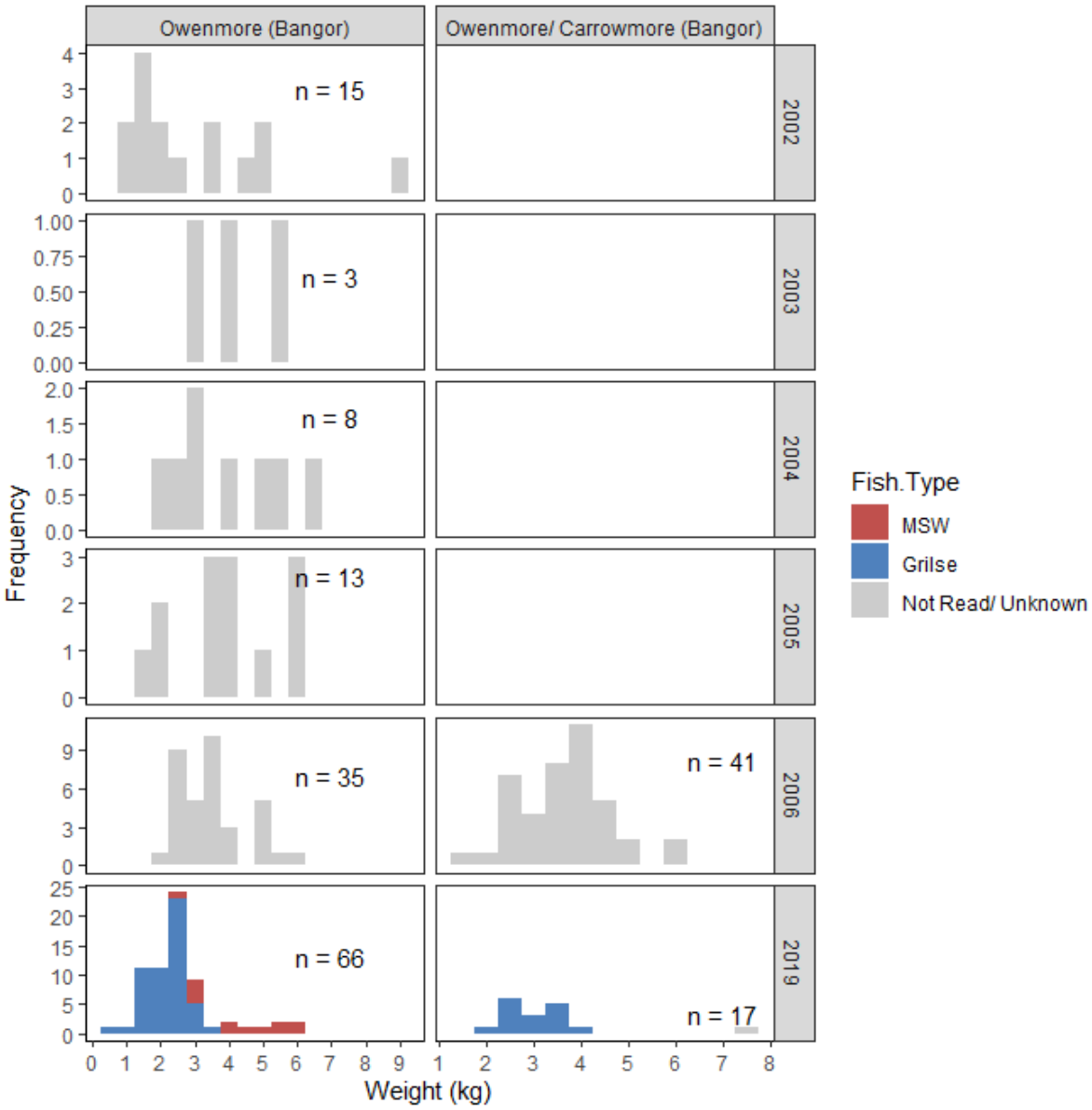


Figure 4.10: Weight and length profiles and length weight relationships of Salmon samples returned in 2019 and previous years.



Comparison of Size and Age profile of Corrib Salmon over time.

Anglers on the Corrib returned scales from 542 fish. Of these 517 had both length and weight information, these showed a strong length weight relationship. The weight distribution and length weight relationship of salmon 2019 was similar to that found in previous years. Age was determined by scale reading for 11 salmon. Previous years samples (particularly 2014 and 2015) have been read and show that Corrib grilse have a mean weight of 2.12kg (S= 0.53, n=180), MSW salmon 3.95kg (SD=1.18kg, n=42) and Previously spawned grilse 3.82kg (Sd 1.0, n=4). Applying previous scale reading results to this years sample would indicate 83% of fish were grilse, 15% MSW and 2% PSG.

Figure 4.11: Weight Salmon sample returned from the Corrib in 2019 (n=518), by day number.

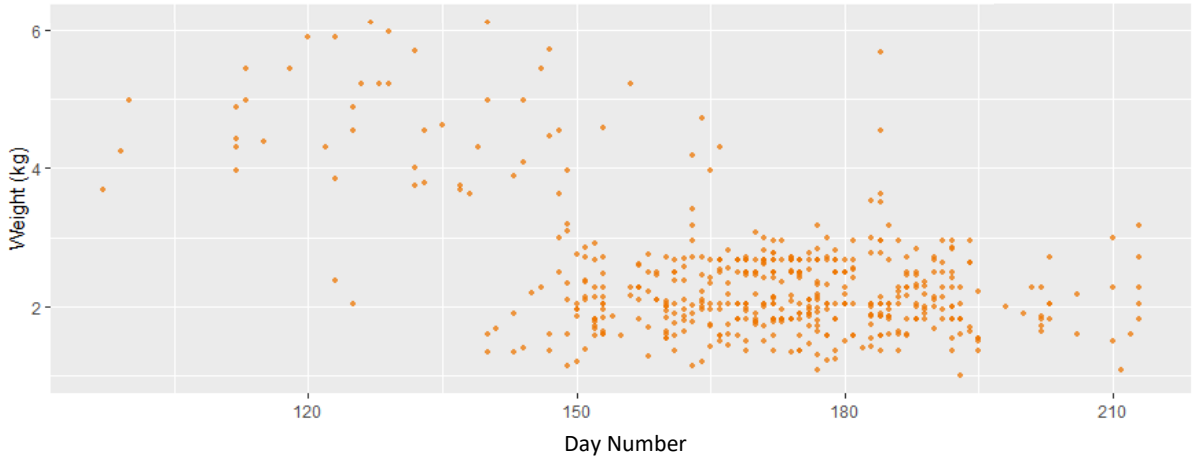
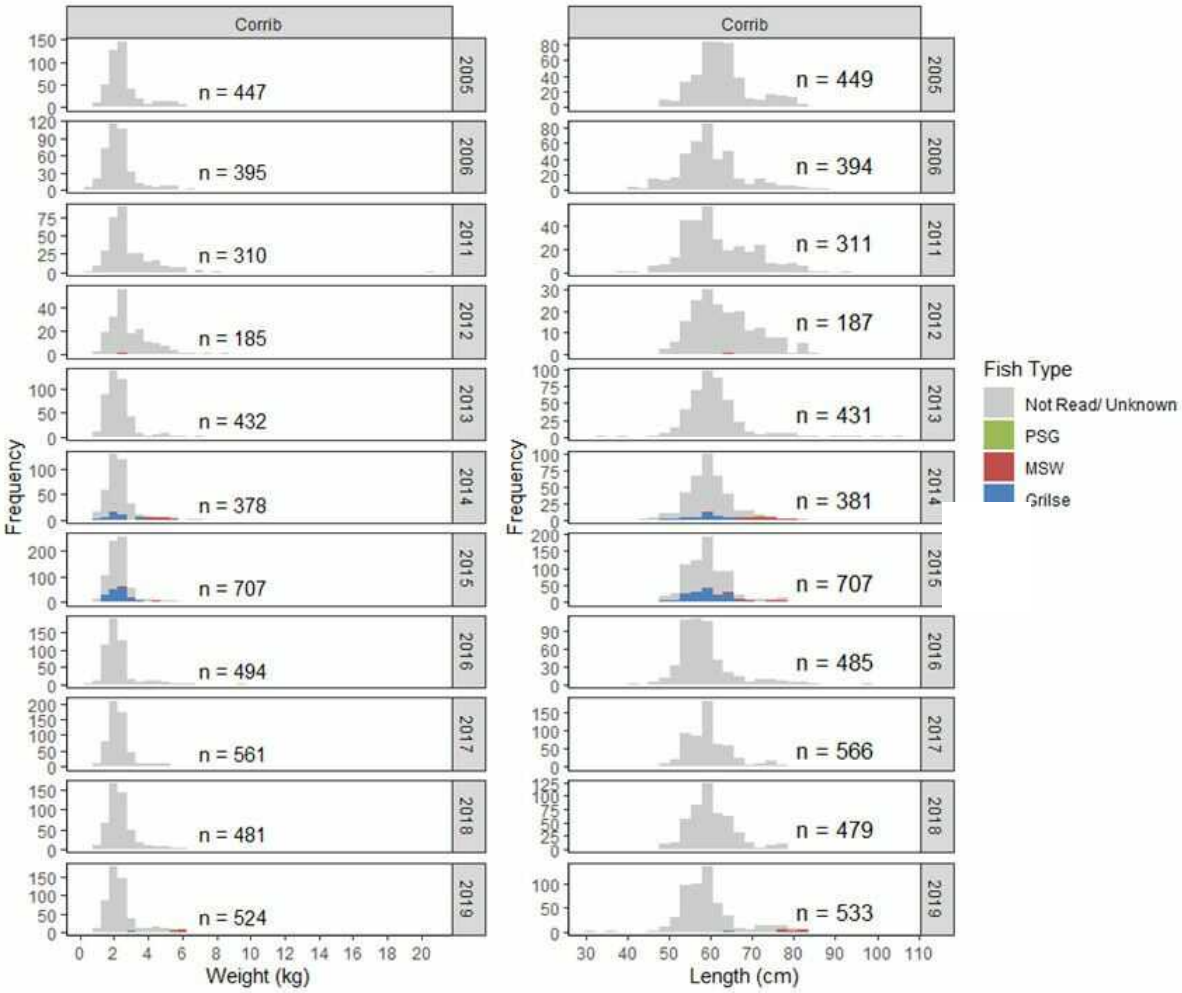
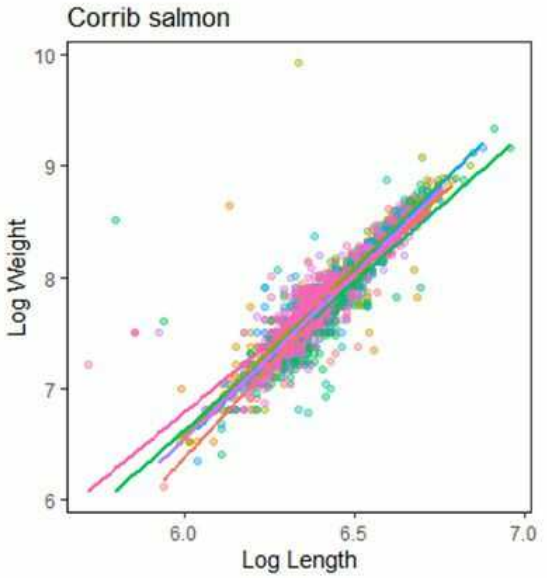


Figure 4.12: Weight and length profiles and length weight relationships of Salmon samples returned from the Corrib in 2019 and previous years.





Year	n
2005	446
2006	392
2011	310
2012	184
2013	426
2014	375
2015	707
2016	483
2017	559
2018	475
2019	517

Comparison of Size and Age profile of Erriff Salmon over time.

IFI has designated the River Erriff as the National Salmonid Index Catchment. Salmon and sea trout migrating upstream in the Erriff pass through fish counting and trapping facilities located at Aasleagh Falls, where the Erriff flows into Killary Harbour. Since 1985, salmon and sea trout smolts and kelts migrating downstream pass through a trap located below Tawnyard Lough. Scale samples are collected from wild salmon passing up through the traps. In addition alnglers can return scales from captured fish.

In 2019 63 wild fish were sampled, all 63 had both length and weight information and showed a strong length weight relationship. The weight distribution and length weight relationship of salmon 2019 was similar to that found in wild fish in previous years. Age was determined for 53 fish, all were Grilse mean weight of 1.71kg (SD 0.49kg, n=53). Comparison with the details of fish captured and read in previous years show that fish >3kg were absent from the 2019 sample.

Figure 4.12: Weight and fish types of Salmon sample returned in 2019 from the Erriff rivers (n=63), by day number.

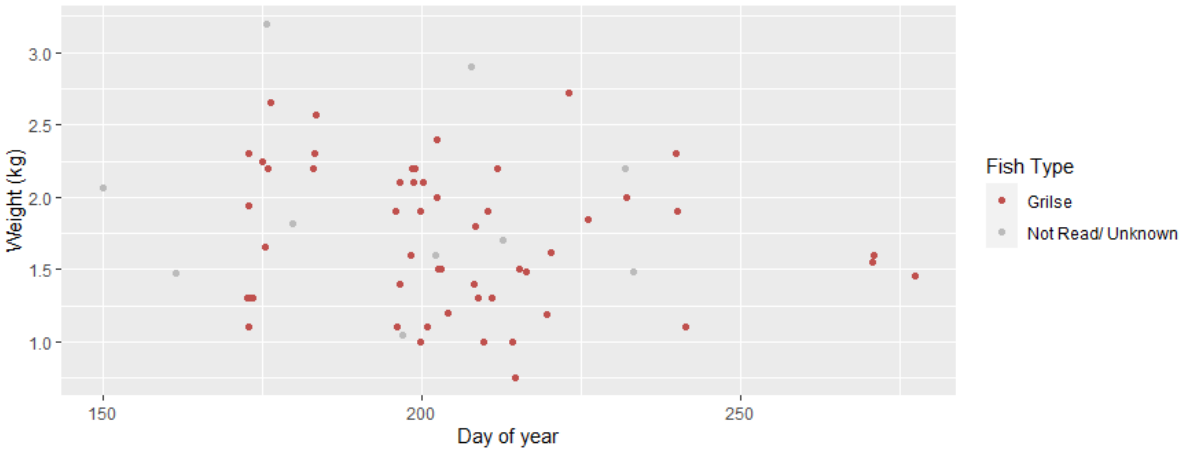
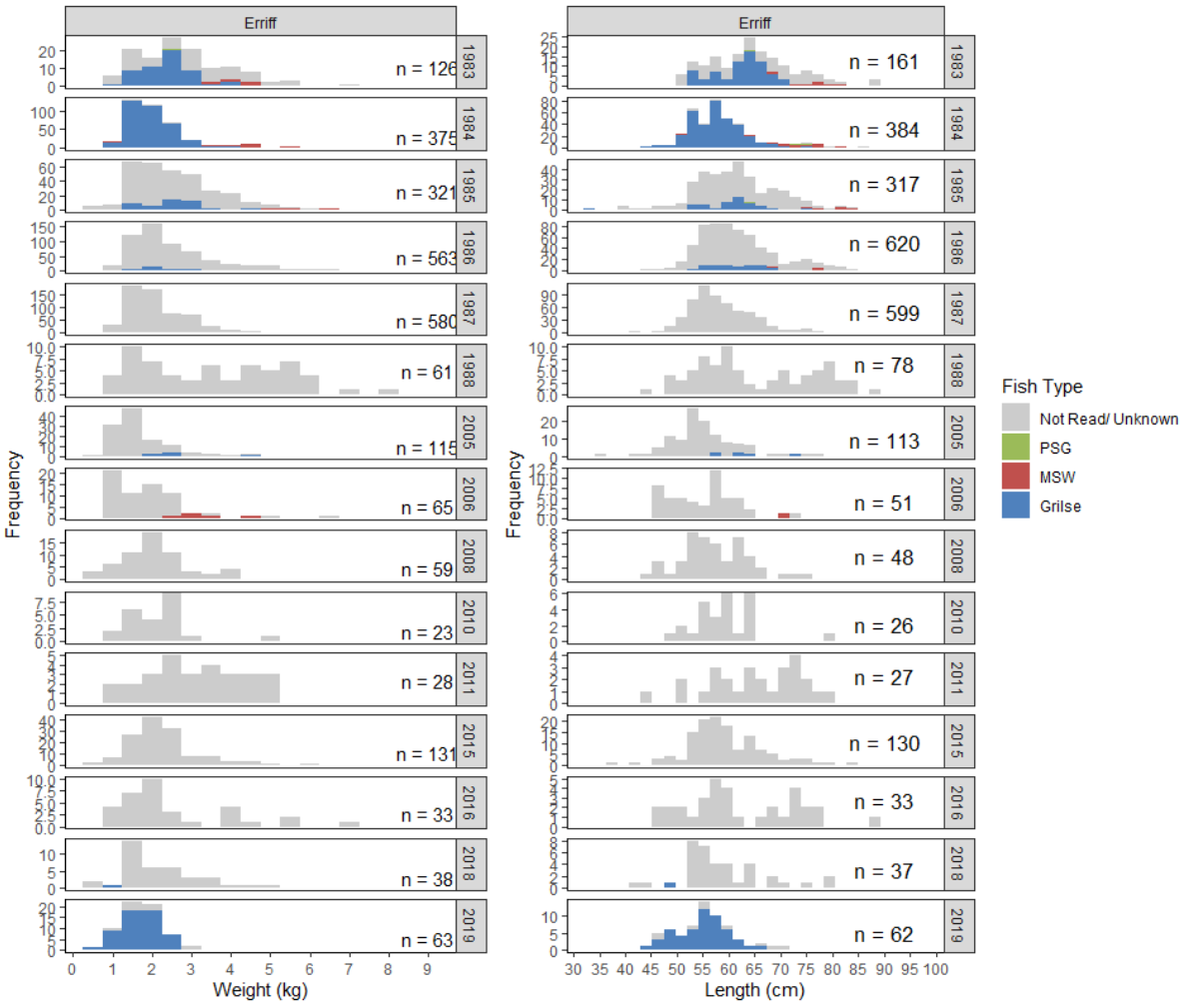
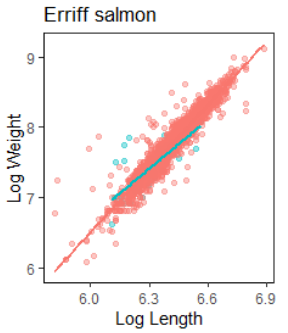


Figure 4.13: Weight and length profiles and length weight relationships of Salmon samples returned from the Erriff in 2019 and previous years.



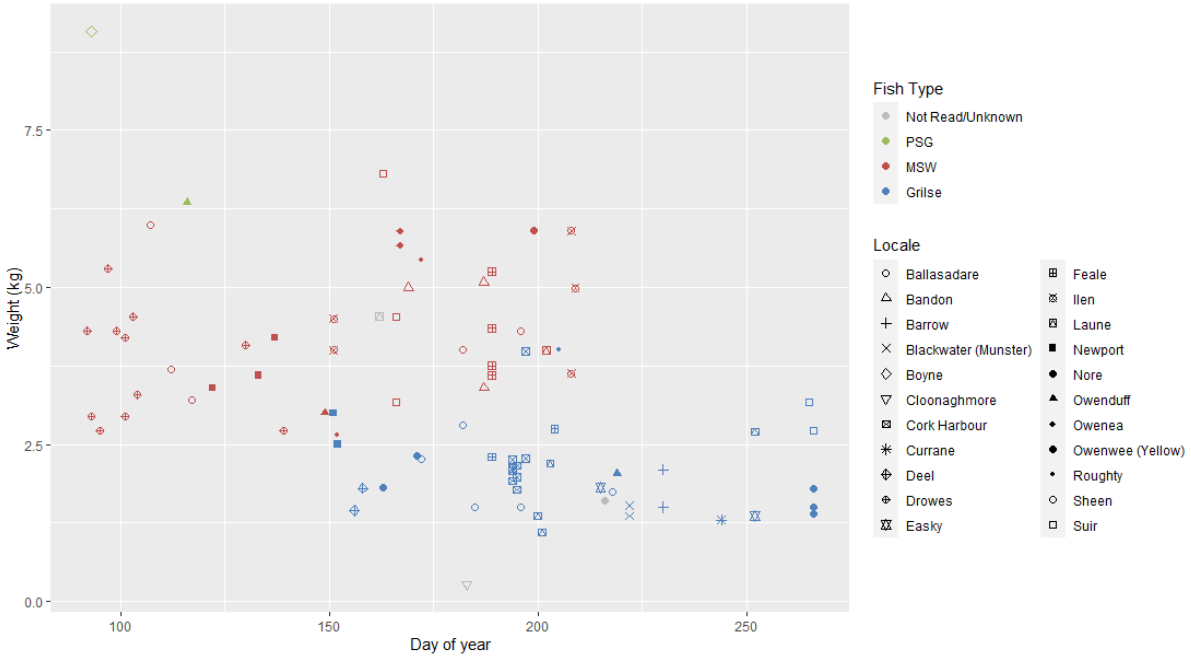


Year	n
Previous Years	2430
2019	62

Other rivers.

In addition to the rivers in described previous sections salmon were also returned from various other catchments in 2019. Numbers were small, ranging from 11 from the Drowes, to 1 each from the Sheen, Croanshagh, Boyne and Currane. It is expected that over time more salmon will be returned from these and other systems; this will contribute greatly to the understanding of salmon habits within the systems and nationally. In 2019 92 scale samples were returned from a range of other rivers, 86 of these were read 42 (49%) were Grilse, 42 (49%) were MSW and 2(1%) were PSG.

Figure 4.14: Weight and fish types of Salmon sample returned in 2019 from a range of rivers (n=89), by day number.



References.

Amiro, P.G. Habitat measurement and population estimation of juvenile Atlantic salmon (Salmon salar), P.81-97. In R.J. Gibson & R.E. Cutting (ed.) Production of juvenile Atlantic salmon (Salmon salar) in natural waters. Can. Spec.Publ.Fish.Aquat.Sci.118

Anon (2009) Report of the Standing Scientific Committee of the National Salmon Commission; The status of Irish Salmon Stocks in 2008 and Precautionary Catch advice for 2009.

Anon (2007) Report of the Standing Scientific Committee of the National Salmon Commission; The Status of Irish Salmon stocks in 2007 and Precautionary Catch advice for 2008.

Cowx IG & Fraser D (2003). Monitoring the Atlantic salmon. Conserving Natura 2000 Rivers Monitoring Series No.7 &, English nature, Peterborough.

Crozier, W.W. & Kennedy, G.J.A. (1994) Application of semi-quantitative electrofishing to juvenile salmonid stock surveys. Journal of Fish Biology (1994) 45, 159-164

Gargan, P., Roche, W., Keane, S. & Stafford, T. 2009. Report on Salmon Monitoring Programmes 2008 (June 2009), Central & Regional Fisheries Board.

McGinnity, P. Gargan, P. Roche, W., Mills, P. & McGarrigle, M. (2003) Quantification of the freshwater salmon habitat asset in Ireland using data interpreted in a G.I.S. platform. Irish Freshwater Ecology & Management Series: No.3, Central fisheries board.

McGinnity P., DeEyto, E., Gilbey, J., Gargan, P., Roche, W., Stafford, T., McGarrigle, M., O'Maoileidigh, N., & Mills, P. (2012). A predictive model for estimating river habitat area using GIS-derived catchment and river variables. Fisheries Management and Ecology, 19 (1) 67-77.

R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/.

Wickham, H. (2009) ggplot2: elegant graphics for data analysis. Springer New York, 2009.

Appendices:

A. Catchment Wide Electrofishing Results.

Data are presented for rivers electro-fished in each River Basin District in 2019. Results of any previous catchment wide electro-fishing surveys undertaken over the 2009-2019 period are also shown (Data from 2007-2019 is presented in Appendix B). Data is presented on the Current CWEF index and the number of surveys considered in the index calculation.

A.1.Neagh Bann International River Basin District.

Summary

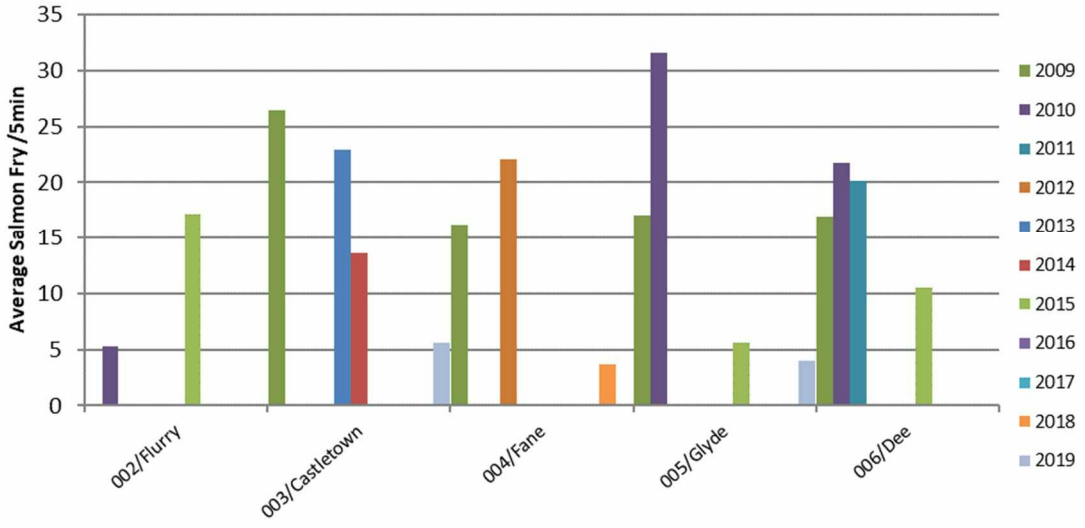
Since 2007, five salmon rivers have been surveyed in the Neagh Bann International River Basin District (NBIRBD) as part of the on-going catchment-wide electrofishing surveys. These are presented in (Table A.1.1). At present one river is meeting the threshold of 17 salmon fry per 5min. Surveys of the Castletown, Glyde and Dee were undertaken in 2019.

Table A.1.1: Catchment-wide Electrofishing data for the Neagh-Bann River Basin District 2009-2019 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C).

	Survey Year											Current Index	# Annual Surveys Considered
Code/River	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
002/Flurry		**5.24**					**17.15**					11.19	2
003/Castletown	**26.41**				**22.96**	**13.59**					**5.58**	<u>17.13</u>	4
004/Fane	**16.17**			**22.09**			8.94*		0.50*	**3.65**		13.97	3
005/Glyde	**17.08**	**31.61**					**5.19**				**4.02**	12.15	5
006/Dee	**16.92**	**21.72**	**20.13**				**10.51**				4.17*	15.57	5

Bold annual figures indicate years included in calculation of current CWEF index.
<u>Underlined</u> index figures indicate those exceeding the 17 salmon fry threshold.
* Incomplete surveys not included in calculation of current index.

Figure A.1: Summary of CWEF results in Neagh Bann international River basin district 2009-2019.



A.1.1. River Castletown

IFI Salmon Catchment #:	3
2019 survey dates:	17/9/2019 – 20/9/19
Mean Salmon Fry/5 min (2019):	5.58 fry/5min.
CWEF Index:	17.13 fry/5min.

Sampling carried out by:
Ronan McCormick
Tom Duffy
Dermot Wynne
Maurice Corrolan
Gerry Wynne

Fish Species Present:

Brown Trout	Salmon
European Eel	Stone Loach
Minnow	3-Spined Stickleback

Figure A.1.1.1: Length distribution of salmon captured in 2019 CWEF survey on the Castletown Catchment.

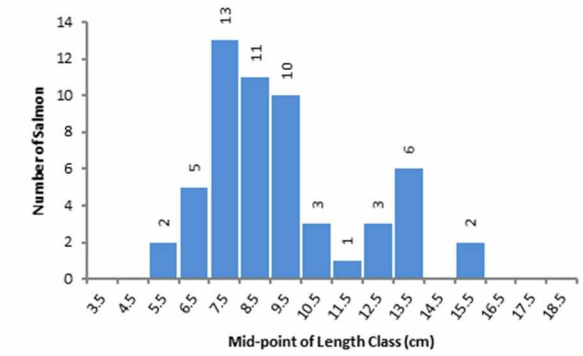
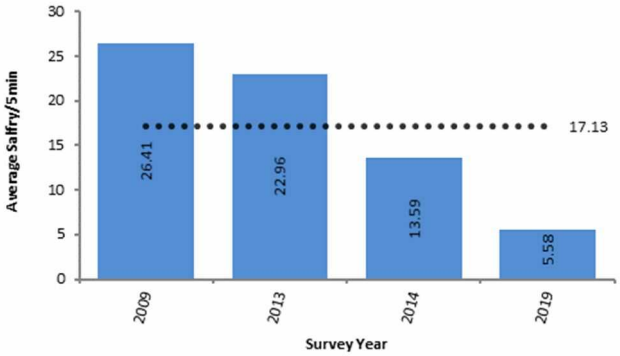


Figure A.1.1.2: Comparison of mean salmon fry/5min for all surveys on the Castletown catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Open							
2007	2008	Open							
2008	2009	Open	8	5				2.37	26.41
2009	2010	Open							
2010	2011	Open							
2011	2012	Open							
2012	2013	C&R	11					2.80	22.96
2013	2014	C&R	11					2.80	13.59
2014	2015	C&R							
2015	2016	C&R							
2016	2017	C&R							
2017	2018	C&R							
2018	2019	C&R	9	1				3.08	5.58

C&R = Catch and Release; * Incomplete Surveys.

The survey this year consisted of 9 sites fished on the 17th of September, Salmon were found at eight sites, the highest numbers were at site 2 where eleven fry were observed. The modal length of 0+ salmon was 7.5 cm. The survey was conducted in stretches within the Republic; coverage was slightly poorer than had been intended as a fish disease issue was noted during the survey at which point the survey ceased.

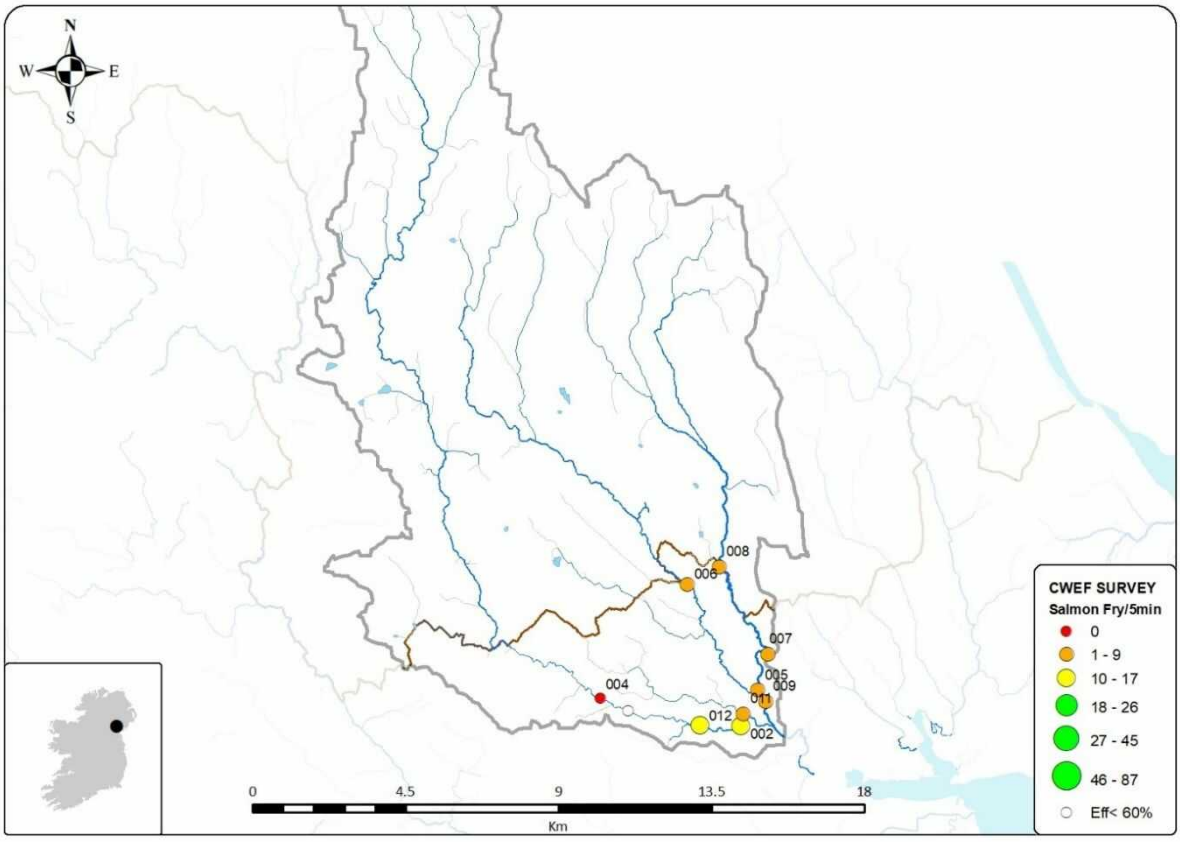
Table A.1.1.2: Site specific results of CWEF on the Castletown catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
002	J 01903 09874	3	1	1	11	Include	1.33	14.67
003	H 98585 10316	2	2	0	1	Eff <60%		
004	H 97781 10681	2	3	1	0	Include	1.00	0.00
005	J 02384 10907	3	2	0	1	Include	0.00	1.00
006	J 00311 14007	2	2	3	1	Include	3.00	1.00
007	J 02689 11965	3	2	4	6	Include	4.80	7.20
008	J 01262 14525	2	1	3	1	Include	3.00	1.00
009	J 02621 10580	2	1	0	6	Include	0.00	8.00
011	J 01960 10216	2	1	4	6	Include	4.80	7.20
012	J 00700 09890	2	2	2	7	Include	2.89	10.11

Conclusion

The Castletown had a salmon abundance of 5.58 salfry/5min in 2019. Taking the four most recent complete surveys into account this results in a cumulative average of 17.13 salmon fry/5min which is above the 17 salmon fry threshold. The result is the lowest of any complete CWEF survey, and considerably lower than the best year 2009 when an abundance of 26.41 salfry per 5 min was observed. Over the course the four CWEF surveys that have been undertaken on this catchment there has been a clear trend downwards in salmon fry abundance.

Map A.1.1.1: Showing locations of 2019 survey sites on Castletown River.



A.1.2. River Glyde

IFI Salmon Catchment #: 5
2019 survey dates: 10/9/2019- 20/9/2019
Mean Salmon Fry/5 min (2019): 4.02 fry/5min.
CWEF Index: 12.08 fry/5min.

Sampling carried out by:
Ronan McCormick
Tom Duffy
Dermot Wynne
Maurice Corrolan
Gerry Wynne

Fish Species Present:

Brown Trout	Roach
European Eel	Salmon
Minnow	Stone Loach
Perch	

Figure A.1.2.1: Length distribution of salmon captured in 2019 CWEF survey on the Glyde Catchment.

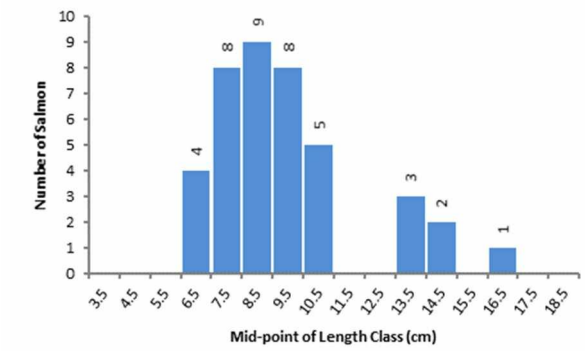
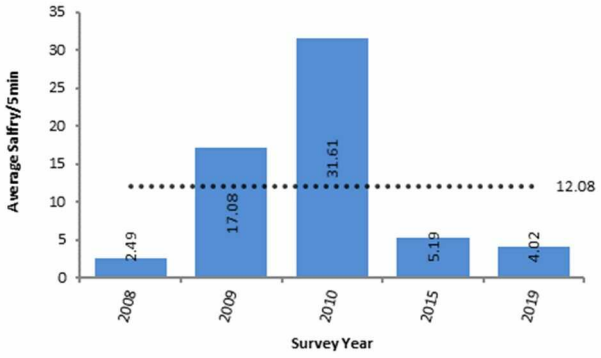


Figure A.1.2.2: Comparison of mean salmon fry/5min for all surveys on the Glyde catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	C&R							
2007	2008	C&R	16					10.33	2.49
2008	2009	C&R	14	1				11.01	17.08
2009	2010	C&R	14					11.80	31.61
2010	2011	C&R							
2011	2012	C&R							
2012	2013	C&R							
2013	2014	C&R							
2014	2015	Open	15					11.01	5.19
2015	2016	Open							
2016	2017	Open							
2017	2018	C&R							
2018	2019	C&R	10					16.52	4.02

C&R = Catch and Release; * Incomplete Surveys.

The survey was undertaken between the 10th and the 20th of September, 10 sites were surveyed all of which were included in the analysis. Salmon were found at six sites; the highest numbers were at site 19 where 11 fry were observed. The mean catch of included sites was 4.02 salmon fry/5min. The modal length category of 0+ fry caught was 8.5cm.

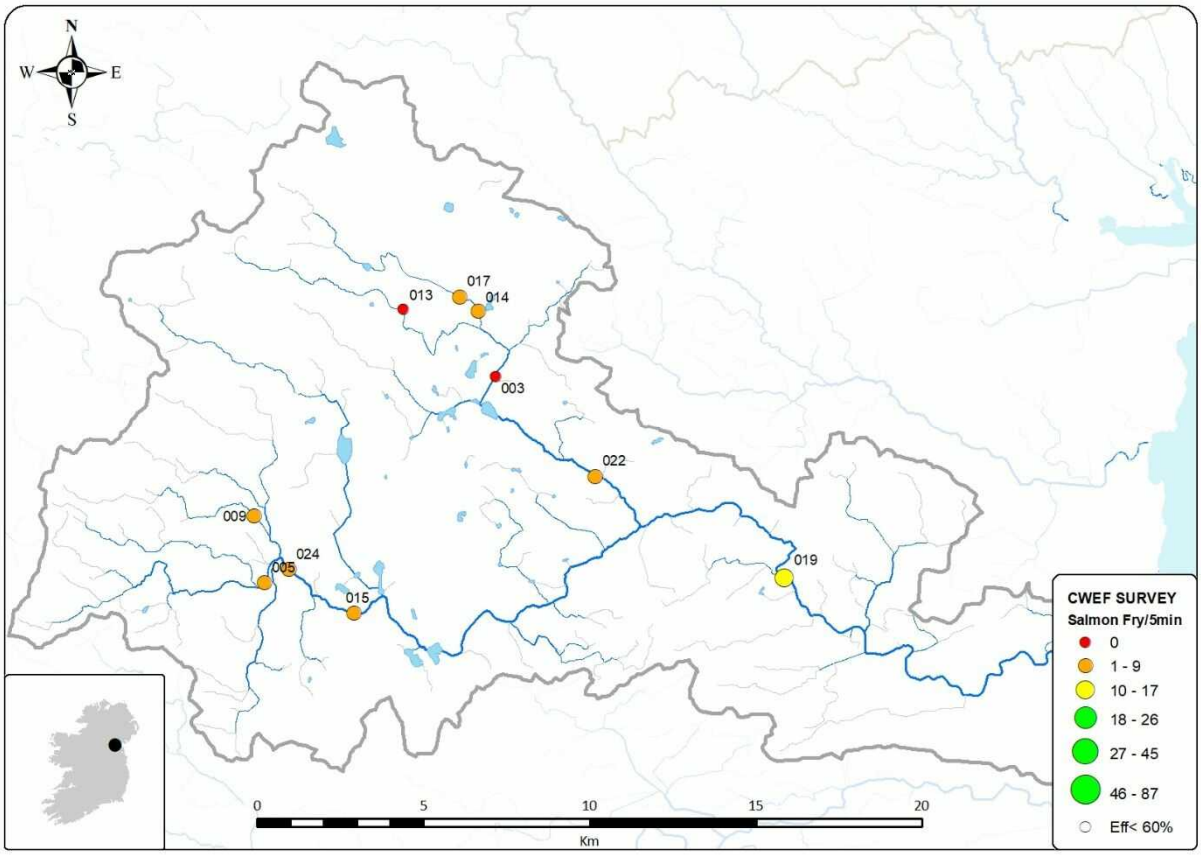
Table A.1.2.2: Site specific results of CWEF on the Glyde catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
003	H 86832 03758	3	1	0	0	Include	0.00	0.00
005	N 79877 97535	3	1	11	5	Include	13.75	6.25
009	N 79575 99538	2	2	5	1	Include	5.00	1.00
013	H 84067 05783	2	1	1	0	Include	1.00	0.00
014	H 86315 05731	2	2	7	3	Include	7.70	3.30
015	N 82565 96616	4	1	1	1	Include	1.00	1.00
017	H 85761 06148	2	1	10	3	Include	12.31	3.69
019	N 95526 97702	5	2	0	11	Include	0.00	13.00
022	H 89825 00728	4	1	0	4	Include	0.00	4.00
024	N 80604 97928	4	2	0	6	Include	0.00	8.00

Conclusion

The Glyde had a salmon abundance of 4.02 salfry/5min in 2019. Taking the five most recent complete surveys into account this results in a cumulative average of 12.08 salmon fry/5min which is below the 17 salmon fry threshold. The 2019 result is considerably lower than the best year 2010 when an abundance of 31.61 salmon fry per 5 min was observed.

Map A.1.2.1: Showing locations of 2019 survey sites on Glyde River.



A.1.3. River Dee

IFI Salmon Catchment #:	6
2019 survey dates:	2/9/2019- 20/9/2019
Mean Salmon Fry/5 min (2019):	15.57 fry/5min.
CWEF Index:	4.17* fry/5min.

Sampling carried out by:
Ronan McCormick
Tom Duffy
Dermot Wynne
Maurice Corrolan
Gerry Wynne

Fish Species Present:

Brown Trout	Roach
European Eel	Salmon
Gudgeon	Stone Loach
Minnow	3-Spined Stickleback

Figure A.1.3.1: Length distribution of salmon captured in 2019 CWEF survey on the Dee Catchment.

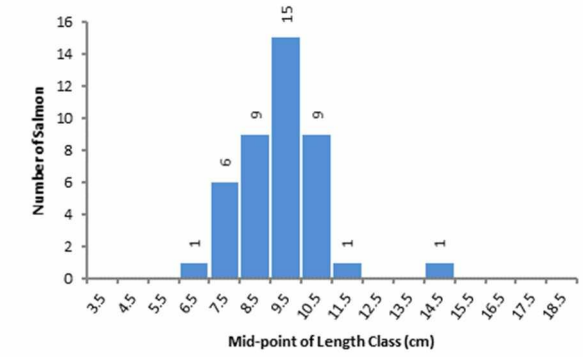
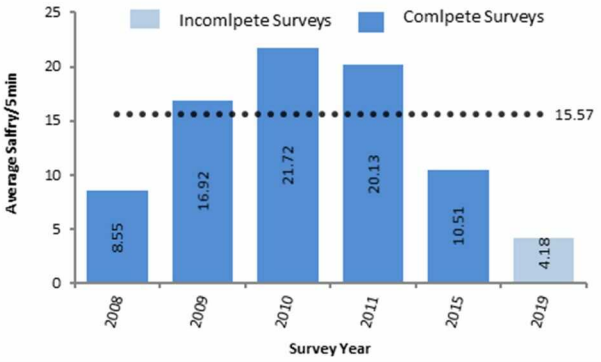


Figure A.1.3.2: Comparison of mean salmon fry/5min for all surveys on the Dee catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	Closed	29					6.92	8.55
2008	2009	Closed	18	1				10.57	16.92
2009	2010	Closed	20					10.04	21.72
2010	2011	Closed	20					10.04	20.13
2011	2012	Closed							
2012	2013	C&R							
2013	2014	C&R							
2014	2015	C&R	20					10.04	10.51
2015	2016	C&R							
2016	2017	C&R							
2017	2018	C&R							
2018	2019	C&R	13					15.45	4.18

C&R = Catch and Release; * Incomplete Surveys.

The survey was undertaken between the 2nd and the 20th of September, 13 sites were surveyed. Salmon were found at five sites; the highest numbers were at site 1 where 16 fry were observed. The mean catch of included sites was 4.17 salmon fry/5min. The modal length category of fry caught was 9.5cm. Rising water levels throughout the permitted sampling period restricted the surveying on much of the main channel where most of the spawning would be expected to occur, for this reason the survey was not considered complete. Comparison of site-specific results this year compared with previous results indicates poor salmon fry abundance this year.

Table A.1.3.2: Site specific results of CWEF on the Dee catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	O 06606 91181	5	2	1	16	Include	1.18	18.82
005	N 78766 91409	3	2	0	0	Include	0.00	0.00
009	O 05887 90322	4	2	1	13	Include	1.29	16.71
010	O 05892 89330	4	1	3	9	Include	4.00	12.00
011	O 05674 88746	3	1	0	0	Include	0.00	0.00
015	N 93166 87620	3	2	3	0	Include	5.00	0.00
020	N 88603 85711	3	1	3	2	Include	4.20	2.80
021	N 87836 84452	3	2	0	0	Include	0.00	0.00
022	N 87868 81359	3	2	14	0	Include	19.00	0.00
024	N 87948 80871	3	2	4	0	Include	6.00	0.00
027	N 79072 88974	3	2	1	0	Include	1.00	0.00
028	N 77537 89981	3	3	0	0	Include	0.00	0.00
033	N 86932 85582	4	2	2	4	Include	2.00	4.00

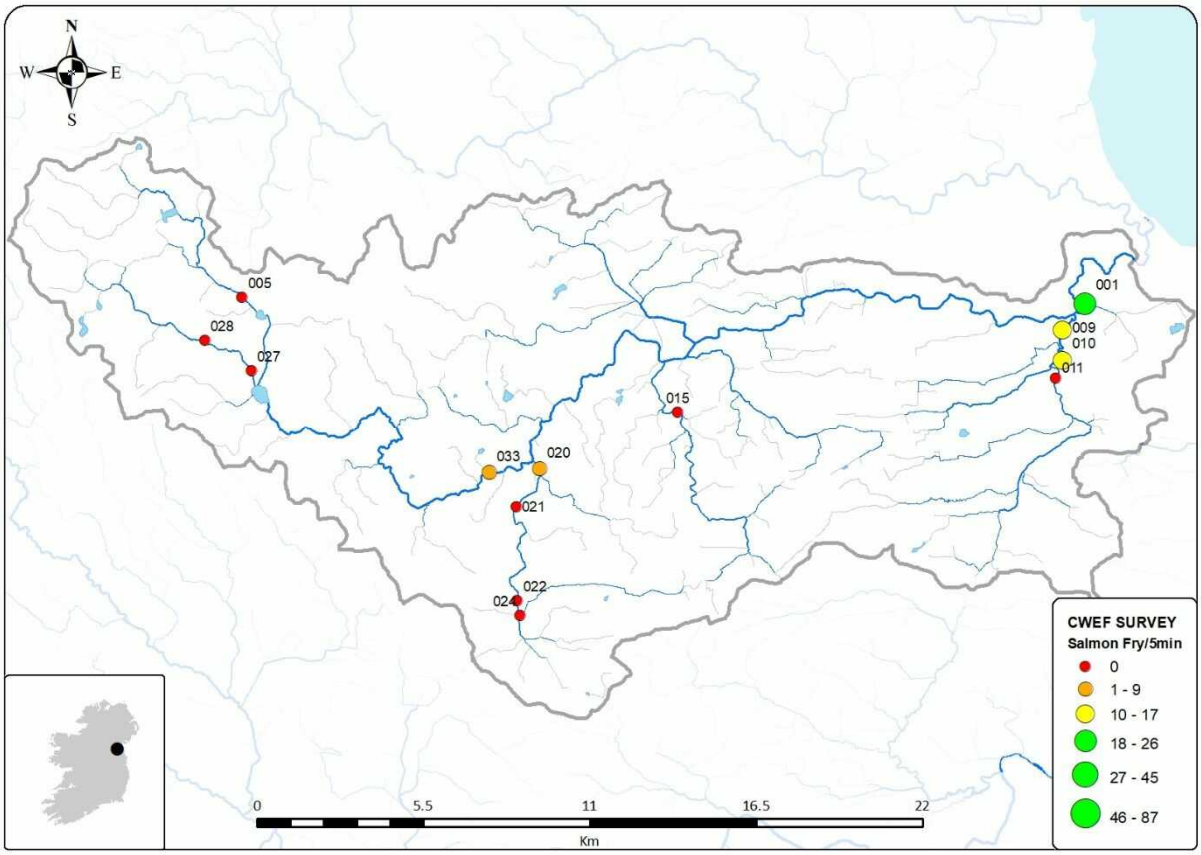
T**able A.1.3.3: Comparison of Salmon fry/5min results on the Dee river in 2019 with previous results.**

	Survey Year					
Site Number	2008	2009	2010	2011	2015	2019
001	10	26	58	38.17	17	18.82
005	20	0	9	18.94	0	0
009	39.95		23.54	17.25	10	16.71
010	14.14	12.76	14.67	1	6	12
011	7.48	4.16	27.87	19.07	5.33	0
015	24.13	0	6.86	2.8	2.57	0
020	12	22.74	33.93	21.56	24.76	2.8
021	4	10.29	10	21.65	6.36	0
022	1	27.02	18.9	4	19.25	0
024	4					0
027	13.75	11.56	20.15	6	13.03	0
028	19.8	7.44	1	8.5	6.72	0
033		20.71	19.09	40.25	9.92	4
Site Average	14.19	12.97	20.25	16.60	10.08	4.18

Conclusion

The CWEF survey on the Dee was incomplete, but the sites that *were* surveyed indicated poor Salmon fry abundance. The cumulative CWEF index remains at 15.57 salmon fry/5min which is below the 17 salmon fry threshold.

Map A.1.3.1: Showing locations of 2019 survey sites on Dee River.



A.2.Eastern River Basin District.

Summary

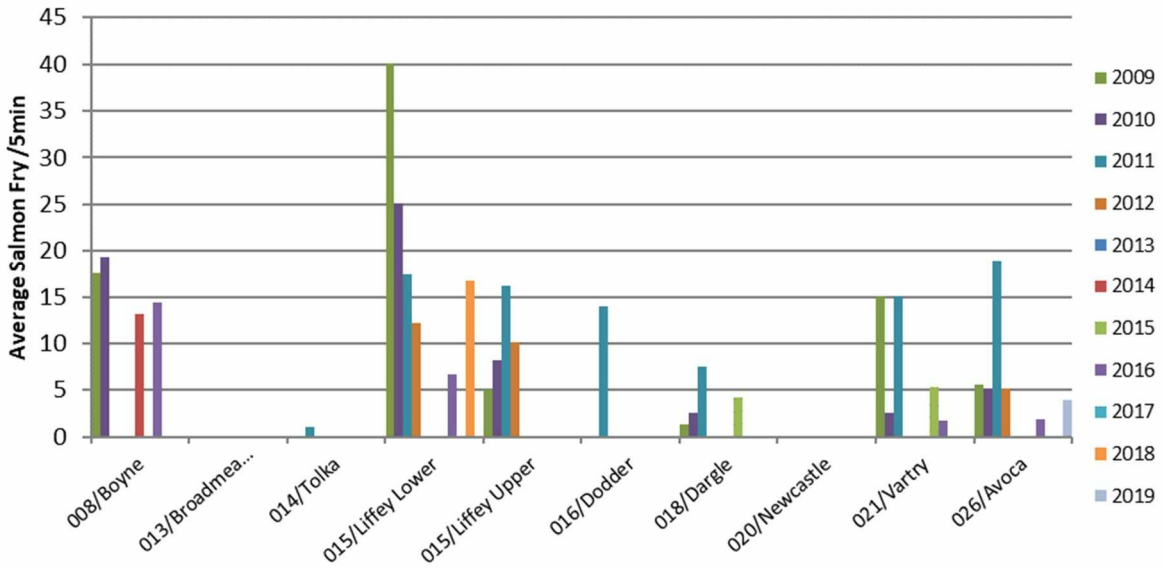
Since 2007, ten salmon rivers have been surveyed in the Eastern River Basin District (ERBD) as part of the on-going catchment-wide electrofishing surveys. These are presented in (Table A.2.1). At present only the Boyne is meeting the threshold of 17 salmon fry per 5min. CWEF surveys were undertaken in the Avoca and Dargle catchments in this region in 2019.

Table A.2.1: Catchment-wide Electrofishing data for the Eastern River Basin District 2008-2018 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C).

	Survey Year											Current	# Annual Surveys
Code/River	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Index	Considered
008/Boyne	**17.54**	**19.38**				**13.21**		**14.37**				17.28	5
013/Broadmeadow		**0.00**										0.00	1
014/Tolka			**1.08**	**0.00**						**0.00**		0.36	3
015/Liffey Lower	40.12	**25.16**	**17.47**	**12.12**				**6.75**		**16.69**		15.64	5
015/Liffey Upper	**5.11**	**8.15**	**16.20**	**10.13**				2.63*		5.33*		10.51	5
016/Dodder			**13.93**									13.93	1
018/Dargle	**1.40**	**2.53**	**7.52**				**4.19**				**1.03**	3.33	5
020/Newcastle										**0.00**		0.00	1
021/Vartry	**15.11**	**2.54**	**15.07**				**5.34**	**1.75**				7.96	5
026/Avoca	5.56	**5.20**	**18.88**	**5.15**				**1.89**		8.37*	**3.95**	7.01	5

Bold annual figures indicate years included in calculation of current CWEF index.
Underlined index figures indicate those exceeding the 17 salmon fry threshold.
* Incomplete surveys not included in calculation of current index.

Figure A.2.1: Summary of CWEF results in Eastern River basin district 2009-2019.

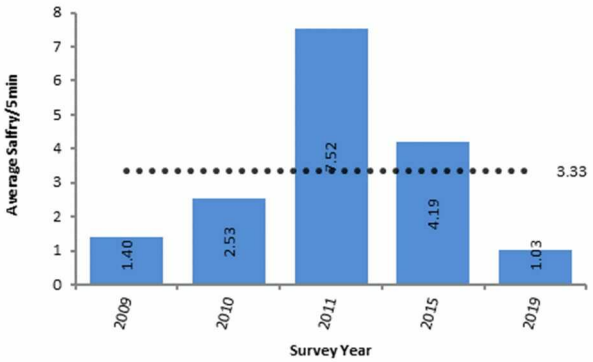


A.2.1. River Dargle

IFI Salmon Catchment #: 18
2019 survey dates: 30/8/19- 11/09/19
Mean Salmon Fry/5 min (2019): 1.03 fry/5min.
CWEF Index: 3.33 fry/5min.

Sampling carried out by:
Alan Carter
Carl Owens
Gary Condren

Figure A.2.1.1: Comparison of mean salmon fry/5min for all surveys on the Dargle.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	Closed					2	38.69	
2008	2009	Closed	5	1				12.90	1.40
2009	2010	Closed	17	1				4.30	2.53
2010	2011	Closed	16					4.84	7.52
2011	2012	Closed							
2012	2013	Closed							
2013	2014	Closed							
2014	2015	Closed	17					4.55	4.19
2015	2016	Closed							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	14					5.53	1.03

C&R = Catch and Release; * Incomplete Surveys.

This, the fifth CWEF survey of this catchment in the 2007 to 2019 period, was carried out in August and September 2019. The survey comprised 14 sites, all of which of which were included in the analysis. Salmon fry were present at 4 sites the max being 7 fry at site 8.

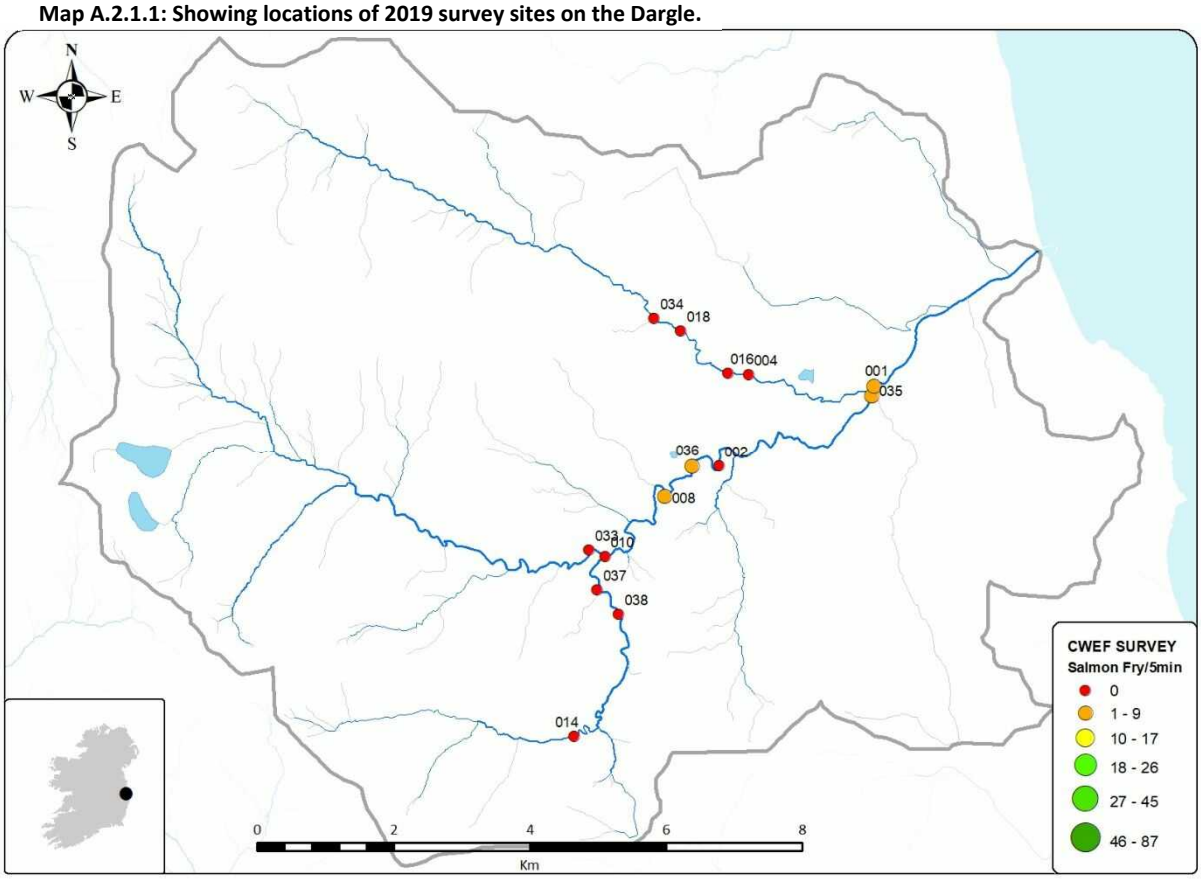
Conclusion

The Dargle had a salmon abundance of 1.03 salfry/5min in 2019. Taking the five most recent complete surveys into account this results in a cumulative average of 3.33 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.2.1.2: Site specific results of CWEF on the Dargle catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	O 24381 17262	5	2	8	13	Include	8.76	14.24
002	O 22116 16088	5	1	13	19	Include	14.22	20.78
004	O 22552 17436	3	3	5	12	Include	5.59	13.41
005	O 21781 17916	3	2	14	0	Include	16.00	0.00
006	O 22964 16532	5	2	3	10	Include	3.69	12.31
010	O 20448 14755	4	1	18	2	Include	20.70	2.30
012	O 20756 13295	4	2	13	4	Include	15.29	4.71
013	O 20601 12850	4	2	18	6	Include	20.25	6.75
014	O 20000 12124	3	1	5	0	Include	5.00	0.00
016	O 22256 17459	3	2	25	0	Include	25.00	0.00
017	O 20350 14824	4	1	6	3	Include	6.67	3.33
018	O 21562 18079	3	3	8	0	Include	8.00	0.00
019	O 23529 17082	3	1	6	12	Include	6.33	12.67
020	O 25635 18507	5	1	0	8	Include	0.00	11.00
021	O 19196 14605	4	3	6	1	Include	8.57	1.43
028	??	0	1	4	15	Include	4.63	17.37

Map A.2.1.1: Showing locations of 2019 survey sites on the Dargle.

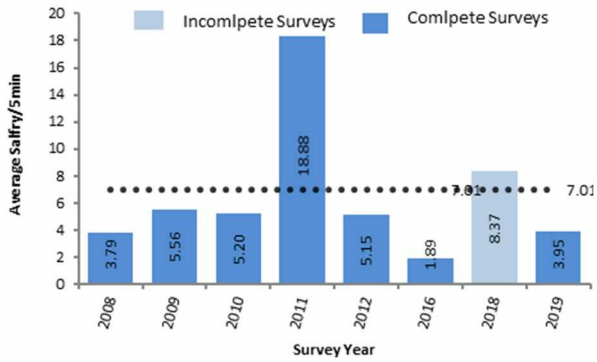


A.2.2. River Avoca

IFI Salmon Catchment #: 26
2019 survey dates: 3/9/2019 – 11/9/19
Mean Salmon Fry/5 min (2019): 3.95 fry/5min.
CWEF Index: 7.01 fry/5min.

Sampling carried out by:
Alan Carter, Carl Owens, Claire Daly, Gary Condren, Jarlaith Gallagher and Joe Delaney.

Figure A.2.2.1: Comparison of mean salmon fry/5min for all surveys on the Avoca catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	Closed	16	5				16.41	3.79
2008	2009	Closed	29	2				11.12	5.56
2009	2010	Closed	24	2				13.25	5.20
2010	2011	Closed	65				16	4.25	18.88
2011	2012	Closed	23	6		1		11.49	5.15
2012	2013	Closed							
2013	2014	Closed							
2014	2015	Closed							
2015	2016	Closed	45					7.66	1.89
2016	2017	Closed							
2017	2018	Closed	15					22.98	8.37
2018	2019	Closed	38					9.07	3.95

C&R = Catch and Release; * Incomplete Surveys.

This, the Eighth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during September 2019. The survey comprised 38 sites, all of which were included in the analysis. Salmon fry were present at 24 sites. The maximum fry catch was 22 salmon at site 13. The mean catch of included sites was 3.95 salmon fry/5min.

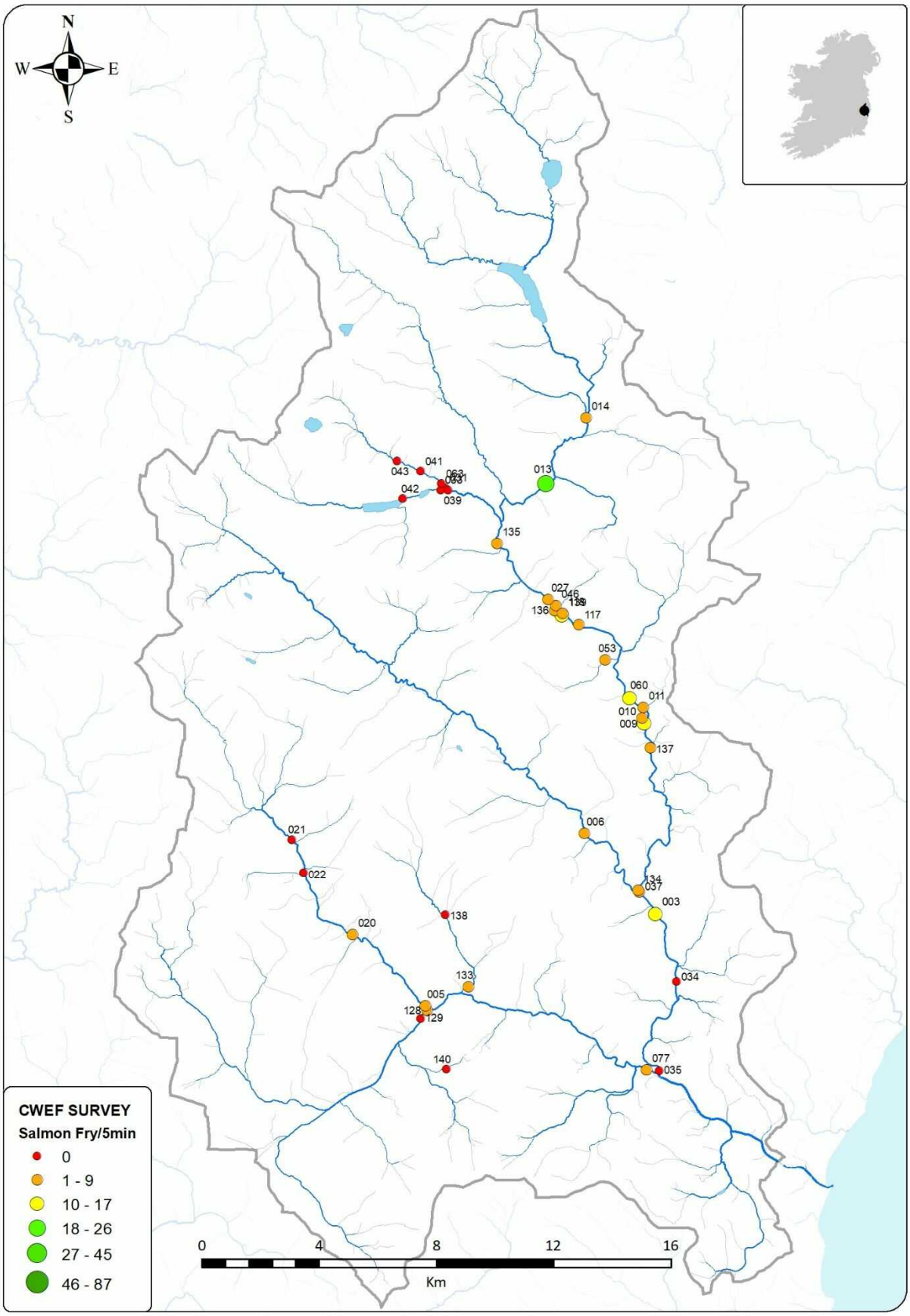
Conclusion

Overall, 2019 had a mean catch of 3.95 salmon fry/5min, taking the previous five most recent surveys into account this results in a cumulative average of 7.01 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.2.2.2: Site specific results of CWEF on the Avoca catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
003	T 19647 82194	5	1	6	17	Include	6.00	17.00
005	T 11797 79078	4	1	10	5	Include	10.00	5.00
006	T 17211 84992	4	2	6	1	Include	6.00	1.00
009	T 19258 88726	5	1	2	11	Include	2.00	11.00
010	T 19174 88916	5	1	2	8	Include	2.00	8.00
011	T 19216 89275	5	1	0	8	Include	0.00	8.00
013	T 15892 96911	4	1	1	22	Include	1.00	22.00
014	T 17275 99199	4	2	2	9	Include	2.00	9.00
020	T 09303 81516	4	3	1	1	Include	1.00	1.00
021	T 07256 84765	4	1	7	0	Include	7.00	0.00
022	T 07657 83637	4	3	3	0	Include	3.00	0.00
027	T 15983 92960	5	1	3	5	Include	3.00	5.00
031	T 12481 96767	3	2	2	0	Include	3.00	0.00
033	T 12319 96698	3	3	2	0	Include	2.00	0.00
034	T 20367 79914	5	1	0	0	Include	0.00	0.00
035	T 19780 76874	5	3	1	0	Include	1.00	0.00
037	T 19080 82962	5	1	6	3	Include	6.00	3.00
039	T 12571 96693	4	2	3	0	Include	3.00	0.00
041	T 11649 97334	3	1	4	0	Include	4.00	0.00
042	T 11023 96400	3	1	7	0	Include	7.00	0.00
043	T 10839 97690	3	2	3	0	Include	3.00	0.00
046	T 16251 92764	5	1	3	6	Include	3.00	6.00
053	T 17930 90911	2	2	2	2	Include	2.00	2.00
060	T 18757 89589	5	2	0	11	Include	0.00	11.00
063	T 12349 96911	3	1	6	0	Include	6.00	0.00
077	T 19329 76908	5	1	4	1	Include	4.00	1.00
117	T 17024 92099	5	1	1	1	Include	1.00	1.00
118	T 16465 92486	5	1	6	4	Include	6.00	4.00
128	T 11844 78928	4	2	1	9	Include	1.00	9.00
129	T 11640 78637	4	3	4	0	Include	4.00	0.00
133	T 13259 79742	3	1	31	1	Include	31.00	1.00
134	T 19043 83020	5	1	6	1	Include	6.00	1.00
135	T 14237 94871	5	2	0	4	Include	0.00	4.00
136	T 16205 92594	5	1	0	7	Include	0.00	7.00
137	T 19465 87901	5	1	3	2	Include	3.00	2.00
138	T 12482 82173	2	1	28	0	Include	28.00	0.00
139	T 16453 92415	5	1	0	11	Include	0.00	11.00
140	T 12520 76920?	0	2	3	0	Include	3.00	0.00

Map A.2.2.1: Showing the locations and results of 2019 CWEF surveys on the Avoca River.



A.3.South Eastern River Basin District.

Summary

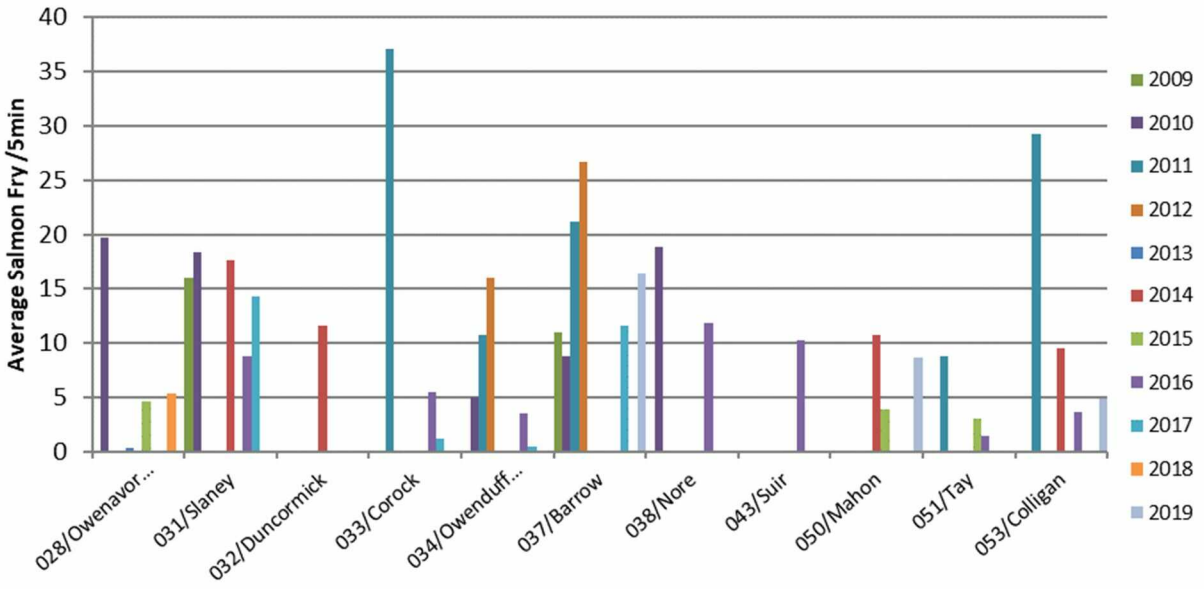
Since 2007, ten salmon rivers have been surveyed in the South Eastern River Basin District (SERBD) as part of the on-going catchment-wide electrofishing surveys. These are presented in (Table A.3). At present no rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2019 a CWEF surveys were undertaken on the Corock, Barrow and Mahon, sub-catchment surveys were undertaken on the Bann and Urrin tributaries on the Slaney.

Table A.3.1: Catchment-wide Electrofishing data for the South Eastern River Basin District 2008-2018 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C).

	Survey Year											Current Index	# Annual Surveys Considered
Code/River	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
028/Owenavorragh		**19.76**			**0.33**		**4.61**			**5.37**		7.52	4
031/Slaney	**15.94**	**18.42**				**17.68**		**8.70**	**14.30**		3.45*	15.01	5
032/Duncormick						**11.54**						11.54	1
033/Corock			**37.11**					**5.47**	**1.23**		6.47*	14.60	3
034/Owenduff Wx.		**4.97**	**10.65**	**15.91**				**3.47**	**0.40**			7.08	5
037/Barrow	**10.93**	**8.71**	**21.23**	**26.72**				8.93*	**11.54**		16.50	16.94	5
038/Nore		**18.83**						**11.77**				15.30	2
043/Suir								**10.27**				10.27	1
050/Mahon						**10.72**	**3.92**				**8.60**	6.34	4
051/Tay			**8.75**				**3.07**	**1.40**				4.41	3

Bold annual figures indicate years included in calculation of current CWEF index.
Underlined index figures indicate those exceeding the 17 salmon fry threshold.
* Incomplete surveys not included in calculation of current index.

Figure A.3.1: Summary of CWEF results in South Eastern River basin district 2009-2019.



A.3.1. River Slaney - Bann and Urrin only.

IFI Salmon Catchment #:	28
2019 survey dates:	27/8/19 to 28/8/19
Mean Salmon Fry/5 min (2019):	Bann: 4.65 fry/5min.
	Urrin: 0.71 fry/5min.
CWEF Index:	15.01 fry/5min.

Sampling carried out by:
Glen McCrave
Michael Farnan
Stephen McKenna

Fish Species Present:

Brown Trout	Salmon
European Eel	Sea Trout
Gudgeon	Stone Loach
Lamprey sp.	3-Spined Stickleback
Minnow	

Figure A.3.1.1: Length distribution of salmon captured in 2019 CWEF survey on the Bann River.

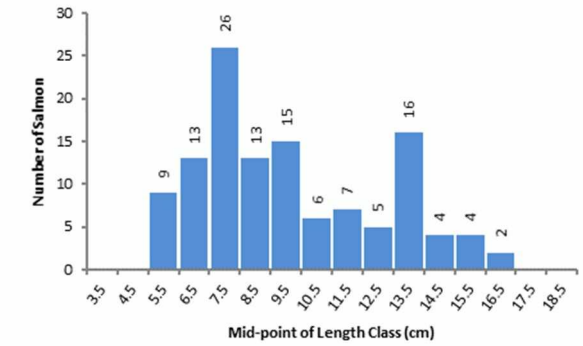


Figure A.3.1.2: Length distribution of Brown Trout captured in 2019 CWEF survey on the Bann River.

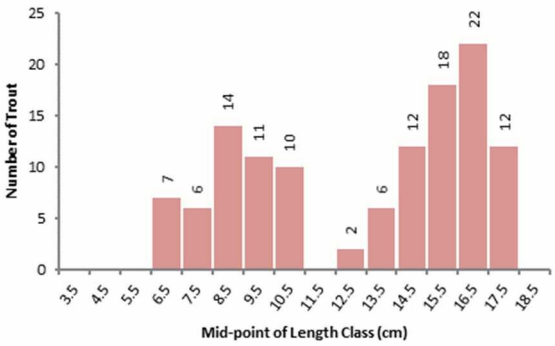


Figure A.3.1.3: Length distribution of salmon captured in 2019 CWEF survey on the Urrin River.

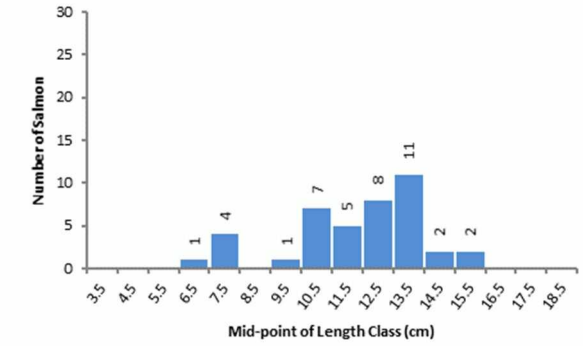
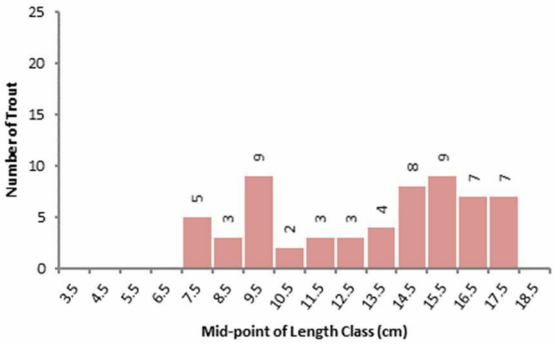


Figure A.3.1.4: Length distribution of Brown Trout captured in 2019 CWEF survey on the Urrin River.



Two discrete surveys were undertaken on the Bann and Urrin Rivers to the southern end of the Slaney catchment. Moderate fry abundance was observed on the Bann. Low abundance was observed on the Urrin.

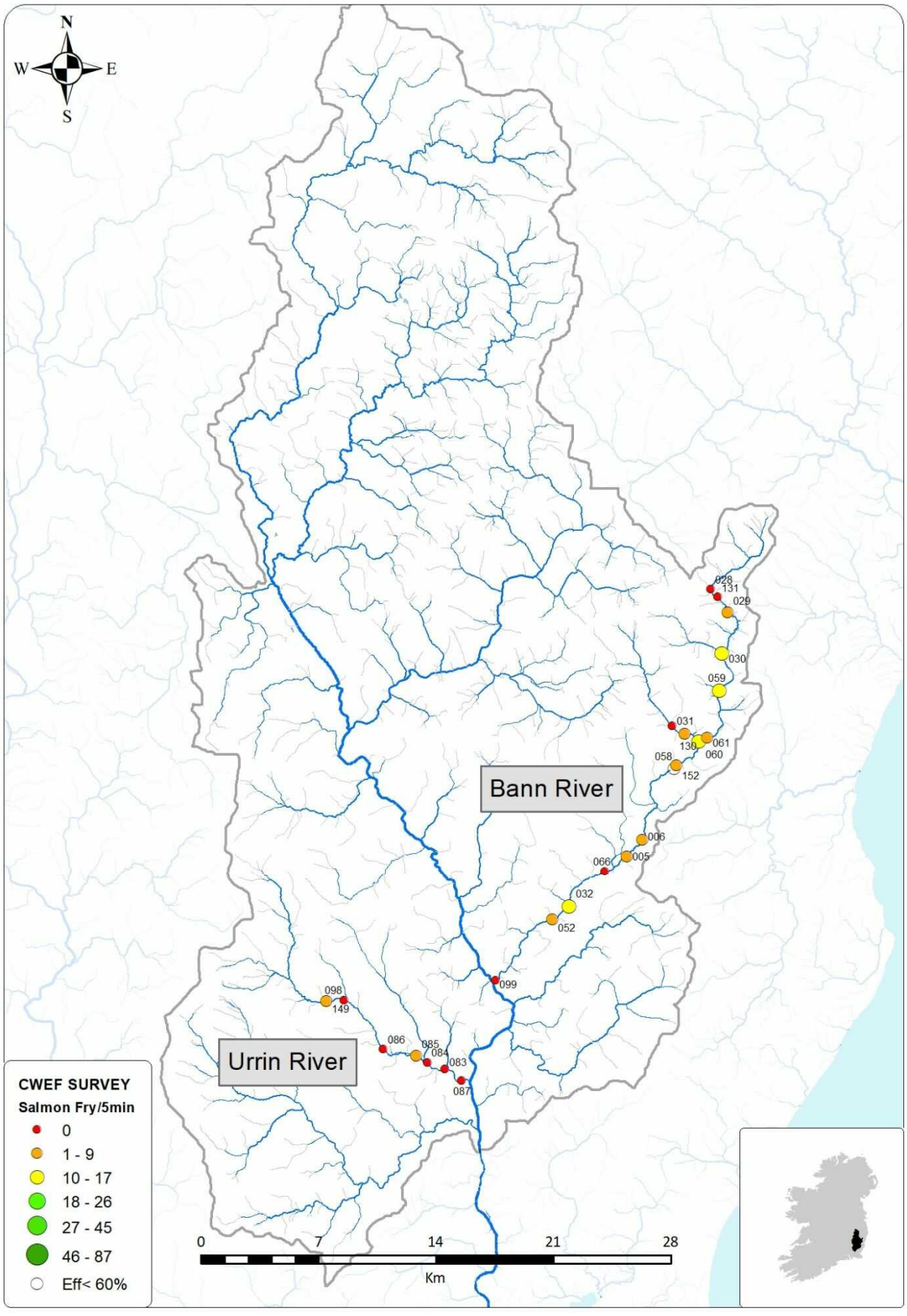
Conclusion

Moderate fry abundance was observed on the Bann. Low abundance was observed on the Urrin.

Table A.3.1.1: Site specific results of CWEF on the Bann and Urrin rivers on the Slaney catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
Bann								
005	T 06529 52250	4	1	1	3	Include	1.00	3.00
006	T 07445 53249	4	2	0	2	Include	0.00	3.00
028	T 11567 68172	3	1	5	0	Include	5.00	0.00
029	T 12564 66811	3	1	2	5	Include	2.00	5.00
030	T 12207 64339	3	1	4	8	Include	5.00	10.00
031	T 09279 60004	3	3	0	0	Include	0.00	0.00
032	T 03092 49217	4	1	0	8	Include	0.00	11.00
052	T 02119 48454	4	2	1	1	Include	1.50	1.50
058	T 09362 57490	4	2	1	1	Eff <60%		
059	T 12057 62107	4	1	2	8	Include	2.60	10.40
060	T 10829 59100	3	1	4	14	Include	4.44	15.56
061	T 11342 59329	4	1	0	6	Include	0.00	8.00
066	T 05229 51330	4	2	0	0	Include	0.00	0.00
099	S 98729 44805	4	2	1	0	Include	1.00	0.00
130	T 10010 59548	3	2	3	1	Include	4.50	1.50
131	T 11969 67721	3	2	10	0	Include	15.00	0.00
152	T 09477 57670	4	1	4	4	Include	5.50	5.50
						Average:	2.97	4.65
Urrin								
083	S 95723 39513	4	2	0	0	Include	0.00	0.00
084	S 94661 39925	4	1	0	0	Include	0.00	0.00
085	S 93979 40349	4	1	1	1	Include	1.00	1.00
086	S 92038 40710	4	2	2	0	Include	5.00	0.00
087	S 96709 38823	4	1	0	0	Include	0.00	0.00
098	S 89704 43626	4	1	8	0	Include	8.00	0.00
149	S 88605 43569	4	1	6	4	Include	6.00	4.00
						Average:	2.86	0.71

Map A.3.1.1: Showing the locations and results of 2019 CWEF surveys on Bann and Urrin tributaries on the Slaney



A.3.2. River Barrow

IFI Salmon Catchment #:	37
2019 survey dates:	29/7/19 to 21/8/19
Mean Salmon Fry/5 min (2019):	16.50 fry/5min.
CWEF Index:	16.94 fry/5min.

Sampling carried out by:
Noel Power
Tony Byrne

Fish Species Present:

Brown Trout	Pike
Crayfish	Roach
Dace	Rudd
European Eel	Salmon
Lamprey sp.	Stone Loach
Minnow	3-Spined Stickleback

Figure A.3.2.1: Length distribution of salmon captured in 2019 CWEF survey on the Barrow Catchment.

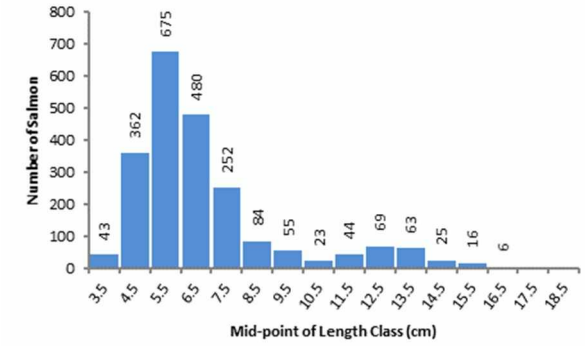
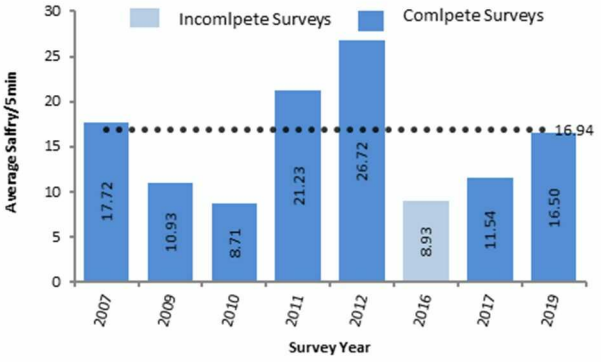


Figure A.3.2.2: Comparison of mean salmon fry/5min for all surveys on the Barrow catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Closed	88		3	5		11.41	17.72
2007	2008	Closed							
2008	2009	Closed	66	12		6		13.04	10.93
2009	2010	Closed	76	1	1	5		13.19	8.71
2010	2011	Closed	58	22		4		13.04	21.23
2011	2012	Closed	70	12		23		10.43	26.72
2012	2013	Closed							
2013	2014	Closed							
2014	2015	C&R							
2015	2016	C&R	4					273.78	8.93*
2016	2017	C&R	109	4		16		8.49	11.54
2017	2018	C&R							
2018	2019	C&R	117	1	1	5		8.83	16.50

C&R = Catch and Release; * Incomplete Surveys.

This, the sixth CWEF survey of this catchment, was carried out during August and September 2019. The survey comprised 124 sites, 117 of which were included in the analysis. Salmon fry were present at 90 sites. The maximum fry catch was 111 salmon at site 8. The mean catch of included sites was 16.50 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

Table A.3.2.2: Site specific results of CWEF on the Barrow catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
004	N 38563 14734	3	1	2	42	Include	2.27	47.73
006	N 36634 13219	3	1	2	40	Include	2.19	43.81
007	N 36087 13008	3	1	2	48	Include	2.24	53.76
008	N 34729 11076	3	1	7	111	Include	7.42	117.58
009	N 35145 10515	3	1	11	47	Include	12.14	51.86
010	N 35553 09701	3	1	14	46	Include	14.93	49.07
014	S 70903 43584	3	2	6	3	Include	6.67	3.33
018	S 73310 50094	4	2	3	19	Include	3.27	20.73
019	S 73111 52752	4	1	5	0	Barrier Below Site		
020	S 74070 54665	4	2	6	2	Include	6.00	2.00
022	S 74425 50995	4	1	0	6	Include	0.00	9.00
023	S 78267 50994	3	1	3	20	Include	3.13	20.87
025	S 79039 51107	3	1	0	13	Include	0.00	13.00
026	S 81828 48116	2	2	4	13	Include	4.24	13.76
027	S 82657 47832	2	2	3	0	Include	3.00	0.00
028	S 68207 53890	3	3	0	0	Include	0.00	0.00
029	S 67426 55401	3	1	1	34	Include	1.11	37.89
030	S 66591 56479	3	1	0	10	Include	0.00	10.00
031	S 65303 57010	3	2	1	0	Include	1.00	0.00
033	S 68739 64563	4	3	2	4	Include	2.67	5.33
034	S 77954 60136	2	1	3	24	Include	3.00	24.00
035	S 78117 59568	2	1	1	13	Include	1.00	13.00
036	S 78723 58852	2	2	7	7	Include	7.00	7.00
038	S 81929 56875	2	1	10	0	Include	12.00	0.00
040	S 69303 77259	4	2	0	1	Include	0.00	1.00
041	S 68860 78397	4	2	2	2	Include	2.00	2.00
043	S 67299 80183	4	2	5	22	Include	5.19	22.81
044	S 71850 81637	4	1	1	26	Include	1.11	28.89
045	S 72634 82167	4	1	4	21	Include	4.48	23.52
046	S 74222 81486	4	2	3	20	Include	3.13	20.87
047	S 75938 83182	4	1	6	29	Include	6.34	30.66
048	S 71075 82306	4	2	2	29	Include	2.00	29.00
049	S 69679 83295	4	2	0	6	Include	0.00	6.00
051	S 65870 85987	4	2	0	0	Include	0.00	0.00
053	S 64140 85582	3	2	0	1	Include	0.00	1.00
054	S 72922 84947	4	1	7	34	Include	7.68	37.32
055	S 77497 90557	4	1	2	28	Include	2.13	29.87
056	S 80129 97234	2	1	2	10	Include	2.17	10.83
057	S 79927 93234	4	2	8	17	Include	8.00	17.00
058	S 60265 98244	4	1	4	35	Include	4.21	36.79
061	N 67930 03365	3	3	6	1	Include	6.00	1.00
062	N 69829 03081	3	3	0	0	Include	0.00	0.00
063	N 72264 02621	3	2	6	0	Include	8.00	0.00
065	N 68105 04107	2	2	0	0	Too Narrow		
066	N 70514 05613	2	2	1	6	Include	1.00	6.00
071	N 66633 19136	3	2	0	10	Include	0.00	10.00
072	N 67556 19537	3	1	0	24	Include	0.00	25.00
073	N 70315 21660	3	3	0	0	Include	0.00	0.00
075	N 61003 23435	4	3	0	0	Include	0.00	0.00
078	N 55900 16196	3	2	0	0	Include	0.00	0.00
079	N 53130 16742	3	3	0	0	Include	0.00	0.00
084	N 45517 07381	4	2	0	8	Include	0.00	8.00
085	N 44930 07316	4	2	0	0	Include	0.00	0.00
086	N 44132 06559	4	1	0	11	Include	0.00	12.00
087	N 43145 05663	4	1	0	3	Include	0.00	3.00
088	N 41856 05260	4	1	0	21	Include	0.00	24.00
089	N 41693 05144	4	1	0	29	Include	0.00	32.00
090	N 34569 10772	2	1	9	36	Include	9.80	39.20
091	N 34114 10386	2	2	8	21	Include	8.28	21.72
092	S 76956 51611	4	2	0	8	Include	0.00	9.00
097	N 72561 03269	3	2	0	11	Include	0.00	11.00
099	S 73482 87614	4	1	12	62	Include	12.49	64.51
100	S 64646 85618	3	2	0	13	Include	0.00	14.00
105	N 42870 05486	4	1	0	32	Include	0.00	32.00
108	S 69151 75634	4	3	0	11	Include	0.00	11.00
110	S 60871 55626	3	2	0	0	Include	0.00	0.00
111	S 61187 54352	3	2	0	0	Include	0.00	0.00

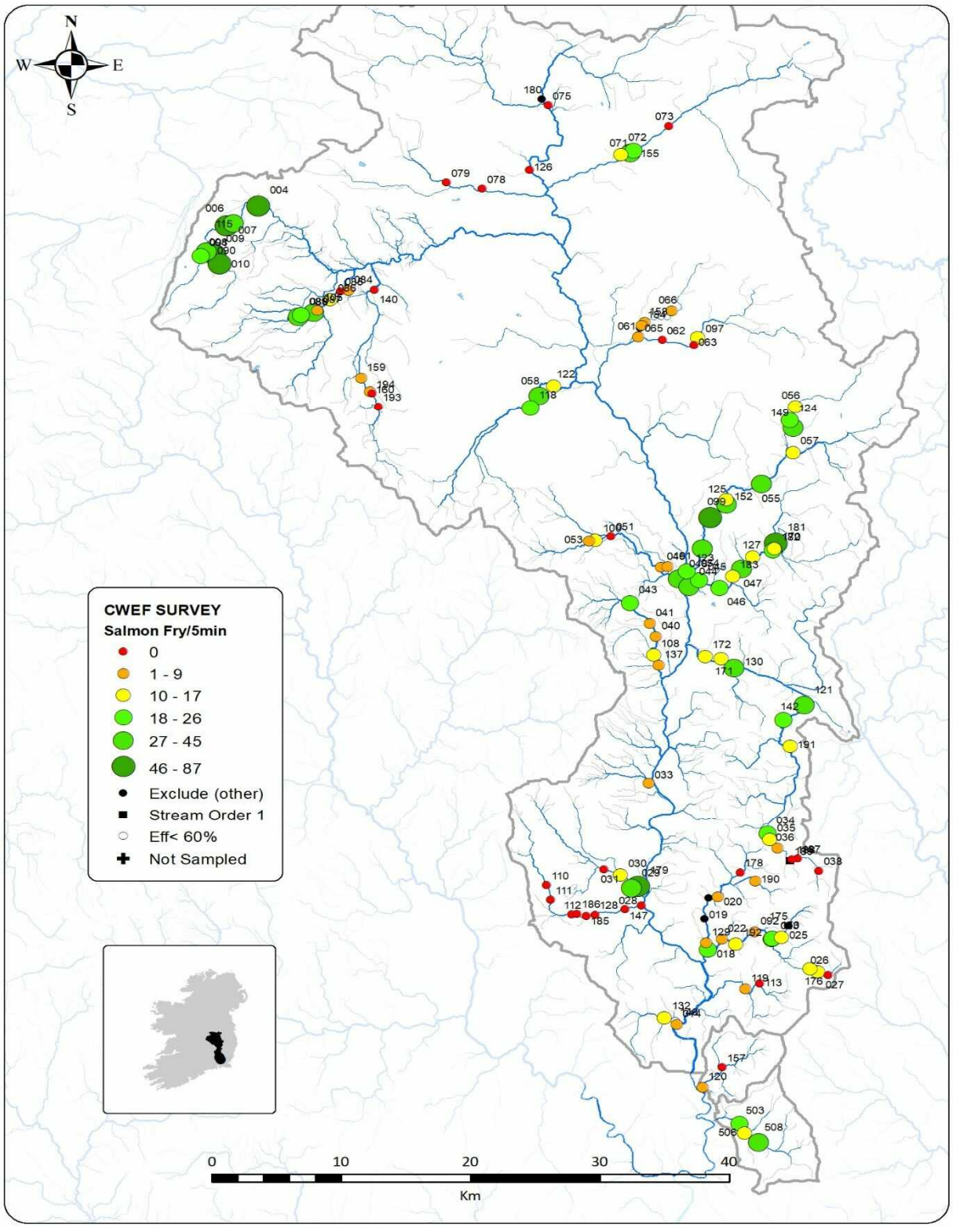
Table A.3.2.2: Site specific results of CWEF on the Barrow catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
112	S 62831 53091	3	2	2	0	Include	4.00	0.00
113	S 77358 47110	3	2	0	0	Include	0.00	0.00
115	N 35239 12688	3	1	0	110	Include	0.00	120.00
118	S 59623 97162	4	2	6	18	Include	6.50	19.50
119	S 76200 46697	3	1	5	2	Include	5.71	2.29
120	S 72890 38171	3	2	2	6	Include	2.75	8.25
121	S 80780 71348	4	1	4	43	Include	4.00	43.00
122	S 61409 99067	4	2	0	14	Include	0.00	14.00
123	S 71685 82946	4	1	1	20	Include	1.10	21.90
124	S 79647 96064	2	2	3	21	Include	3.38	23.63
125	S 74771 88757	4	1	7	28	Include	7.60	30.40
126	N 59544 17853	4	3	0	0	Include	0.00	0.00
127	S 76823 84175	4	1	1	13	Include	1.07	13.93
128	S 64620 53080	3	1	0	0	Include	0.00	0.00
129	S 73192 50683	4	2	5	1	Include	5.83	1.17
130	S 75368 74585	4	2	0	27	Include	0.00	28.00
132	S 69984 44152	3	2	4	10	Include	4.86	12.14
134	S 73406 54560	4	2	4	0	Barrier Below Site		
137	S 69532 74776	2	3	0	5	Include	0.00	5.00
140	N 47581 07434	4	2	0	0	Include	0.00	0.00
142	S 79182 70027	4	1	3	18	Include	3.14	18.86
147	S 66923 53551	3	3	0	0	Include	0.00	0.00
148	S 70841 43847	3	2	6	13	Eff <60%		
149	S 79917 95454	2	2	1	29	Include	1.07	30.93
150	S 78292 51008	3	1	2	18	Include	2.20	19.80
152	S 74781 89143	4	2	5	12	Include	5.59	13.41
155	N 67327 19322	3	2	0	33	Include	0.00	34.00
157	S 74459 39875	3	2	6	0	Include	8.00	0.00
158	N 68431 04623	2	2	4	3	Include	4.00	3.00
159	S 46517 99760	3	2	2	1	Include	2.67	1.33
160	S 47205 98622	3	1	0	4	Include	0.00	6.00
161	S 70174 83354	2	2	0	1	Include	0.00	1.00
170	S 78493 84907	4	1	1	15	Include	1.06	15.94
171	S 74341 75343	4	2	0	12	Include	0.00	12.00
172	S 73127 75530	4	2	9	10	Include	9.47	10.53
175	S 79572 52145	3	2			Barrier Ds		
176	S 81245 48399	2	2	3	11	Include	3.00	11.00
178	S 75841 56727	3	3	5	0	Include	5.00	0.00
179	S 67931 55534	3	1	2	58	Include	2.13	61.87
180	N 60522 23995	4				Too Deep		
181	S 78559 85395	3	1	3	61	Include	3.19	64.81
182	S 78348 84729	4	1	3	18	Include	3.14	18.86
183	S 75260 82472	4	2	8	9	Include	8.47	9.53
184	N 68190 04331	2	1	1	3	Include	1.00	3.00
185	S 63934 52947	3	2	0	0	Include	0.00	0.00
186	S 63244 53167	3	3	0	0	Include	0.00	0.00
187	S 80283 57945	2	2	3	0	Include	3.00	0.00
188	S 79841 57878	2	2	9	0	Include	9.00	0.00
189	S 79691 57777	1	1	5	0	Stream Order<2		
190	S 76995 55989	3	2	5	1	Include	5.00	1.00
191	S 79699 67737	4	1	3	16	Include	3.00	16.00
192	S 75503 50522	4	1	1	12	Include	1.08	12.92
193	S 47859 97252	3	3	5	0	Include	5.00	0.00
194	S 47375 98412	3	2	0	0	Include	0.00	0.00
503	S 75771 34996	3	2	2	16	Include	2.34	18.76
506	S 76166 34196	3	2	8	11	Include	8.42	11.58
508	S 77258 33428	3	2	14	21	Include	17.60	26.40
004	N 38563 14734	3	1	2	42	Include	2.27	47.73
006	N 36634 13219	3	1	2	40	Include	2.19	43.81

Conclusion

The Barrow had a mean catch of 16.50 salmon fry/5min in 2019. Taking the five most recent surveys into account this results in a cumulative average of 16.94 salmon fry/5min which is at the 17 salmon fry threshold.

Map A.3.2.1: Showing the locations and results of 2019 CWEF surveys on the Barrow River.



A.3.3. River Mahon

IFI Salmon Catchment #:	50
2019 survey dates:	19/9/19
Mean Salmon Fry/5 min (2019):	8.60 fry/5min.
CWEF Index:	6.34 fry/5min.

Sampling carried out by:
Mick Millane
Tony Holmes

Fish Species Present:

Brown Trout	Salmon
European Eel	3-Spined Stickleback
Flounder	

Figure A.3.3.1: Length distribution of salmon captured in 2019 CWEF survey on the Mahon Catchment.

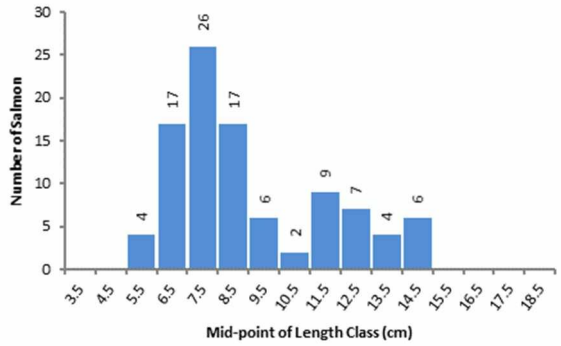
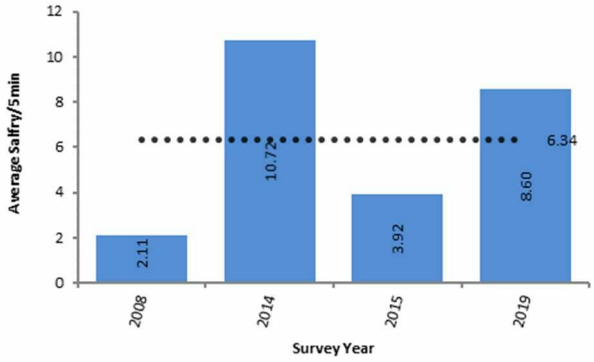


Figure A.3.3.2: Comparison of mean salmon fry/5min for all surveys on the Mahon catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	Closed	9	1				6.41	2.11
2008	2009	Closed							
2009	2010	Closed							
2010	2011	Closed							
2011	2012	Closed							
2012	2013	Closed							
2013	2014	Closed	8					8.01	10.72
2014	2015	Closed	7	1				8.01	3.92
2015	2016	Closed							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	11			4		4.27	8.60

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during September 2019. The survey comprised 15 sites, 11 of which were included in the analysis. Salmon fry were present at 9 sites. The maximum fry catch was 20 salmon at site 14. The mean catch of included sites was 8.60 salmon fry/5min. The modal length category of 0+ fry caught was 7.5cm.

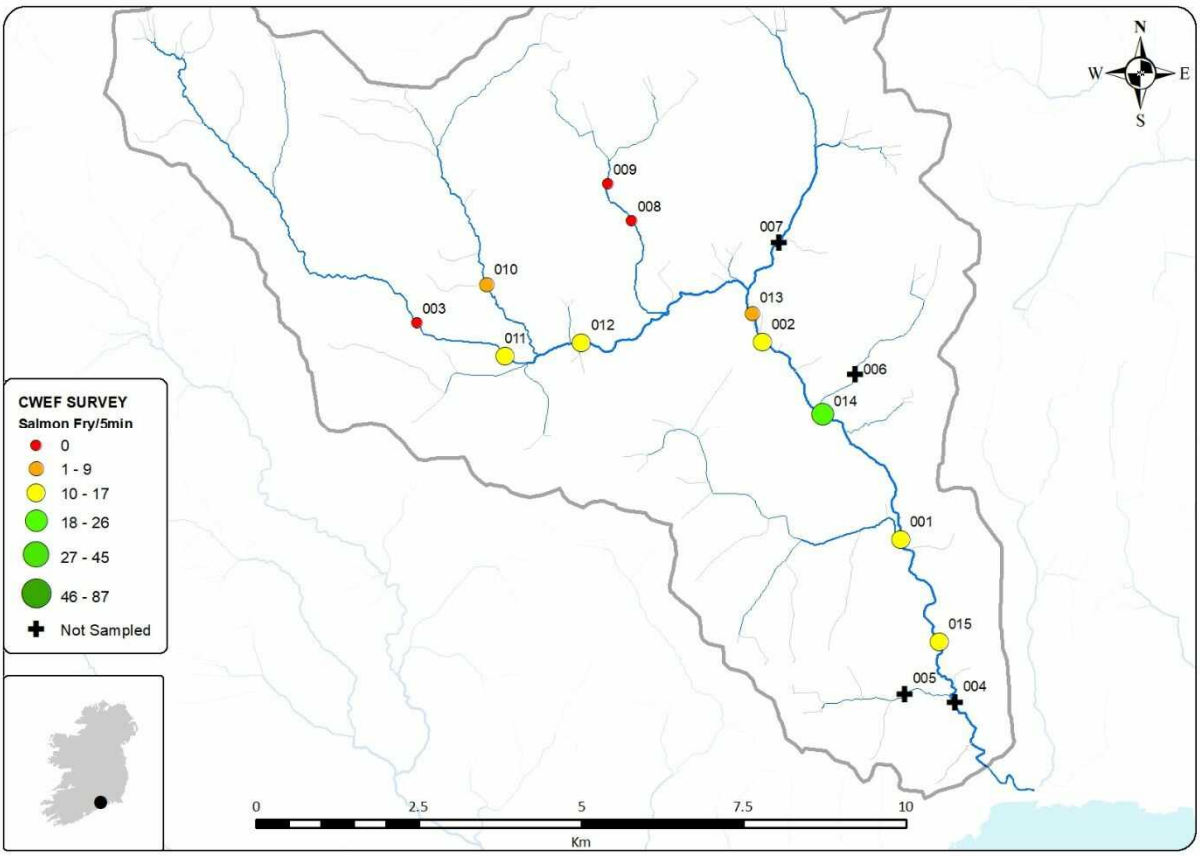
Conclusion

The Mahon had a mean catch of 8.60 salmon fry/5min in 2019. Taking the four most recent surveys into account this results in a cumulative average of 6.34 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.3.3.2: Site specific results of CWEF on the Mahon catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	S 41686 02654	5	1	2	8	Include	2.60	10.40
002	S 39562 05701	5	1	3	10	Include	3.46	11.54
003	S 34253 05999	3	2	4	0	Include	5.00	0.00
008	S 37559 07560	3	2	6	0	Include	7.00	0.00
009	S 37187 08136	3	2	12	0	Include	12.00	0.00
010	S 35322 06572	3	2	19	1	Include	19.95	1.05
011	S 35614 05482	3	1	0	12	Include	0.00	14.00
012	S 36785 05691	4	1	1	13	Include	1.00	13.00
013	S 39411 06136	5	2	1	4	Include	1.40	5.60
014	S 40481 04583	5	1	0	20	Include	0.00	24.00
015	S 42278 01092	5	1	0	13	Include	0.00	15.00
004	S 42517 00153	5		0	0	No Riffle		
005	S 41749 00278	2		0	0	Overgrown		
006	S 40987 05197	2		0	0	Overgrown		
007	S 39811 07223	4		0	0	Overgrown		

Map A.3.3.1: Showing the locations and results of 2019 CWEF surveys on the Mahon River.



A.3.4. River Colligan

IFI Salmon Catchment #:	53
2019 survey dates:	20/9/19
Mean Salmon Fry/5 min (2019):	4.84 fry/5min.
CWEF Index:	11.82 fry/5min.

Sampling carried out by:	Fish Species Present:	
Mick Millane	Brown Trout	Salmon
Tony Holmes	European Eel	3-Spined Stickleback
	Flounder	

Figure A.3.4.1: Length distribution of salmon captured in 2019 CWEF survey on the Colligan Catchment.

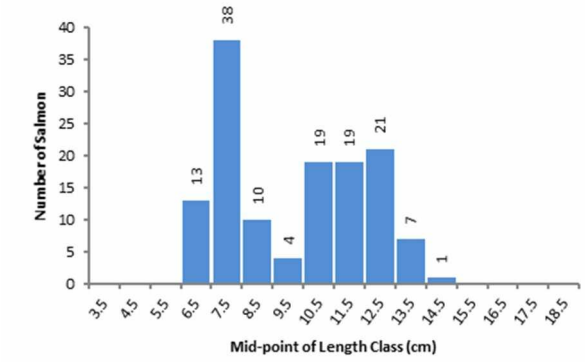
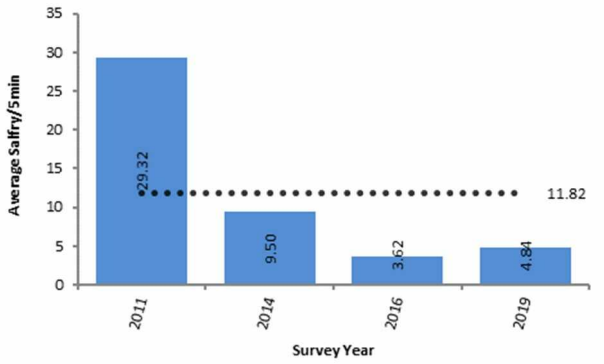


Figure A.3.4.2: Comparison of mean salmon fry/5min for all surveys on the Colligan catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	C&R							
2008	2009	C&R							
2009	2010	C&R							
2010	2011	C&R	5					11.09	29.32
2011	2012	C&R							
2012	2013	C&R							
2013	2014	C&R	12					4.62	9.50
2014	2015	C&R							
2015	2016	C&R	12			1		4.27	3.62
2016	2017	C&R							
2017	2018	Closed							
2018	2019	Closed	14					3.96	4.84

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during September 2019. The survey comprised 14 sites, all of which were included in the analysis. Salmon fry were present at 9 sites. The maximum fry catch was 15 salmon at site 11. The mean catch of included sites was 5.37 salmon fry/5min. The modal length category of 0+ fry caught was 7.5cm.

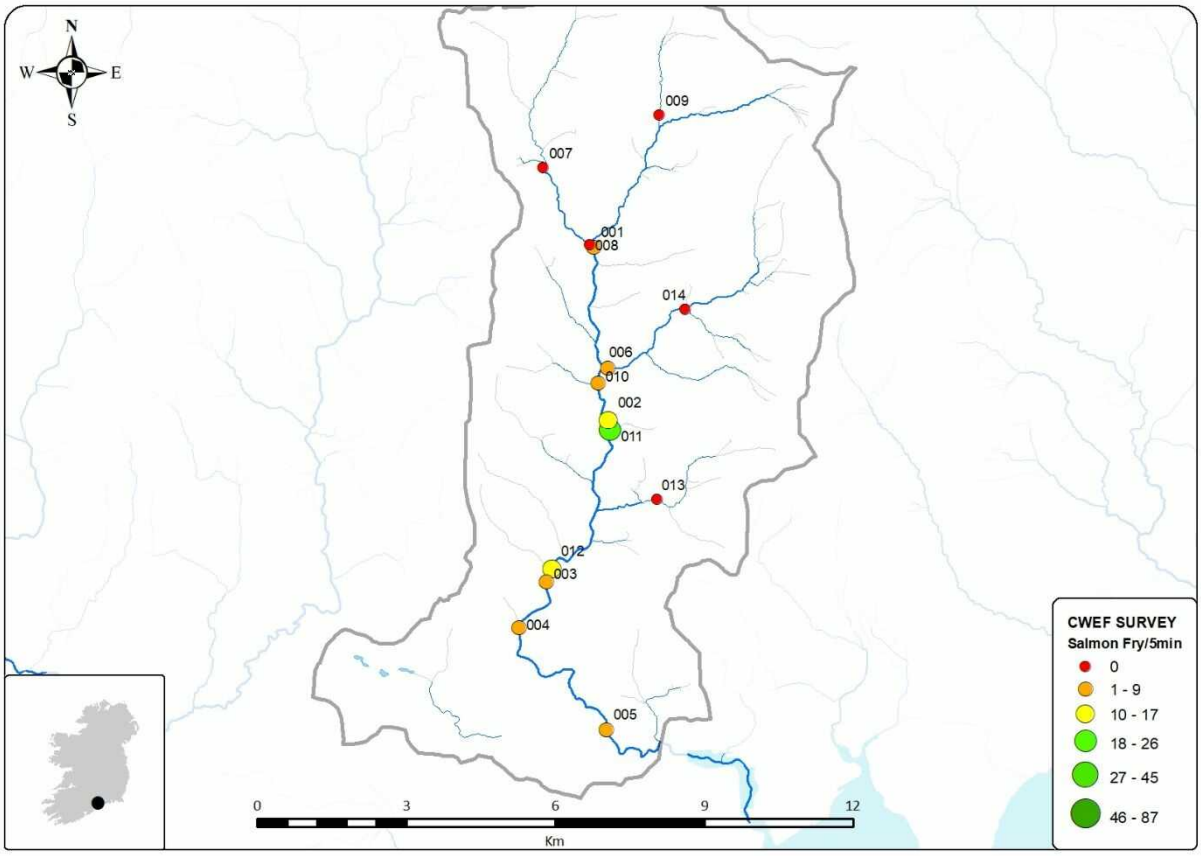
Conclusion

The Colligan had a mean catch of 4.84 salmon fry/5min in 2019. Taking the four most recent surveys into account this results in a cumulative average of 11.82 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.3.4.2: Site specific results of CWEF on the Colligan catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	S 22978 04848	4	1	32	6	Include	39.58	7.42
002	S 23269 01389	4	1	6	10	Include	7.88	13.13
003	X 22018 98113	4	1	5	5	Include	6.50	6.50
004	X 21476 97201	4	1	3	3	Include	3.00	3.00
005	X 23218 95146	4	1	0	3	Include	0.00	3.00
006	S 23254 02433	3	1	15	1	Include	19.69	1.31
007	S 21967 06452	2	1	20	0	Include	26.00	0.00
008	S 22893 04911	3	2	33	0	Include	45.00	0.00
009	S 24296 07508	2	2	24	0	Include	25.00	0.00
010	S 23063 02128	4	1	24	6	Include	24.00	6.00
011	S 23304 01187	4	1	2	15	Include	2.35	17.65
012	X 22132 98382	4	1	1	8	Include	1.22	9.78
013	X 24247 99778	2	2	15	0	Include	18.00	0.00
014	S 24816 03623	3	2	13	0	Include	13.00	0.00

Map A.3.4.1: Showing the locations and results of 2019 CWEF surveys on the Colligan River.



A.4.South Western River Basin District.

Summary

Since 2007, forty-two salmon rivers have been surveyed in the South Western River Basin District (SWRBD) as part of the on-going catchment-wide electrofishing surveys. These are presented in (Table A.4.1). At present eleven rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2019, nine complete CWEF surveys were undertaken on the Bride, Cloonee, Finnihy, Owreagh, Carhan, Ferta, Behy, Milltown and Feohanagh.

Table A.4.1: Catchment-wide Electrofishing data for the South Western River Basin District 2008-2018 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C).

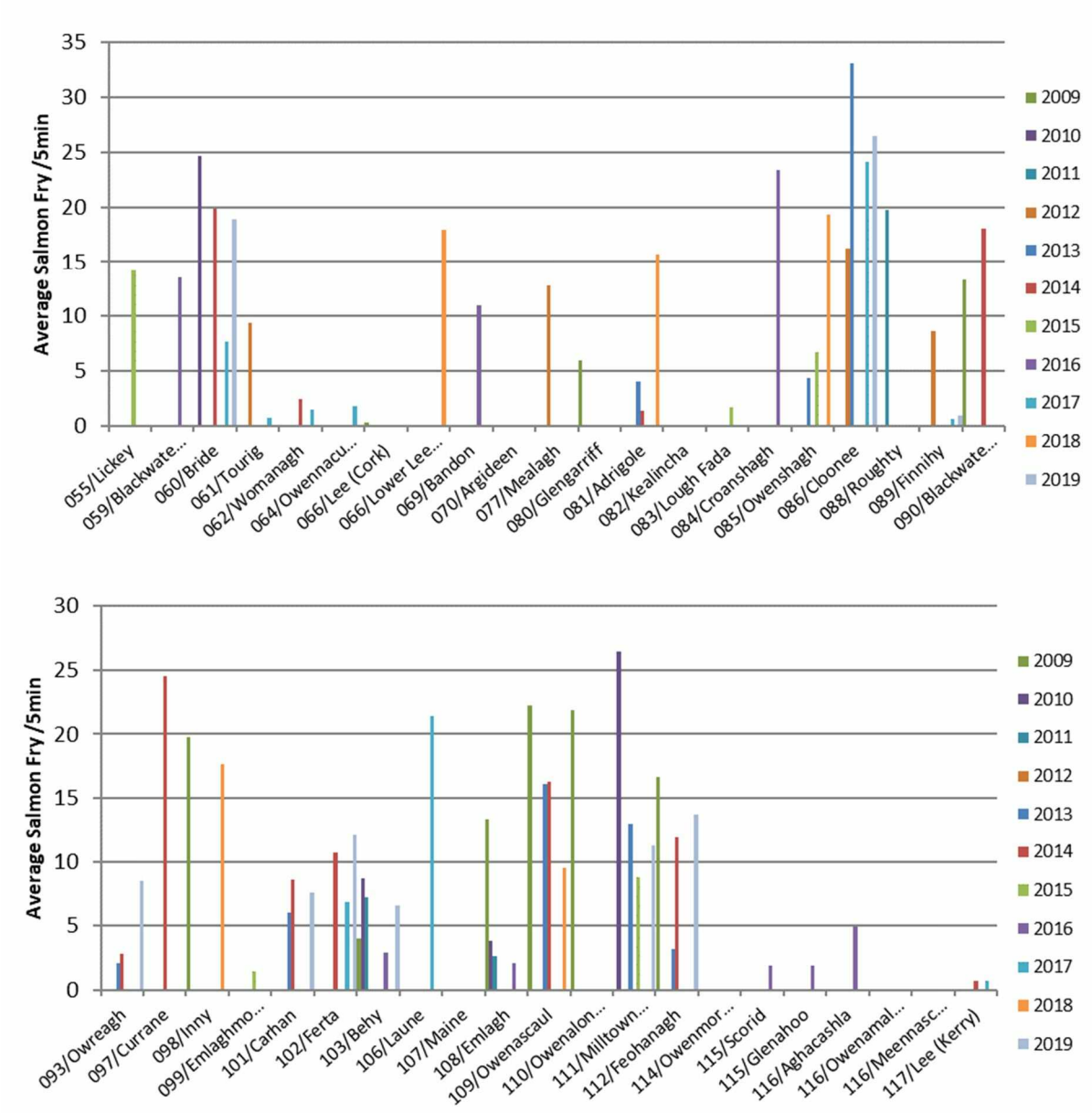
	Survey Year												
Code/River	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Current Index	# Annual Surveys Considered
055/Lickey							**14.14**					13.26	2
059/Blackwater (Munster)								**13.56**		22.8*		15.65	3
060/Bride		**24.70**				**19.85**			**7.65**		**18.93**	16.31	5
061/Tourig				**9.40**					**0.73**			5.06	2
062/Womanagh						**2.39**			**1.43**			6.42	3
064/Owennacurra									**1.77**			8.77	2
066/Lee (Cork)	**0.26**											0.26	1
066/Lee-Shournagh & Martin										**17.97**		17.97	1
069/Bandon								**11.01**				11.01	1
070/Argideen												17.15	1
077/Mealagh				**12.82**								12.82	1
080/Glengarriff	**5.93**											5.93	1
081/Adrigole					**4.01**	**1.33**				**15.64**		6.99	3
082/Kealincha							**0.00**					0.00	2
083/Lough Fada							**1.68**					2.45	2
084/Croanshagh								**23.38**				23.38	1
085/Owenshagh					**4.32**		**6.73**			**19.27**		10.11	3
086/Cloonee				**16.18**	**33.06**				**24.09**		**26.48**	24.95	4
088/Roughty			**19.78**									19.78	1
089/Finnihy				**8.61**	**0.00**				**0.58**		**0.89**	2.52	4
090/Blackwater (Kerry)	**13.35**					**18.01**						19.35	4
093/Owreagh					**2.07**	**2.81**					**8.51**	5.58	4
097/Currane						**24.51**						24.51	1
098/Inny	**19.78**									**17.67**		20.69	3
099/Emlaghmore							**1.45**					1.76	2
101/Carhan					**6.05**	**8.61**					**7.55**	9.49	4
102/Ferta						**10.74**			**6.88**		**12.06**	12.27	4
103/Behy	**4.03**	**8.71**	**7.17**					**2.89**			**6.60**	5.88	5
106/Laune									**21.41**			21.41	1
107/Maine	**34.23**								22.0†	19.6†		32.34	2
108/Emlagh	**13.38**	**3.84**	**2.59**					**2.10**				5.11	5
109/Owenascaul	**22.27**				**16.08**	**16.28**				**9.51**		16.91	5
110/Owenalondrig	**21.90**											21.90	1
111/Milltown		**26.44**			**13.02**		**8.76**				**11.25**	14.96	5
112/Feohanagh	**16.61**				**3.20**	**11.93**					**13.75**	11.37	4
114/Owenmore												25.07	1
115/Scorid								**1.86**				1.86	1
115/Glenahoo								**1.87**				1.87	1
116/Aghacashla								**4.89**				4.89	1

Table A.4.1: Catchment-wide Electrofishing data for the South Western River Basin District 2008-2018 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C). (cont.)

Code/River	Survey Year											Current Index	# Annual Surveys Considered
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
116/Owenamallagh								**0.00**				0.00	1
116/Meennascarty								**0.00**				0.00	1
117/Lee (Kerry)						**0.68**			**0.69**			0.68	3

Bold annual figures indicate years included in calculation of current CWEF index.
Underlined index figures indicate those exceeding the 17 salmon fry threshold.
* Incomplete surveys not included in calculation of current index.
† Sub-catchment surveys not included in calculation of current index

Figure A.4.1: Summary of CWEF results in South Western River basin district 2009-2019.



A.4.1. River Bride

IFI Salmon Catchment #:	60
2019 survey dates:	7-26/8/19
Mean Salmon Fry/5 min (2019):	18.93 fry/5min.
CWEF Index:	16.31 fry/5min.

Sampling carried out by:
Mick Millane
Tony Holmes

Fish Species Present:

Brown Trout	Stone Loach
European Eel	3-Spined Stickleback
Lamprey spp.	
Salmon	

Figure A.4.1.1: Length distribution of salmon captured in 2019 CWEF survey on the Bride catchment.

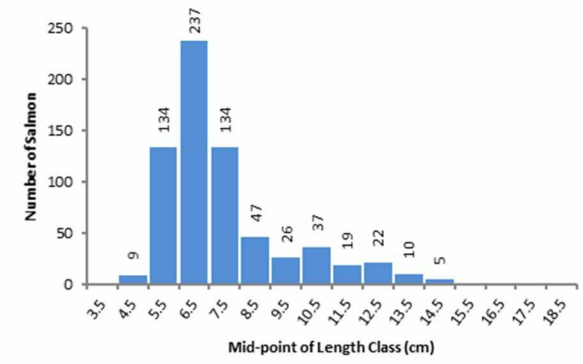
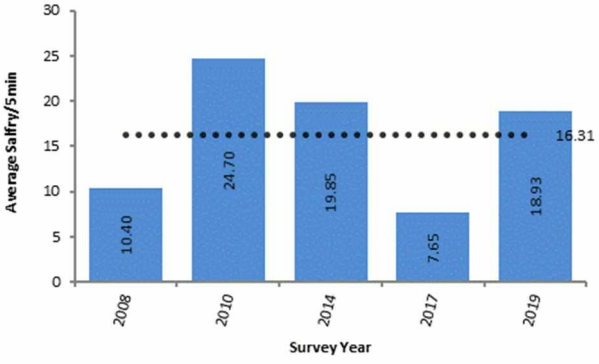


Figure A.4.1.2: Comparison of mean salmon fry/5min for all surveys on the Bride catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	C&R	19	2				7.65	10.40
2008	2009	C&R							
2009	2010	C&R	25		1			6.18	24.70
2010	2011	C&R							
2011	2012	C&R							
2012	2013	C&R							
2013	2014	C&R	33	2	1	1		4.34	19.85
2014	2015	C&R							
2015	2016	C&R							
2016	2017	C&R	35			4		4.12	7.65
2017	2018	C&R							
2018	2019	C&R	37					4.34	18.93

C&R = Catch and Release; * Incomplete Surveys.

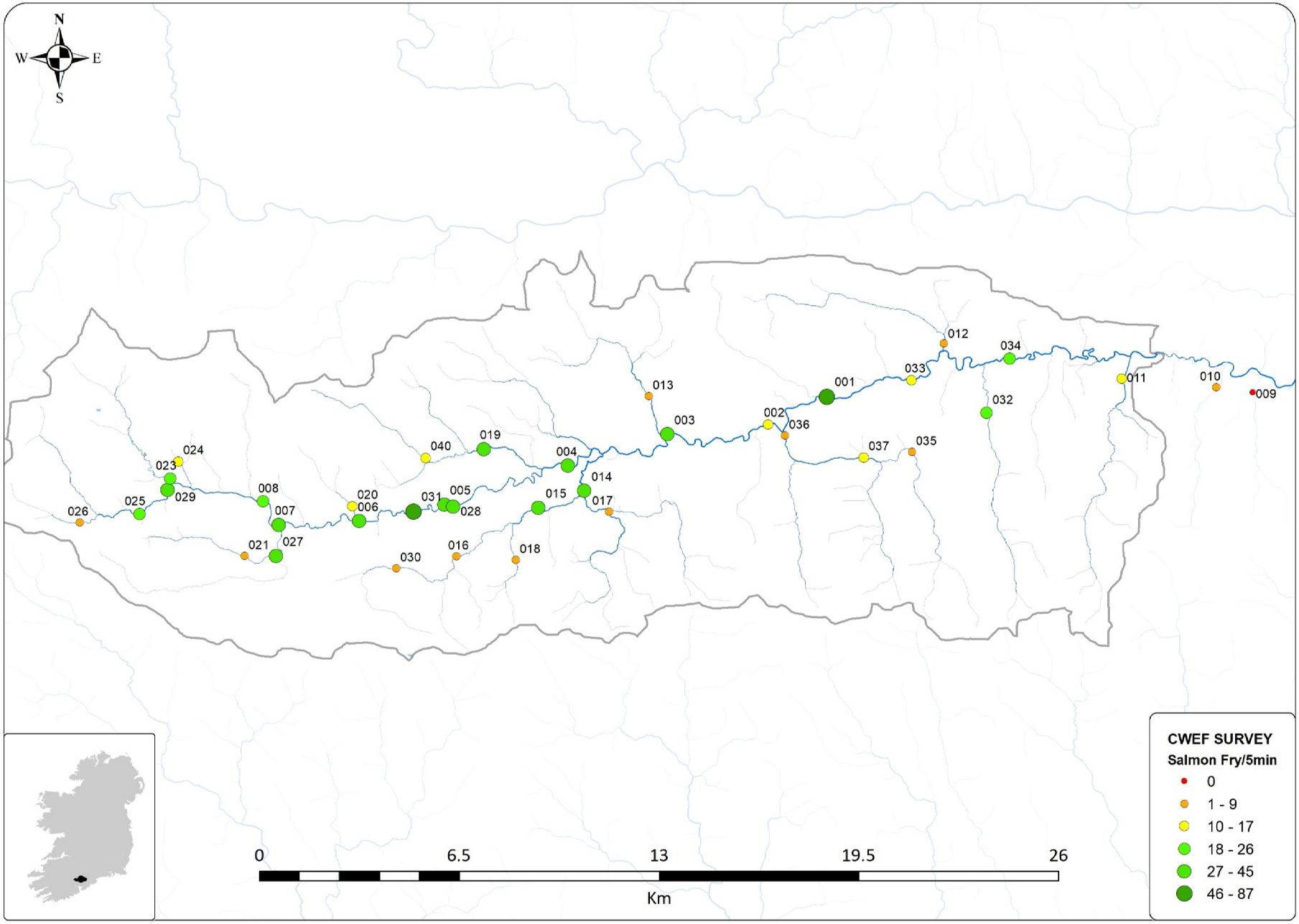
This, the 5th CWEF survey of this catchment in the 2008 to 2019 period, was carried out during August 2019. The survey comprised 37 sites all of which were included in the analysis, Salmon fry were present at 36 sites. The maximum fry catch was 57 salmon at site 1. The mean catch of included sites was 18.93 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

Conclusion

The Bride had a mean catch of 18.93 salmon fry/5min in 2019. Taking the four most recent surveys into account this results in a cumulative average of 16.31 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.1.2: Site specific results of CWEF on the Bride catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	W 89732 92892	5	1	0	57	Include	0.00	82.00
002	W 87832 91990	5	1	4	8	Include	5.00	10.00
003	W 84550 91686	5	1	1	27	Include	1.21	32.79
004	W 81312 90665	4	1	0	24	Include	0.00	32.00
005	W 77292 89403	3	1	0	27	Include	0.00	35.00
006	W 74526 88866	3	1	7	28	Include	9.00	36.00
007	W 71909 88741	3	1	3	31	Include	3.71	38.29
008	W 71389 89498	3	2	3	13	Include	4.13	17.88
009	X 03591 93032	2	2	5	0	Include	8.00	0.00
010	X 02400 93205	2	2	8	1	Include	9.78	1.22
011	W 99329 93479	3	1	3	9	Include	3.25	9.75
012	W 93542 94636	3	2	3	1	Include	4.50	1.50
013	W 83936 92915	3	3	1	1	Include	1.00	1.00
014	W 81850 89847	4	1	2	28	Include	2.47	34.53
015	W 80355 89295	3	1	12	27	Include	14.46	32.54
016	W 77684 87710	2	3	4	1	Include	4.00	1.00
017	W 82643 89165	3	2	15	8	Include	16.30	8.70
018	W 79610 87603	2	2	14	4	Include	17.89	5.11
019	W 78574 91201	3	2	1	25	Include	1.15	28.85
020	W 74300 89333	2	1	26	9	Include	28.97	10.03
021	W 70800 87730	2	2	21	1	Include	23.86	1.14
023	W 68376 90239	2	3	6	17	Include	8.09	22.91
024	W 68640 90782	2	2	15	13	Include	15.00	13.00
025	W 67371 89091	3	2	4	16	Include	5.20	20.80
026	W 65436 88817	2	2	11	5	Include	13.75	6.25
027	W 71815 87727	2		7	25	Include	8.31	29.69
028	W 77583 89330	3	1	0	22	Include	0.00	29.00
029	W 68296 89877	3	2	7	24	Include	8.35	28.65
030	W 75730 87326	2	3	16	1	Include	17.88	1.12
031	W 76292 89169	3	1	0	37	Include	0.00	47.00
032	W 94927 92379	2	1	8	17	Include	8.96	19.04
033	W 92493 93432	5	1	0	10	Include	0.00	13.00
034	W 95681 94135	5	1	0	15	Include	0.00	20.00
035	W 92511 91107	2	2	4	2	Include	5.33	2.67
036	W 88367 91637	3	1	4	8	Include	4.00	8.00
037	W 90936 90911	3	1	6	10	Include	6.38	10.63
040	W 76687 90903	2	1	10	9	Include	10.53	9.47



Map A.4.1.1: Showing the locations and results of 2019 CWEF survey on the Bride River.

A.4.2. River Cloonee

IFI Salmon Catchment #:	86
2019 survey dates:	15/7/2019
Mean Salmon Fry/5 min (2019):	26.48 fry/5min.
CWEF Index:	24.95 fry/5min.

Sampling carried out by:	Fish Species Present:	
Danny Breen	Brown Trout	Minnow
Tony Holmes	European Eel	Salmon

Figure A.4.2.1: Length distribution of salmon captured in 2019 CWEF survey on the Cloonee Catchment.

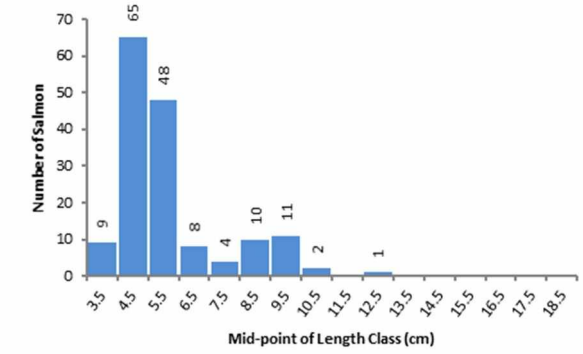
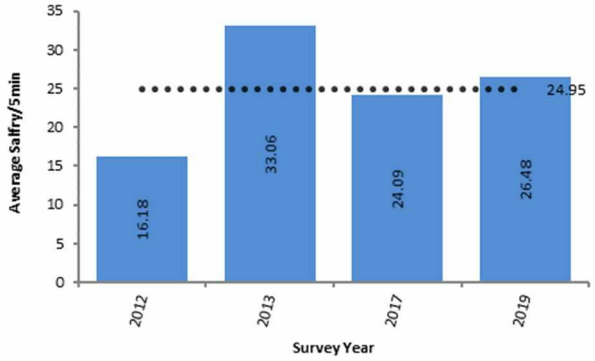


Figure A.4.2.2: Comparison of mean salmon fry/5min for all surveys on the Cloonee catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2011	2012	Closed	6			1		2.61	16.18
2012	2013	Closed	6					3.04	33.06
2013	2014	Closed							
2014	2015	C&R							
2015	2016	C&R							
2016	2017	C&R	6			1		2.61	24.09
2017	2018	C&R							
2018	2019	C&R	6	1				2.61	26.48

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during on 15th July 2019. The survey comprised 7 sites, 6 of which were included in the analysis. Salmon fry were present at 6 sites. The maximum fry catch was 39 salmon at site 7. The mean catch of included sites was 26.48 salmon fry/5min. The modal length category of 0+ fry caught was 4.5cm.

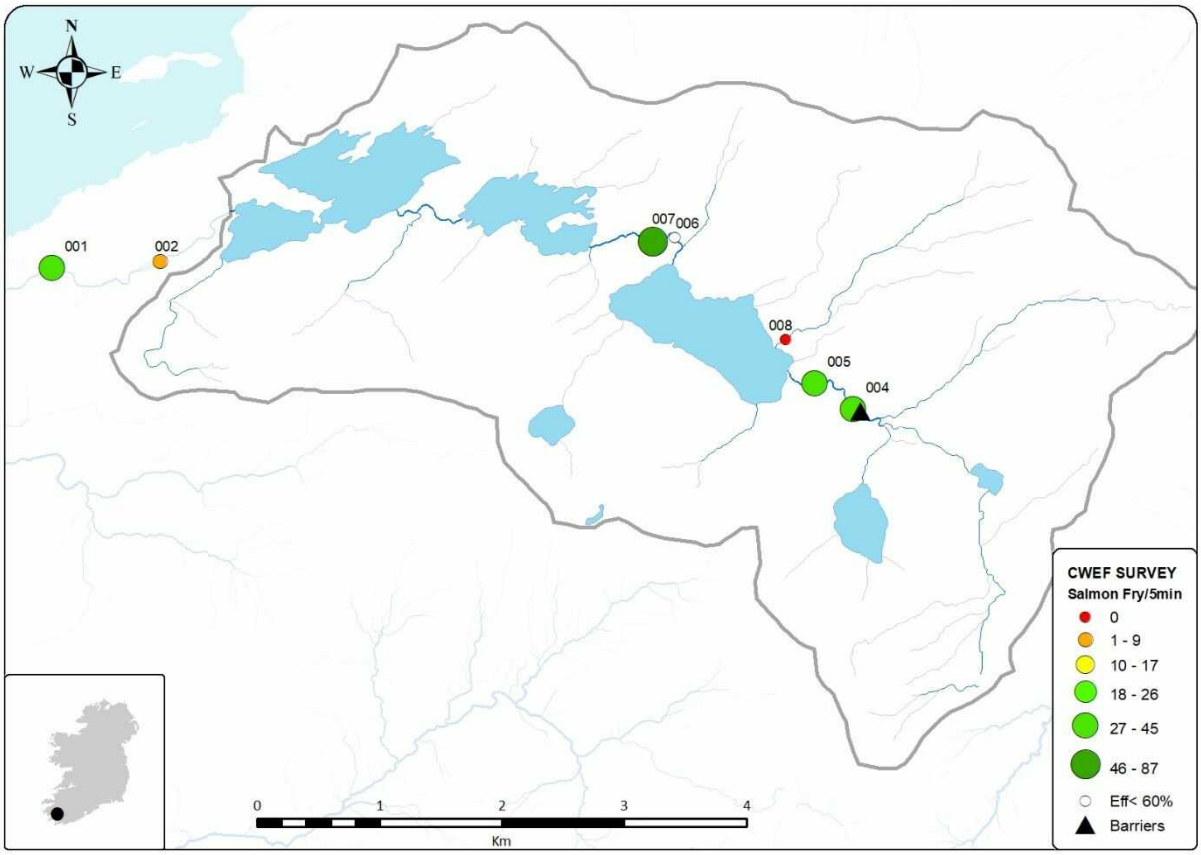
Conclusion

The Cloonee had a mean catch of 26.48 salmon fry/5min in 2019. This results in a cumulative average of 24.95 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.4.2.2: Site specific results of CWEF on the Cloonee catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	V 78433 63466	3	2	2	22	Include	2.83	31.17
002	V 79317 63511	3	3	6	4	Include	9.60	6.40
004	V 84968 62312	3	2	12	22	Include	17.29	31.71
005	V 84654 62520	3	1	8	35	Include	10.05	43.95
006	V 83515 63712	3	1	0	8	Eff <60%		
007	V 83334 63672	3	1	8	39	Include	9.36	45.64
008	V 84419 62881	2	1	63	0	Include	73.00	0.00

Map A.4.2.1: Showing the locations and results of 2018 CWEF surveys on the Cloonee River.



A.4.3. River Finnihy

IFI Salmon Catchment #:	85
2019 survey dates:	16/7/2019 to 22/7/2019
Mean Salmon Fry/5 min (2019):	0.89 fry/5min.
CWEF Index:	2.52 fry/5min.

Sampling carried out by:	Fish Species Present:
Christine Meehan	Brown Trout Salmon
Dan Breen	European Eel
Tony Holmes	

Figure A.4.3.1: Length distribution of salmon captured in 2019 CWEF survey on the Finnihy Catchment.

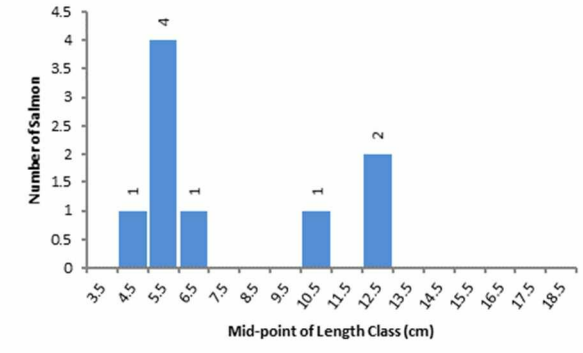
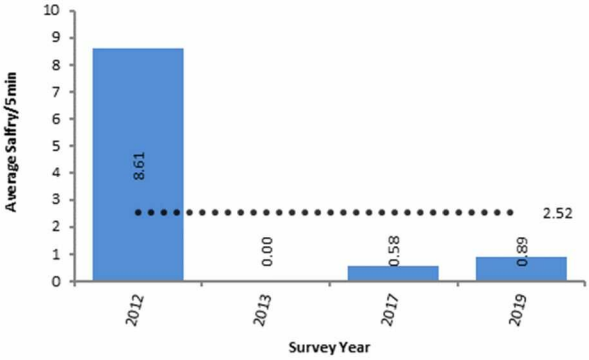


Figure A.4.3.2: Comparison of mean salmon fry/5min for all surveys on the Finnihy catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2011	2012	Closed	6					3.68	8.61
2012	2013	Closed	6					3.68	0.00
2013	2014	Closed							
2014	2015	Closed							
2015	2016	Closed							
2016	2017	Closed	6					3.68	0.58
2017	2018	Closed							
2018	2019	Closed	8					2.76	0.89

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried on the 16th and 22nd of July 2019. The survey comprised 8 sites, all of which were included in the analysis. Salmon fry were present at 3 sites. The maximum fry catch was 4 salmon at site 4. The mean catch of included sites was 0.89 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

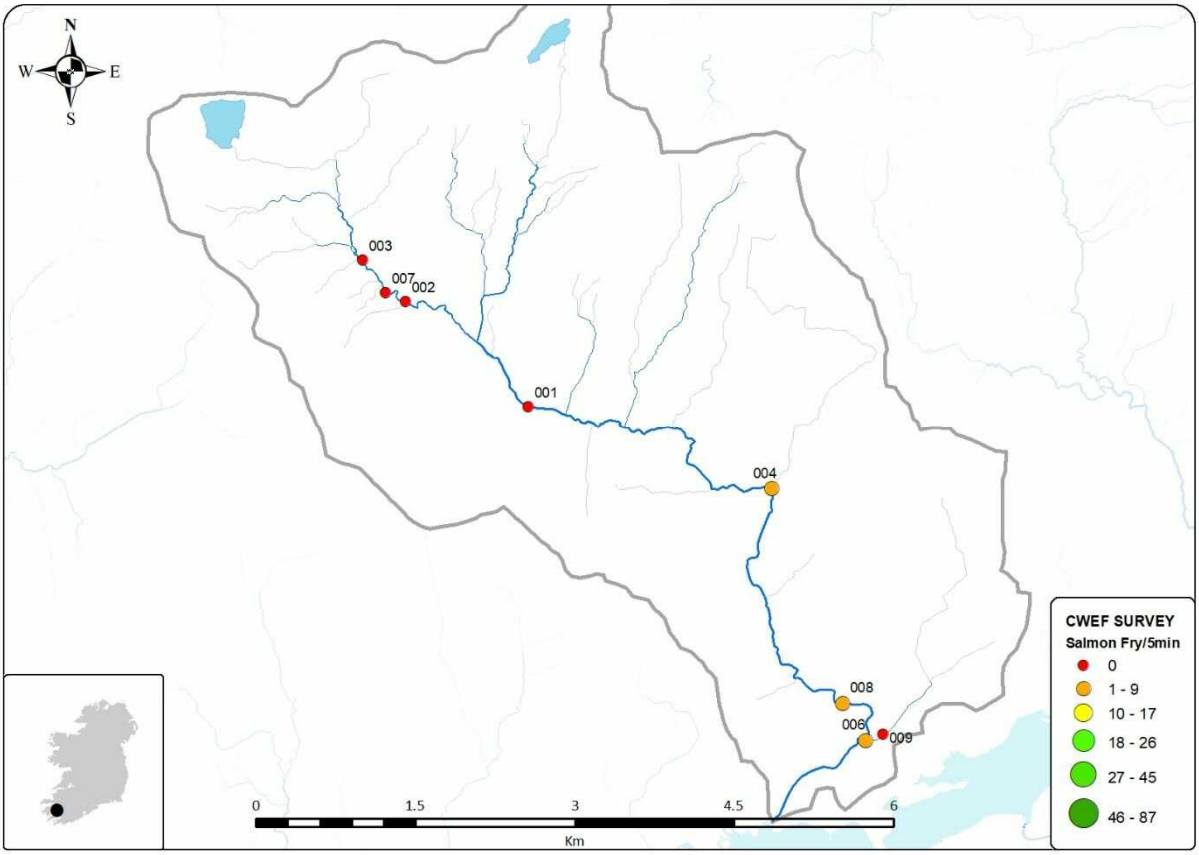
Conclusion

The Finnihy had a mean catch of 0.89 salmon fry/5min in 2019. While this value is very low, it is an improvement from the past two surveys. Taking the three most recent surveys into account this results in a cumulative average of 2.52 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.3.2: Site specific results of CWEF on the Finnihy catchment in 2017.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	V 87761 74122	4	2	9	0	Include	19.00	0.00
002	V 86608 75113	3	1	15	0	Include	19.00	0.00
003	V 86206 75501	3	2	8	0	Include	10.00	0.00
004	V 90044 73344	4	3	7	4	Include	8.91	5.09
006	V 90924 70988	4	1	0	1	Include	0.00	1.00
007	V 86424 75192	3	1	20	0	Include	22.00	0.00
008	V 90712 71335	4	1	2	1	Include	2.00	1.00
009	V 91096 71047	2	2	11	0	Include	13.00	0.00

Map A.4.3.1: Showing locations of 2019 survey sites on Finnihy.



A.4.4. River Owreagh

IFI Salmon Catchment #:	93
2019 survey dates:	22/7/2019
Mean Salmon Fry/5 min (2019):	8.51 fry/5min.
CWEF Index:	5.58 fry/5min.
Sampling carried out by:	Fish Species Present:
Christine Meehan	Brown Trout
Tony Holmes	Salmon

Figure A.4.4.1: Length distribution of salmon captured in 2019 CWEF survey on the Owreagh Catchment.

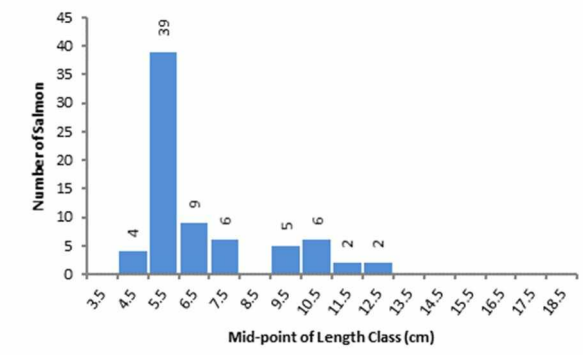
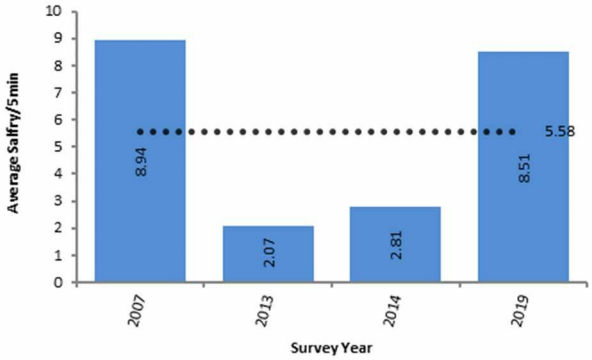


Figure A.4.4.2: Comparison of mean salmon fry/5min for all surveys on the Owreagh catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Closed	6					2.90	8.94
2007	2008	Closed							
2008	2009	Closed							
2009	2010	Closed							
2010	2011	Closed							
2011	2012	Closed							
2012	2013	Closed	6					2.90	2.07
2013	2014	Closed	8					2.18	2.81
2014	2015	Closed							
2015	2016	Closed							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	8					2.18	8.51

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out on 22nd July 2019. The survey comprised 8 sites, all of which were included in the analysis. Salmon fry were present at 5 sites. The maximum fry catch was 20 salmon at site 8. The mean catch of included sites was 8.51 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

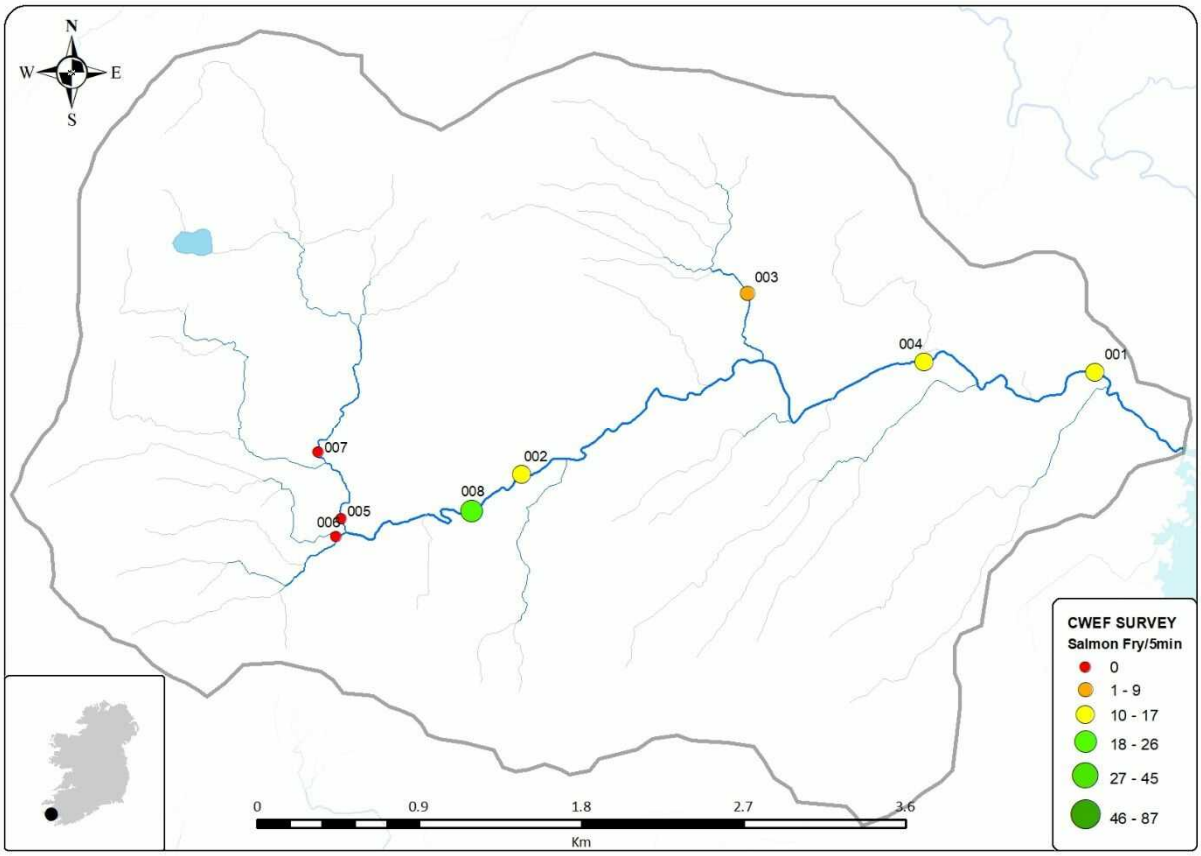
Conclusion

The Owreagh had a mean catch of 8.51 salmon fry/5min in 2019.This results in a cumulative average of 5.58 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.4.2: Site specific results of CWEF on the Owreagh catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	V 68040 66704	4	3	4	10	Include	4.57	11.43
002	V 64859 66136	4	3	1	10	Include	1.09	10.91
003	V 66109 67140	3	2	13	5	Include	15.17	5.83
004	V 67090 66762	4	1	3	13	Include	3.75	16.25
005	V 63856 65890	3	1	15	0	Include	17.00	0.00
006	V 63827 65789	3	1	12	0	Include	14.00	0.00
007	V 63730 66257	3	2	11	0	Include	13.00	0.00
008	V 64580 65930	4	2	2	20	Include	2.36	23.64

Map A.4.4.1: Showing locations of 2019 survey sites on the Owreagh River.



A.4.5. River Carhan

IFI Salmon Catchment #:	101
2019 survey dates:	18/7/2019/
Mean Salmon Fry/5 min (2019):	7.55 fry/5min.
CWEF Index:	9.49 fry/5min.

Sampling carried out by:	Fish Species Present:
Andrew Quigley	Brown Trout
Tony Holmes	European Eel
	Salmon

Figure A.4.5.1: Length distribution of salmon captured in 2019 CWEF survey on the Carhan Catchment.

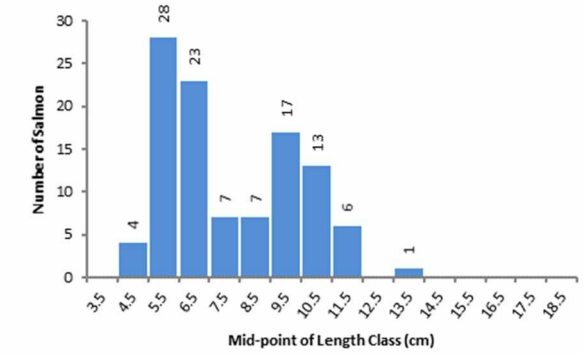
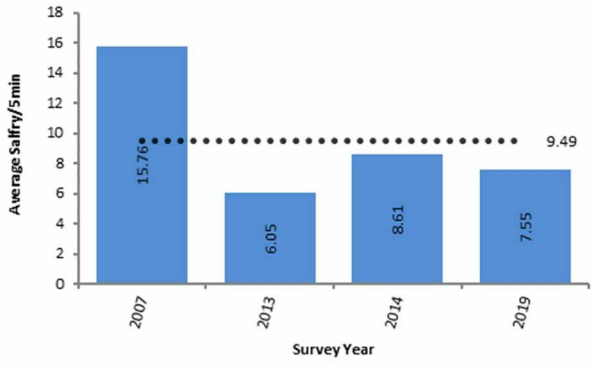


Figure A.4.5.2: Comparison of mean salmon fry/5min for all surveys on the Carhan catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Closed	6					3.00	15.76
2007	2008	Closed							
2008	2009	Closed							
2009	2010	Closed							
2010	2011	Closed							
2011	2012	Closed							
2012	2013	Closed	8					2.25	6.05
2013	2014	Closed	10					1.80	8.61
2014	2015	Closed							
2015	2016	Closed							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	10					1.80	7.55

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during on 22nd July 2019. The survey comprised 10 sites, all of which were included in the analysis. Salmon fry were present at 7 sites. The maximum fry catch was 22 salmon at site 3. The mean catch of included sites was 7.55 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

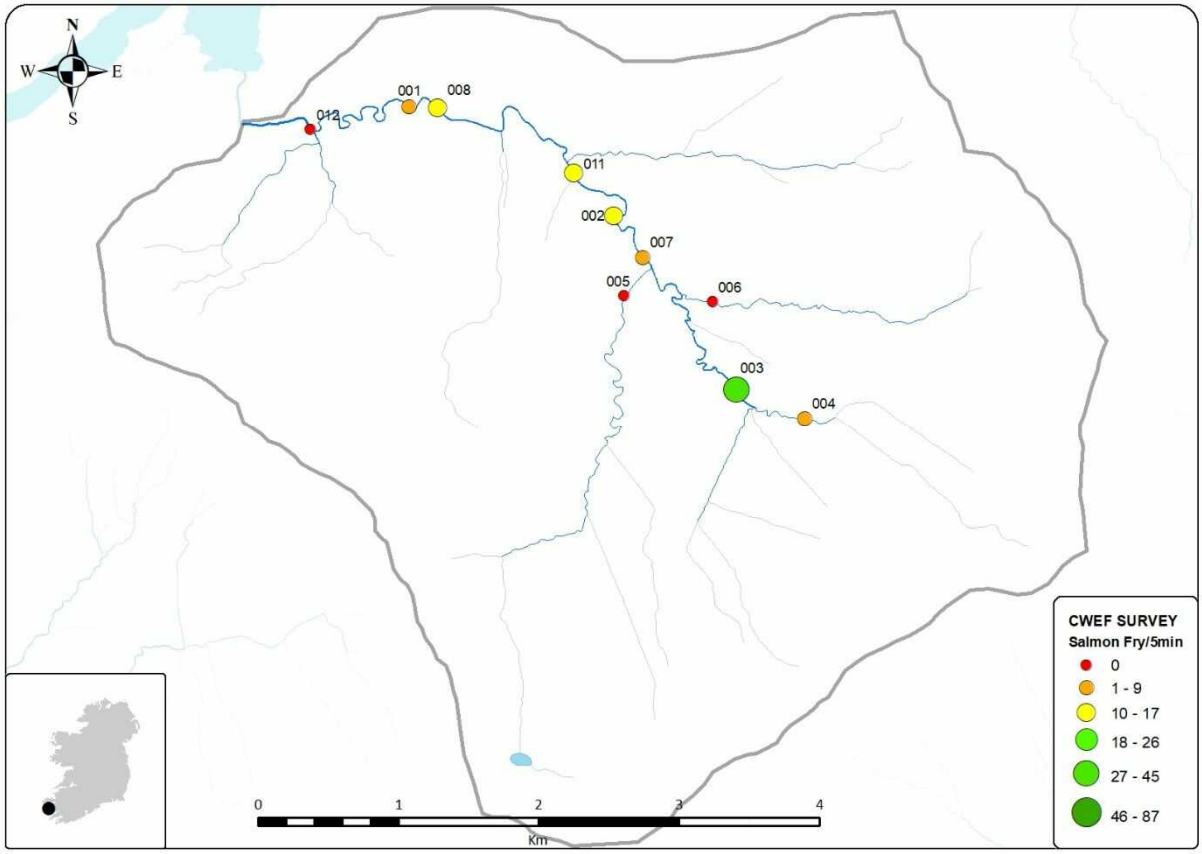
Conclusion

The Carhan had a mean catch of 7.55 salmon fry/5min in 2019. This results in a cumulative average of 9.49 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.5.2: Site specific results of CWEF major tributaries on the Carhan catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	V 49710 79746	3	1	3	5	Include	3.00	5.00
002	V 51172 78971	3	1	9	12	Include	11.57	15.43
003	V 52046 77733	3	1	12	22	Include	14.47	26.53
004	V 52527 77522	2	0	19	2	Include	22.62	2.38
005	V 51243 78401	2	3	12	0	Include	15.00	0.00
006	V 51874 78357	2	2	11	0	Include	14.00	0.00
007	V 51379 78668	3	0	21	1	Include	23.86	1.14
008	V 49919 79742	3	1	10	11	Include	11.43	12.57
011	V 50888 79275	3	2	2	10	Include	2.50	12.50
012	V 49014 79587	4	1	1	0	Include	1.00	0.00

Map A.4.5.1 Showing the locations and results of CWEF surveys on the Carhan River 2019.



A.4.6. River Ferta

IFI Salmon Catchment #:	102
2019 survey dates:	23/7/2019 – 19/9/2019
Mean Salmon Fry/5 min (2019):	12.06 fry/5min.
CWEF Index:	12.27 fry/5min.

Sampling carried out by:
Andrew Quigley
Danny Breen,
Tony Holmes

Fish Species Present:

Brown Trout	Salmon
European Eel	3-Spined Stickleback

Figure A.4.6.1: Length distribution of salmon captured in 2019 CWEF survey on the Ferta Catchment.

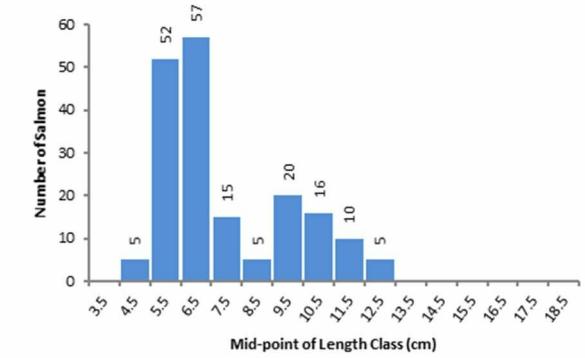
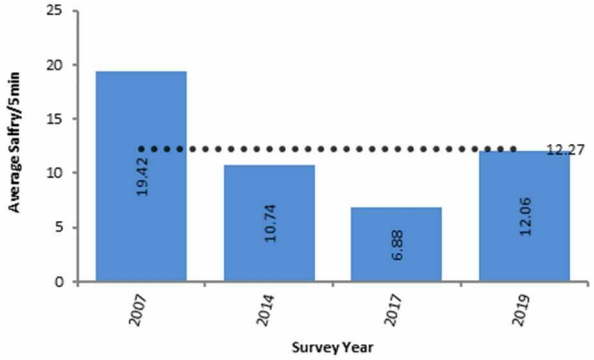


Figure A.4.6.2: Comparison of mean salmon fry/5min for all surveys on the Ferta catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Open	8					4.30	19.42
2007	2008	Open							
2008	2009	Open							
2009	2010	Open							
2010	2011	Open							
2011	2012	Open							
2012	2013	Open							
2013	2014	Open	12	1				2.65	10.74
2014	2015	C&R							
2015	2016	Open							
2016	2017	Open	12	1		3		2.15	6.88
2017	2018	C&R							
2018	2019	Open	13					2.65	12.06

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during July and September 2019. The survey comprised 13 sites, all of which were included in the analysis. Salmon fry were present at all 12 sites. The maximum fry catch was 37 salmon at site 7. The mean catch of included sites was 12.06 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

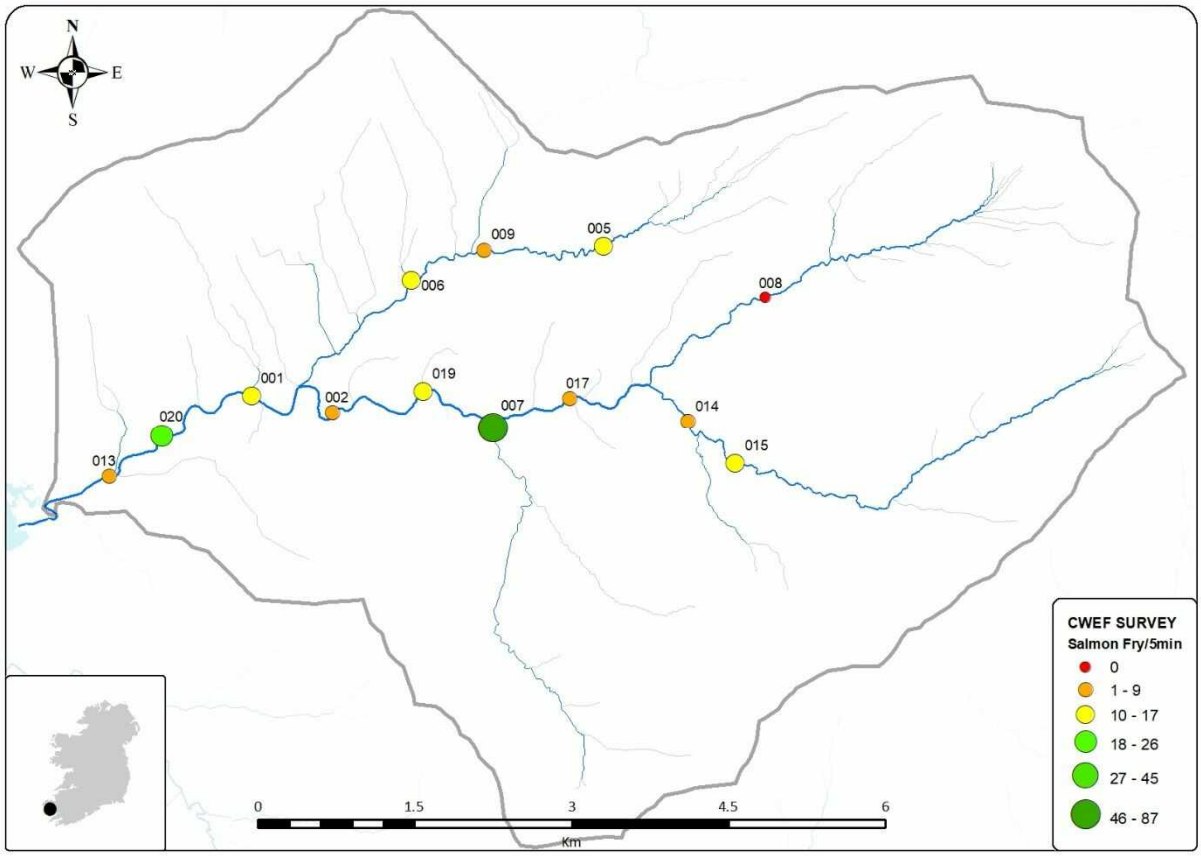
Conclusion

The Ferta had a mean catch of 12.06 salmon fry/5min in 2019. This results in a cumulative average of 12.27 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.6.2: Site specific results of CWEF major tributaries on the Ferta catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	V 52107 82375	4	1	0	12	Include	0.00	14.00
002	V 52883 82209	4	1	2	3	Include	2.00	3.00
005	V 55470 83801	3	2	14	9	Include	15.22	9.78
006	V 53636 83477	3	1	16	10	Include	17.85	11.15
007	V 54409 82062	2	1	8	37	Include	9.78	45.22
008	V 57014 83309	3	2	5	0	Include	5.00	0.00
009	V 54323 83757	3	1	17	6	Include	19.96	7.04
013	V 50751 81597	4	2	1	6	Include	1.29	7.71
014	V 56274 82126	3	2	0	8	Include	0.00	8.00
015	V 56727 81727	3	2	4	11	Include	5.33	14.67
017	V 55142 82343	4	2	1	3	Include	1.50	4.50
019	V 53747 82413	4	1	3	13	Include	3.00	13.00
020	V 51249 81987	4	1	1	14	Include	1.33	18.67

Map A.4.6.1 Showing the locations and results of CWEF surveys on the Ferta River, 2019.



A.4.7. River Behy

IFI Salmon Catchment #:	103
2019 survey dates:	18/9/2019
Mean Salmon Fry/5 min (2019):	6.60 fry/5min.
CWEF Index:	5.88 fry/5min.

Sampling carried out by:	Fish Species Present:
Andrew Quigley	Brown Trout
Danny Breen	European Eel
Tony Holmes	Salmon

Figure A.4.7.1: Length distribution of salmon captured in 2019 CWEF survey on the Behy Catchment.

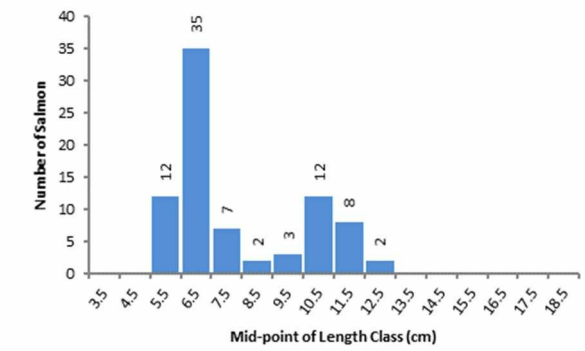
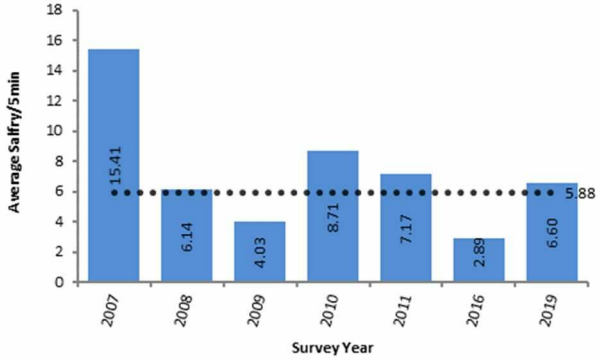


Figure A.4.7.2: Comparison of mean salmon fry/5min for all surveys on the Behy catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	C&R	8					3.53	15.41
2007	2008	C&R	9	1				2.82	6.14
2008	2009	C&R	9	1				2.82	4.03
2009	2010	C&R	8	1				3.13	8.71
2010	2011	C&R	10					2.82	7.17
2011	2012	C&R							
2012	2013	C&R							
2013	2014	C&R							
2014	2015	Closed							
2015	2016	Closed	11					2.56	2.89
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	10					2.82	6.60

C&R = Catch and Release; * Incomplete Surveys.

This, the Seventh CWEF survey of this catchment in the 2007 to 2019 period, was carried out on 18th September 2019. The survey comprised 10 sites, all of which were included in the analysis. Salmon fry were present at 8 sites, the maximum fry catch was 20 salmon at site 1. The mean catch of included sites was 6.60 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

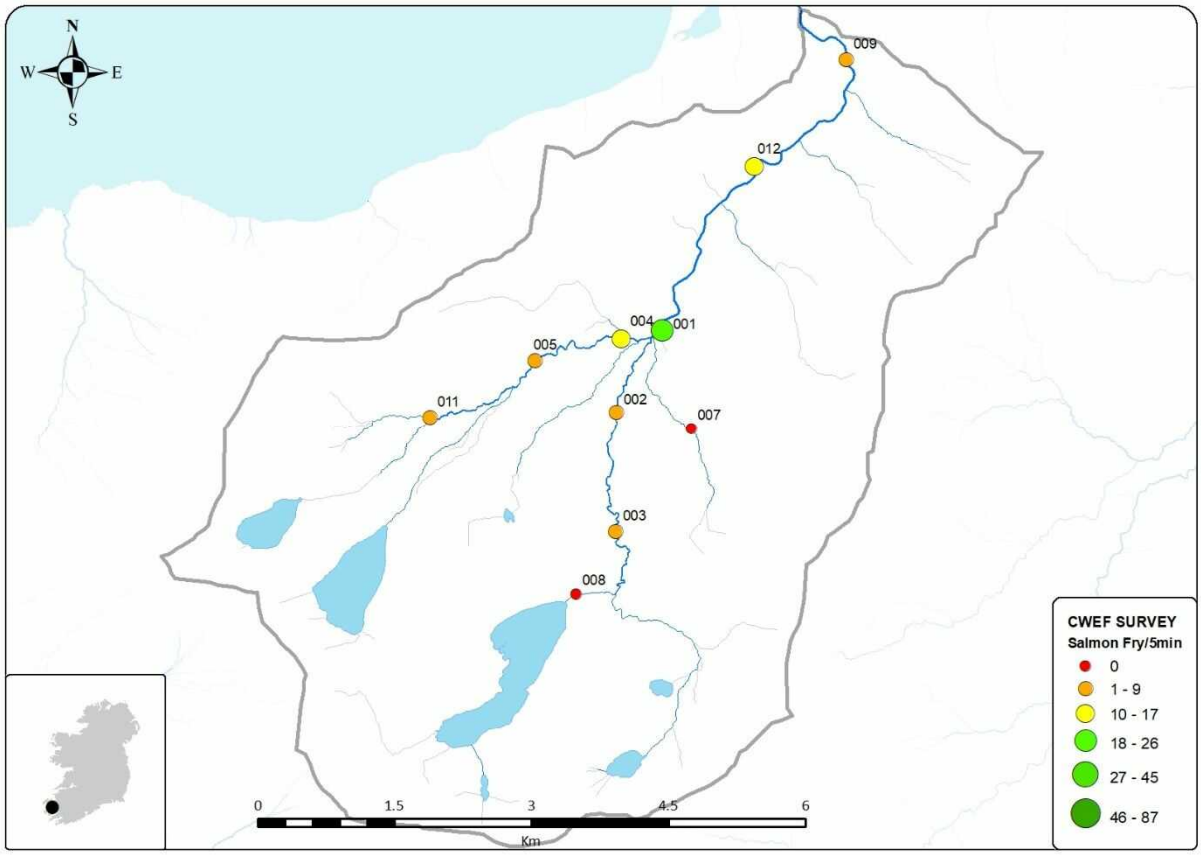
Conclusion

The Behy had a mean catch of 6.60 salmon fry/5min in 2019. This results in a cumulative average of 5.88 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.7.2: Site specific results of CWEF major tributaries on the Behy catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	V 64467 87888	4	1	3	20	Include	3.52	23.48
002	V 63965 86992	3	2	3	4	Include	4.29	5.71
003	V 63961 85686	3	2	3	4	Include	3.86	5.14
004	V 64021 87805	3	2	10	10	Include	12.00	12.00
005	V 63076 87560	3	2	2	1	Include	3.33	1.67
007	V 64795 86815	2	3	11	0	Include	13.00	0.00
008	V 63533 85000	2	3	2	0	Include	2.00	0.00
009	V 66485 90856	4	2	8	1	Include	10.67	1.33
011	V 61932 86938	2	1	19	1	Include	22.80	1.20
012	V 65480 89688	4	1	5	14	Include	5.53	15.47

Map A.4.7.1 Showing the locations and results of CWEF surveys on the Behy River, 2019.



A.4.8. River Milltown

IFI Salmon Catchment #:	111
2019 survey dates:	1/8/19
Mean Salmon Fry/5 min (2019):	11.25 fry/5min.
CWEF Index:	14.96 fry/5min.

Sampling carried out by:	Fish Species Present:	
Mick Millane	Brown Trout	Salmon
Tony Holmes	European Eel	3-Spined Stickleback
	Flounder	

Figure A.4.8.1: Length distribution of salmon captured in 2019 CWEF survey on the Milltown Catchment.

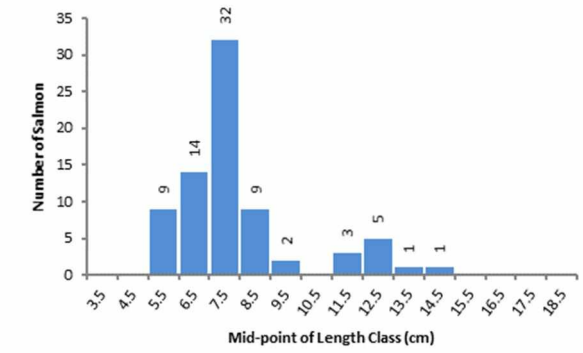
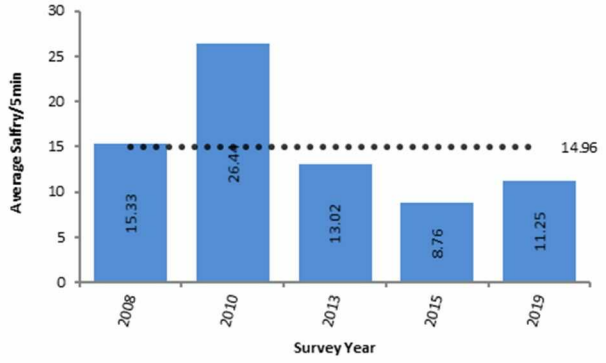


Figure A.4.8.2: Comparison of mean salmon fry/5min for all surveys on the Milltown catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	C&R							
2007	2008	C&R	5			1		2.73	15.33
2008	2009	C&R							
2009	2010	C&R	7	1				2.05	26.44
2010	2011	C&R							
2011	2012	C&R							
2012	2013	C&R	8			1		1.82	13.02
2013	2014	C&R							
2014	2015	C&R	8					2.05	8.76
2015	2016	C&R							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	C&R	7	1				2.05	11.25

C&R = Catch and Release; * Incomplete Surveys.

This, the fifth CWEF survey of this catchment in the 2007 to 2019 period, was carried out on 1st of August 2019. The survey comprised 8 sites, 7 of which were included in the analysis. Salmon fry were present at 8 sites, the maximum fry catch was 15 salmon at site 6. The mean catch of included sites was 11.25 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

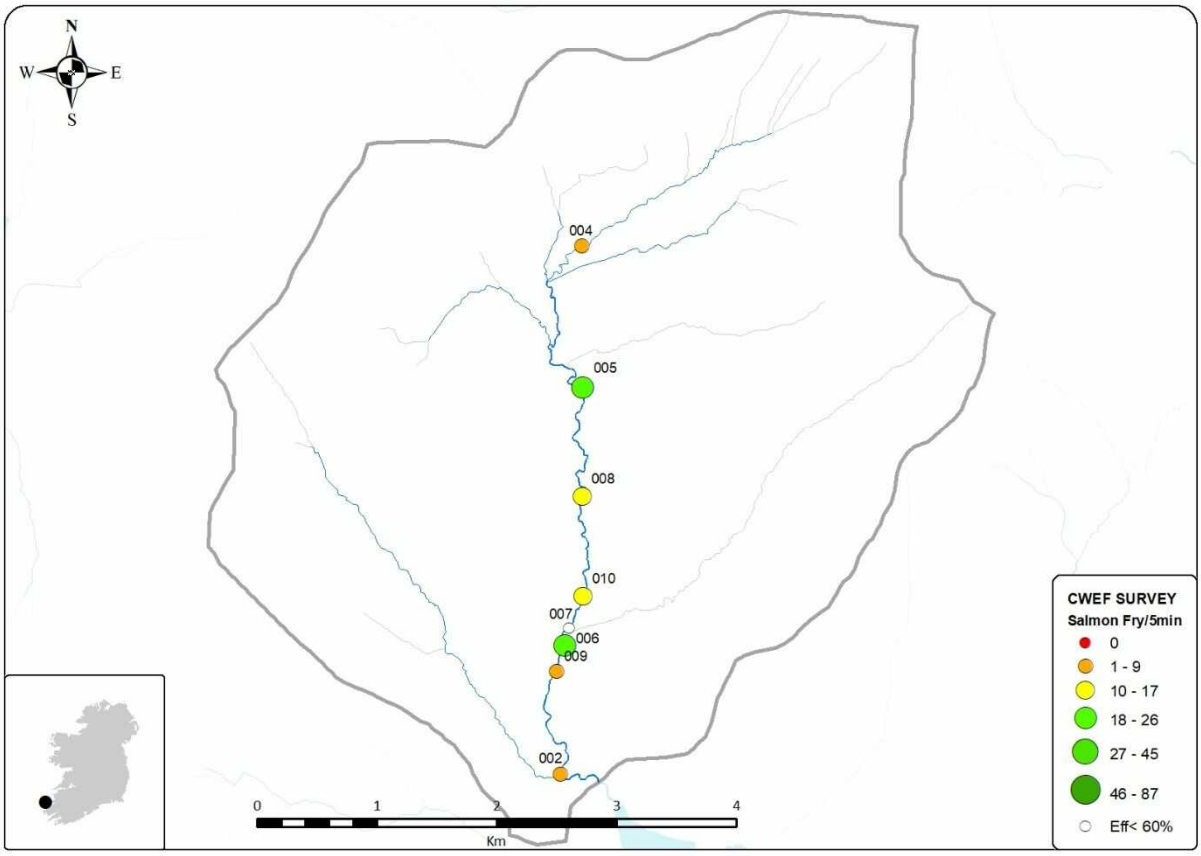
Conclusion

The Milltown had a mean catch of 11.25 salmon fry/5min in 2019. This results in a cumulative average of 14.96 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.8.2: Site specific results of CWEF major tributaries on the Milltown catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
002	Q 42924 01569	2	2	3	2	Include	4.20	2.80
004	Q 43102 05974	2	2	20	1	Include	24.76	1.24
005	Q 43107 04800	3	1	9	14	Include	12.52	19.48
006	Q 42962 02638	3	1	9	15	Include	13.13	21.88
007	Q 42998 02785	3	1	4	4	Eff <60%		
008	Q 43105 03885	3	1	5	11	Include	6.56	14.44
009	Q 42891 02423	3	1	9	6	Include	11.40	7.60
010	Q 43114 03054	3	2	4	8	Include	5.67	11.33

Map A.4.8.1 Showing the locations and results of CWEF surveys on the Milltown River, 2019.



A.4.9. River Feohanagh

IFI Salmon Catchment #:	112
2019 survey dates:	2/8/19
Mean Salmon Fry/5 min (2019):	13.75 fry/5min.
CWEF Index:	11.37 fry/5min.
Sampling carried out by:	Fish Species Present:
Mick Millane	Brown Trout
Tony Holmes	European Eel
	Salmon

Figure A.4.9.1: Length distribution of salmon captured in 2019 CWEF survey on the Feohanagh Catchment.

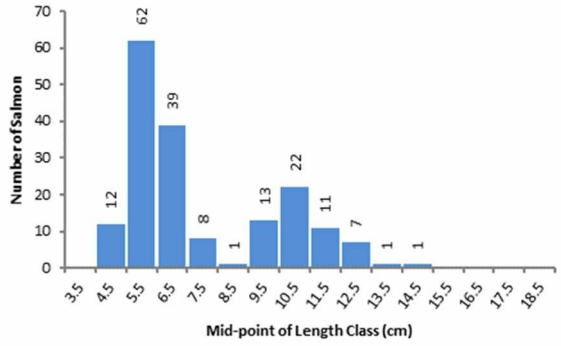
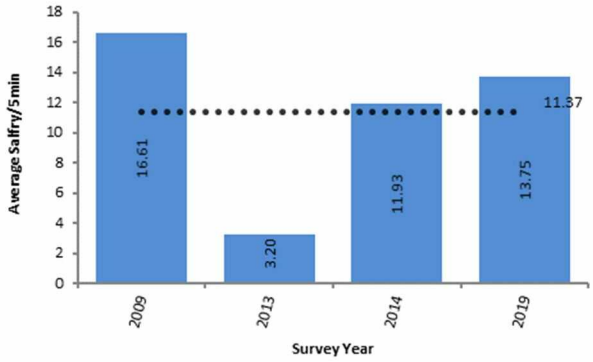


Figure A.4.9.2: Comparison of mean salmon fry/5min for all surveys on the Feohanagh catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2008	2009	C&R	10					2.94	16.61
2009	2010	C&R							
2010	2011	C&R							
2011	2012	C&R							
2012	2013	C&R	10			1		2.67	3.20
2013	2014	C&R	12					2.45	11.93
2014	2015	Closed							
2015	2016	Closed							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	11	1				2.45	13.75

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out on 2nd of August 2019. The survey comprised 12 sites, 11 of which were included in the analysis. Salmon fry were present at 10 sites, the maximum fry catch was 52 salmon at site 1. The mean catch of included sites was 13.75 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

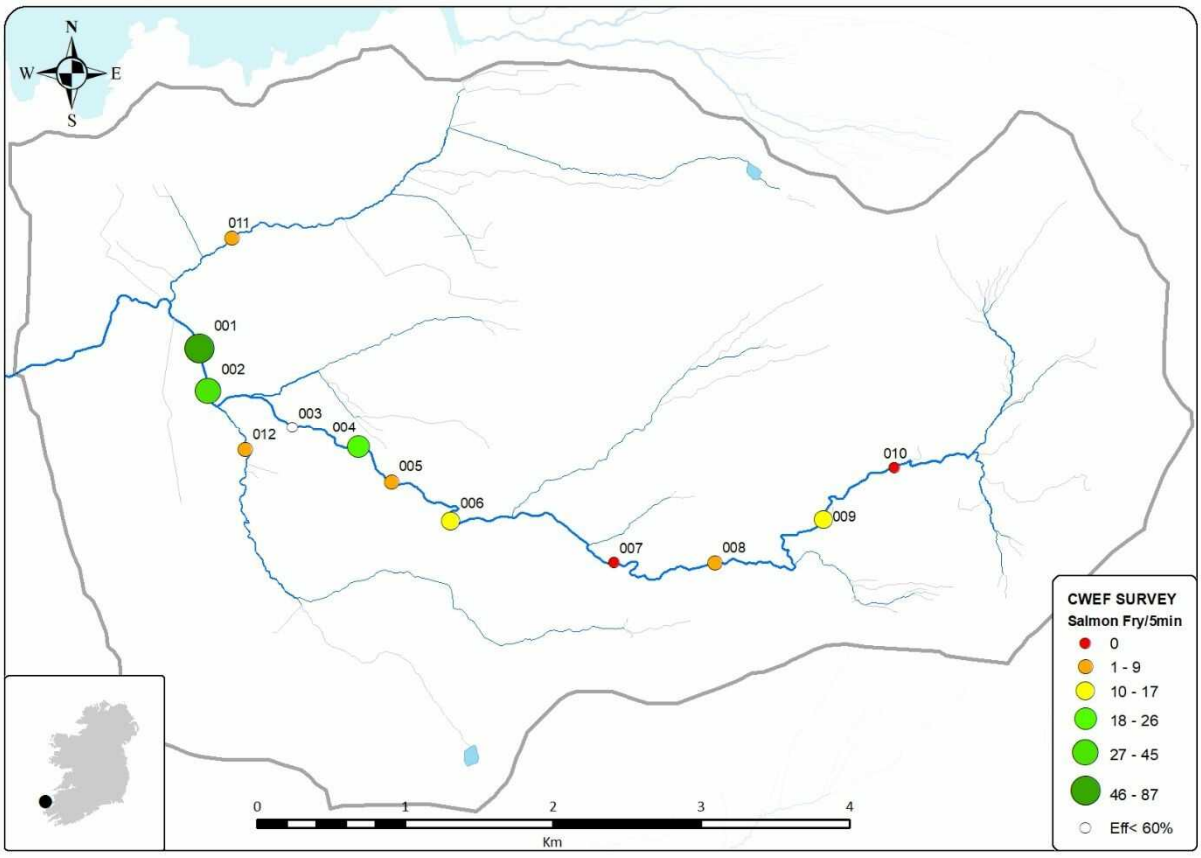
Conclusion

The Feohanagh had a mean catch of 13.75 salmon fry/5min in 2019. This results in a cumulative average of 11.37 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.4.9.2: Site specific results of CWEF major tributaries on the Feohanagh catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	Q 40432 09927	4	1	0	52	Include	0.00	68.00
002	Q 40492 09642	4	1	3	22	Include	3.72	27.28
003	Q 41063 09391	4	1	1	1	Eff <60%		
004	Q 41506 09259	4	1	7	18	Include	8.96	23.04
005	Q 41733 09020	4	2	7	3	Include	7.00	3.00
006	Q 42132 08760	4	3	7	9	Include	7.88	10.13
007	Q 43235 08478	4	1	26	0	Include	28.00	0.00
008	Q 43913 08471	4	1	13	2	Include	13.87	2.13
009	Q 44647 08766	4	1	16	11	Include	19.56	13.44
010	Q 45129 09116	4	1	11	0	Include	12.00	0.00
011	Q 40649 10671	3	3	5	3	Include	5.00	3.00
012	Q 40742 09236	3	2	10	1	Include	11.82	1.18

Map A.4.9.1 Showing the locations and results of CWEF surveys on the Feohanagh River, 2019.



A.5.Shannon River Basin District.

Summary

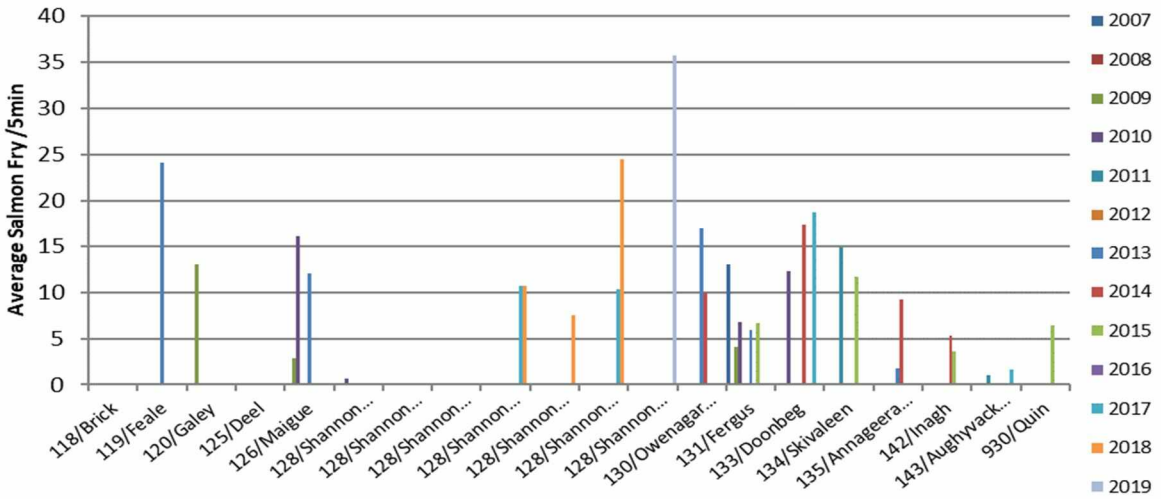
Since 2007, twenty-one catchments or sub catchments have been surveyed in the Shannon River Basin District (ShRBD) as part of the on-going catchment-wide electrofishing surveys. These are presented in (Table A.5.1). At present just one designated salmon river is meeting the threshold of 17 salmon fry per 5min. In this region in 2019 just one CWEF survey was undertaken. This was conducted on the old River Shannon channel near Castleconnell.

Table A.5.1: Catchment-wide Electrofishing data for the Shannon River Basin District 2009-2019 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C).

	Survey Year										Current Index	# Annual Surveys Considered
Code/River	2009	2010	2011	2013	2014	2015	2016	2017	2018	2019		
118/Brick											0.00	1
119/Feale				**24.15**							24.15	1
120/Galey	**12.99**										12.99	1
125/Deel			**0.18**		**0.23**		1.96*	**0.04**			0.15	3
126/Maigue	**2.82**	**16.05**		**12.05**							10.31	3
128/Shan. Kilcrow		**0.69†**									0.69	1
128/Shan. Graney.		**0.19†**									0.19	1
128/Shan. Woodfd.		**0.00†**									0.00	1
128/Shan. Mulkear									**8.00†***			
128/Shan. Blkwtr.								**10.7†**	**10.7†**		10.74	2
128/Shan. Groody.								**0.00†**	**7.45†**		3.73	2
128/Shan. Kilmast.								**10.3†**	**24.4†**		17.40	2
128/Shan. Old Ch.								5.5†*	18.2†*	**35.68†**	35.68	1
130/Owenagarney				**16.97**	**9.97**						13.47	2
131/Fergus	**4.10**	**6.84**		**5.89**		**6.66**					7.29	5
133/Doonbeg		**12.28**			**17.39**		16.1*	**18.77**			16.15	3
134/Skivaleen			**14.82**			**11.70**	14.5*				13.26	2
135/Annageeragh				**1.82**	**9.24**						5.53	2
142/Inagh					**5.31**	**3.59**					4.45	2
143/Aughyvackeen			**1.00**					**1.70**			1.35	2
930/Quin						**6.47**					6.47	1

Bold annual figures indicate years included in calculation of current CWEF index.
Underlined index figures indicate those exceeding the 17 salmon fry threshold.
* Incomplete surveys not included in calculation of current index.
† Sub-catchment surveys.

Figure A.5.2: Summary of CWEF results in Shannon River basin district 2007-2018.



A.5.1. River Shannon- Old main channel.

IFI Salmon Catchment #:	128
2019 survey dates:	30/7/2019-20/8/2019
Mean Salmon Fry/5 min (2019):	35.68 fry/5min.
CWEF Index:	35.68 fry/5min.

Sampling carried out by:
Mick Millane
Tony Holmes
Marcus McMahon

Fish Species Present:

Brown Trout	Minnow
Crayfish	Roach
Dace	Salmon
European Eel	Stone Loach
Flounder	3-Spined Stickleback
Gudgeon	

Figure A.5.2.1: Length distribution of salmon captured in the Shannon 2019 CWEF.

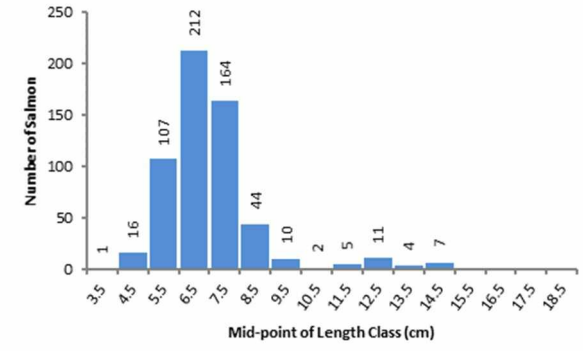
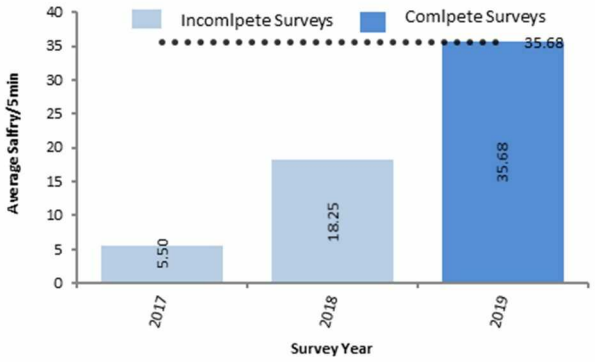


Figure A.4.5.2: Comparison of mean salmon fry/5min for all surveys on the Shannon catchment to 2019.



This, the third CWEF survey of this catchment in the 2007 to 2019 period, was carried out on the 30th July and 20 august 2019. Site selection was aided by a comprehensive site survey and detailed boat survey of the river along with consultation of local stakeholders to identify sites suitable for the survey. The survey comprised 26 sites, 20 of which were included in the analysis. Salmon fry were present at 22 sites. The maximum fry catch was 44 salmon at site 505. The mean catch of included sites was 35.68 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm. Previous surveys were restricted by high water levels.

Conclusion

The Shannon had a mean catch of 35.68 salmon fry/5min in 2019. This is the first comprehensive CWEF survey of this area and is used as the Cumulative mean for this area and is above the 17 salmon fry threshold.

Table A.4.5.1: Site specific results of CWEF on the Shannon main channel in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
501	R 66087 62925	0	2	0	34	Include	0.00	48.00
502	R 65520 62361	0	3	0	25	Include	0.00	39.00
503	R 65649 62484	0	2	1	36	Include	1.32	47.68
504	R 65659 62489	0	1	0	34	Include	0.00	46.00
505	R 65877 62879	0	1	0	44	Include	0.00	65.00
507	R 65359 61733	0	3	0	19	Include	0.00	27.00
508	R 65349 61880	0	2	0	43	Include	0.00	58.00
509	R 65533 61949	0	1	0	30	Include	0.00	37.00
510	R 65436 61652	0	2	0	34	Include	0.00	44.00
511	R 63854 61124	0	2	0	20	Include	0.00	30.00
512	R 65844 63462	0	1	0	27	Include	0.00	41.00
513	R 65808 63531	0	1	0	37	Include	0.00	53.00
514	R 65669 63936	0	1	0	15	Include	0.00	25.00
515	R 65686 63985	0	1	0	22	Include	0.00	25.00
516	R 64530 61686	0	2	0	25	Include	0.00	30.00
517	R 64516 61616	0	2	0	16	Include	0.00	22.00
518	R 58301 60144	0	3	0	0	Include	0.00	0.00
519	R 61213 58535	0	1	0	26	Include	0.00	33.00
522	R 62032 58594	0	2	0	11	Include	0.00	16.00
525	R 61254 58649	0	2	0	17	Include	0.00	27.00
506	R 65244 61655	0	2	1	19	Eff <60%		
520	R 61346 58497	0	2	0	7	Eff <60%		
523	R 62012 58618	0	0	0	3	Eff <60%		
524	R 61917 58471	0	0	0	0	Water Too Fast		
526	R 61187 58638	0	0	0	0	Water Too Fast		
521	R 63042 58896	0	3	0	0	Deep No Riffle- Best site in this entire stretch		

Map A.4.5.1 Showing the extent of the boat survey and the fishing locations and results of CWEF surveys on the

A.6.Western River Basin District.

Summary

Since 2007, thirty catchments have been surveyed in the Western River Basin District (WRBD) as part of the on-going catchment-wide electrofishing programme. These are presented in (Table A.6.1). At present six rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2019 three CWEF surveys were undertaken. These were conducted on the Erriff, Carrownisky, and Owenwee/Belclare.

Table A.6.1: Catchment-wide Electrofishing data for the Western River Basin District 2009-2019 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C).

	Survey Year											Current	# Annual Surveys
Code/River	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Index	Considered
145/Kilcolgan	**2.51**								*0.10	**0.79**		1.65	2
146/Clarinbridge			**7.26**									7.26	1
147/Corrib Owenriff										*10.3		15.75	1
148/Knock			**12.53**							*1.5		12.53	1
149/Owenboliska						*4.52				**0.60**		3.06	3
152/Cashla					**10.83**							10.83	1
154/L. Na Furnace							**0.00**					0.00	1
155/Screeb									**10.70**			10.70	1
163/Owenglin	**11.57**											11.57	1
167/Culfin												30.83	1
168/Erriff	16.03	20.43	20.86	24.45	27.45	24.90	**28.52**	**21.72**	**13.69**	**22.81**	**22.25**	21.80	5
171/Carrownisky				**20.60**	**18.22**				**4.25**		**15.24**	18.08	4
172/Bunowen	**13.62**											13.62	1
173/Owenwee		**8.47**	**7.25**	**15.27**							**4.49**	8.87	4
178/Newport	**5.53**					**17.40**						13.00	3
179/Srahmore	**4.33**											4.33	1
181/Owengarve	**5.51**					**6.19**	**0.72**					4.14	3
185/Owenduff	**6.00**					**6.20**						6.10	2
186/Owenmore					**27.65**							27.65	1
186/ Carrowmore					**25.77**							25.77	1
187/Glenamoy	**5.65**											16.91	2
188/Muingnabo							**1.88**					1.33	2
193/Ballinglen			**15.09**		**6.37**			**4.97**				9.27	4
194/Cloonaghmore		**9.71**	**22.27**	**17.32**	**15.02**				*5.07	14.63		15.79	5
196/Brusna	**4.70**				**14.16**	**14.74**						11.20	3
198/Leaffony	**7.95**						**1.87**					5.20	3
203/Garvogue	**16.83**	**11.31**	**7.08**	**18.54**								13.41	5
205/Drumcliff		**17.72**										17.72	1
207/Grange	**3.29**						**4.56**					4.53	3
1461/Oranmore										*0.63			0
1551/L. An Mhuillin									**0.00**			0.00	1

Bold annual figures indicate years included in calculation of current CWEF index.
Underlined index figures indicate those exceeding the 17 salmon fry threshold.
* Incomplete surveys not included in calculation of current index.

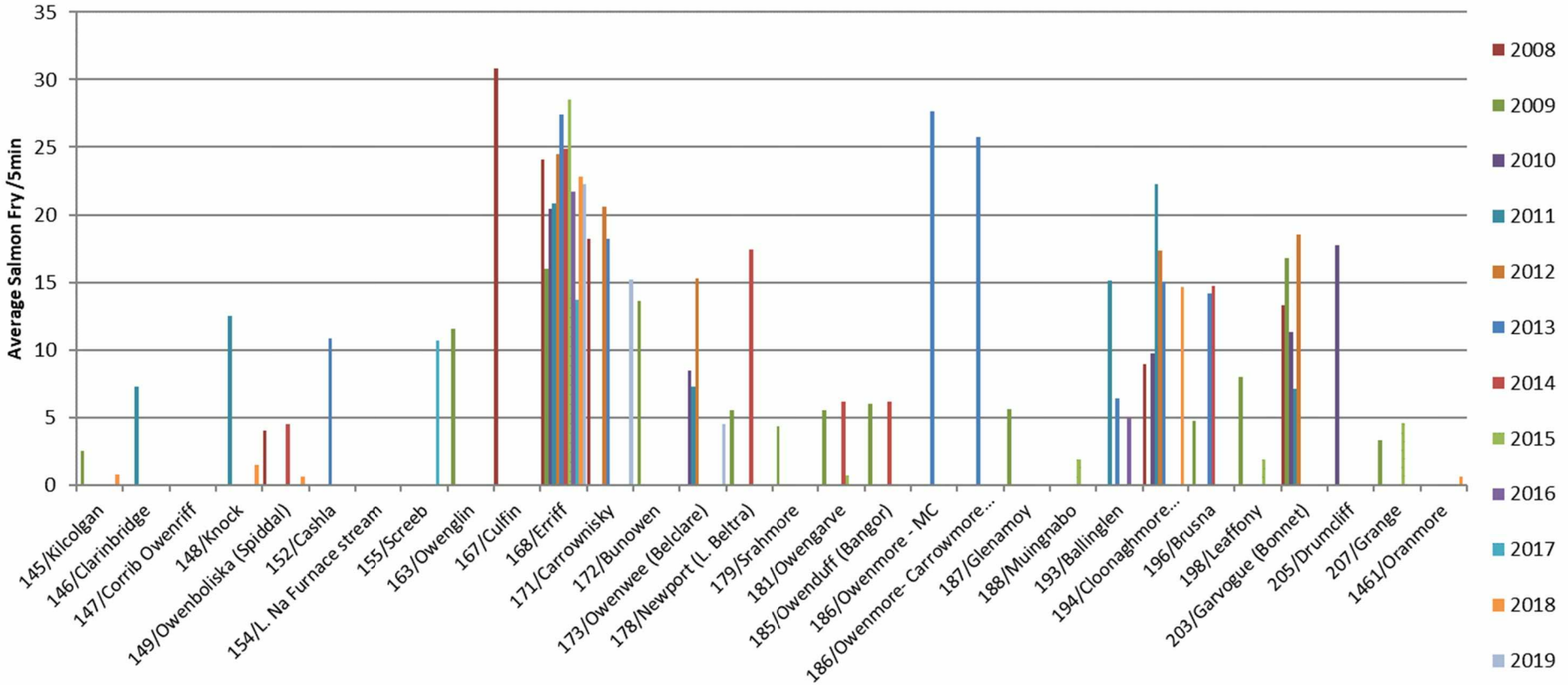


Figure A.6.1: Summary of CWEF results in Western River basin district 2009-2019.

A.6.1. River Erriff

IFI Salmon Catchment #:	168
2019 survey dates:	17– 19/9/19
Mean Salmon Fry/5 min (2019):	22.25 fry/5min.
CWEF Index:	21.80 fry/5min.

Sampling carried out by:
Donovan Brinklow
Mick Millane
Paddy Gargan

Fish Species Present:

Brown Trout	Salmon
European Eel	3-spined Stickleback
Minnow	

Figure A.6.1.1: Length distribution of salmon captured in 2019 CWEF survey on the Erriff Catchment.

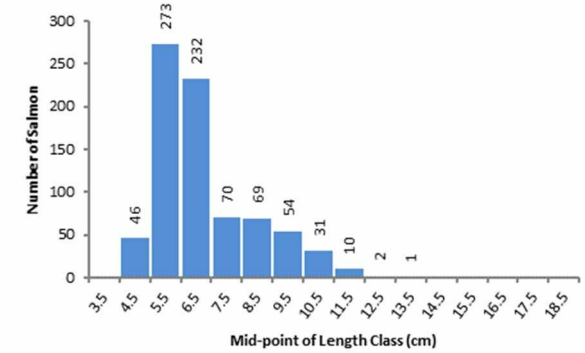
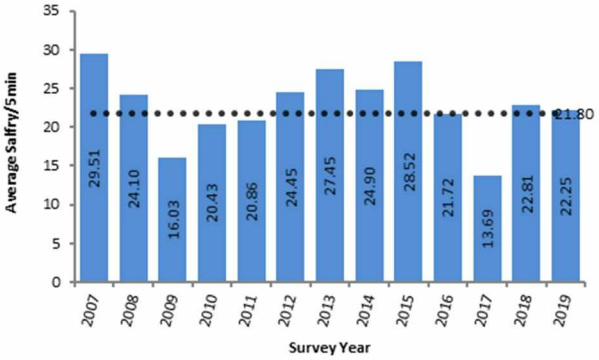


Figure A.6.1.2: Comparison of mean salmon fry/5min for all surveys on the Erriff catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Open	44	5	2	2		2.68	29.51
2007	2008	Open	46		1	2		2.89	24.10
2008	2009	Open	33	16	2	2		2.68	16.03
2009	2010	Open	46	2	2	1		2.78	20.43
2010	2011	Open	32		1	1	1	4.05	20.86
2011	2012	Open	33		1	1		4.05	24.45
2012	2013	Open	33		1			4.17	27.45
2013	2014	Open	34		1			4.05	24.90
2014	2015	Open	35		1	1		3.83	28.52
2015	2016	Open	33					4.30	21.72
2016	2017	Open	33					4.30	13.69
2017	2018	Open	33			1		4.17	22.81
2018	2019	Open	35			1		3.94	22.25

C&R = Catch and Release; * Incomplete Surveys.

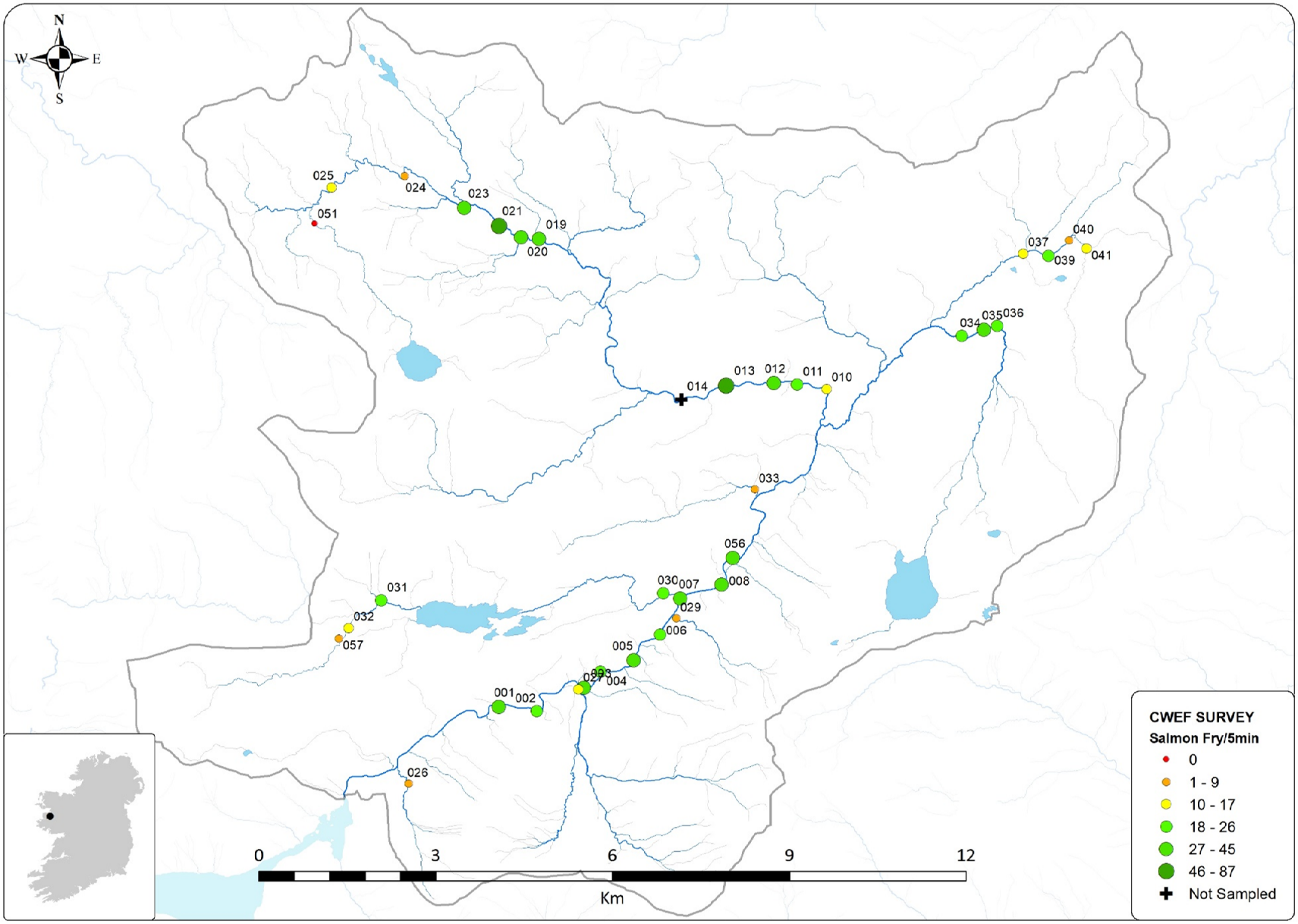
This, the thirteenth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during September 2018. The survey comprised 36 sites, 35 of which were included in the analysis. Salmon fry were observed at 34 sites, the maximum fry catch was 47 salmon at site 21. The mean catch of included sites was 22.25 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

Conclusion

The Erriff had a mean catch of 22.25 salmon fry/5min in 2019. Taking the most recent 5 surveys into account, this results in a cumulative average of 21.80 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.6.1.2 Site specific results of CWEF on the Erriff catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	L 92056 65797	5	1	0	21	Include	0.00	27.00
002	L 92702 65721	5	1	0	21	Include	0.00	26.00
003	L 93503 66122	5	1	0	24	Include	0.00	30.00
004	L 93784 66390	5	1	0	21	Include	0.00	26.00
005	L 94352 66589	5	2	0	27	Include	0.00	34.00
006	L 94798 67019	5	1	0	20	Include	0.00	25.00
007	L 95142 67641	5	1	0	28	Include	0.00	35.00
008	L 95846 67875	5	1	0	27	Include	0.00	33.00
010	L 97630 71190	4	2	1	13	Include	1.29	16.71
011	L 97125 71269	4	1	0	19	Include	0.00	24.00
012	L 96732 71295	4	1	0	32	Include	0.00	40.00
013	L 95919 71252	4	1	0	40	Include	0.00	48.00
014	L 95163 71013	4	1	0	0	Not Fished- habitat changed		
019	L 92739 73748	4	1	1	22	Include	1.26	27.74
020	L 92438 73774	4	1	0	30	Include	0.00	34.00
021	L 92057 73962	4	1	0	47	Include	0.00	57.00
023	L 91466 74275	4	1	0	29	Include	0.00	37.00
024	L 90454 74809	3	1	2	8	Include	2.00	8.00
025	L 89216 74612	3	1	0	10	Include	0.00	10.00
026	L 90525 64492	3	2	2	7	Include	2.22	7.78
027	L 93408 66092	4	1	1	9	Include	1.20	10.80
029	L 95076 67299	3	3	4	4	Include	5.00	5.00
030	L 94855 67725	3	1	0	19	Include	0.00	23.00
031	L 90058 67605	3	2	7	16	Include	8.22	18.78
032	L 89506 67128	2	2	0	9	Include	0.00	12.00
033	L 96407 69493	3	2	1	8	Include	1.11	8.89
034	L 99926 72098	4	1	0	20	Include	0.00	24.00
035	M 00301 72204	4	1	0	23	Include	0.00	28.00
036	M 00529 72263	4	2	0	18	Include	0.00	24.00
037	M 00973 73488	3	1	2	10	Include	2.00	10.00
039	M 01401 73456	3	1	3	13	Include	3.94	17.06
040	M 01753 73717	3	2	3	3	Include	4.00	4.00
041	M 02046 73578	2	1	0	7	Include	0.00	10.00
051	L 88924 74002	2	2	0	0	Include	0.00	0.00
056	L 96034 68324	5	2	0	26	Include	0.00	32.00
057	L 89337 66953	2	2	2	5	Include	2.00	5.00



Map A.6.1.1: Showing locations of 2019 survey sites on Erriff River.

A.6.2. River Carrownisky

IFI Salmon Catchment #:	171
2019 survey dates:	20-25/09/2019
Mean Salmon Fry/5 min (2019):	15.24 fry/5min.
CWEF Index:	18.08 fry/5min.

Sampling carried out by:		Fish Species Present:	
Alex Hahn	Paddy Gargan	Brown Trout	Lamprey sp.
Mick Millane	Paudie O'Malley	European Eel	Salmon

Figure A.6.2.1: Length distribution of salmon captured in 2019 CWEF survey on the Carrownisky Catchment.

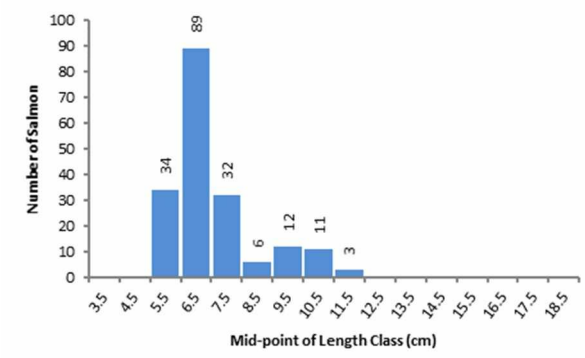
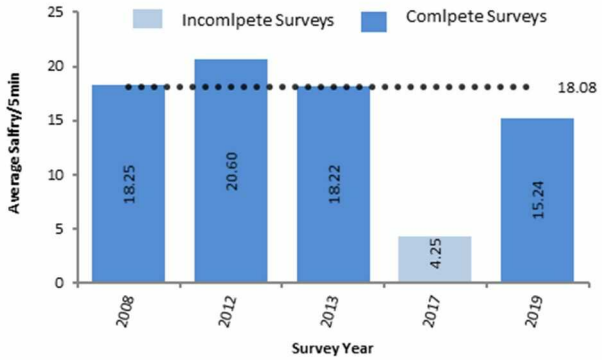


Figure A.6.2.2: Comparison of mean salmon fry/5min for all surveys on the Carrownisky catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	C&R	16	3	1			2.08	18.25
2008	2009	C&R							
2009	2010	C&R							
2010	2011	C&R							
2011	2012	C&R	19					2.19	20.60
2012	2013	C&R	17					2.45	18.22
2013	2014	C&R							
2014	2015	C&R							
2015	2016	C&R							
2016	2017	C&R	4					10.42	4.25
2017	2018	C&R							
2018	2019	C&R	13					3.21	15.24

C&R = Catch and Release; * Incomplete Surveys.

This, was the second CWEF survey of this biodiversity river in the 2007 to 2018 period, was carried out during September 2018. The survey comprised 13 sites all of which were used in the analysis. Salmon fry were present at all sites. The maximum fry catch was 23 salmon at site 1. The mean catch of included sites was 15.24 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

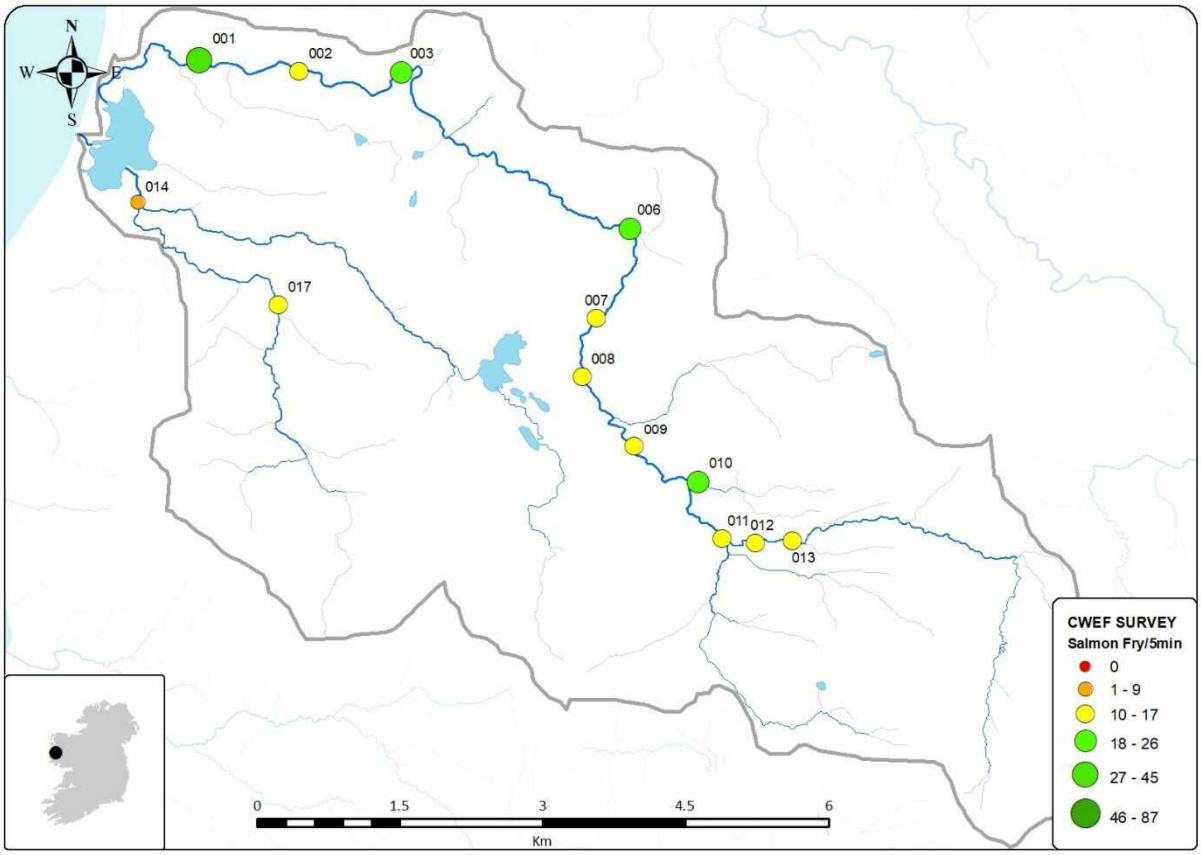
Conclusion

The Carrowinsky had a mean catch of 15.24 salmon fry/5min in 2019, Considering the most recent four surveys this results in a cumulative average of 18.08 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.6.2.2: Site specific results of CWEF on the Carrownisky catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	L 76033 77436	4	1	0	23	Include	0.00	27.00
002	L 77078 77319	4	1	0	10	Include	0.00	16.00
003	L 78148 77301	4	1	3	14	Include	4.06	18.94
006	L 80541 75666	4	1	4	20	Include	4.33	21.67
007	L 80197 74734	4	2	2	14	Include	2.00	14.00
008	L 80047 74125	4	1	0	7	Include	0.00	10.00
009	L 80594 73387	4	2	0	9	Include	0.00	12.00
010	L 81256 73007	4	1	0	17	Include	0.00	22.00
011	L 81513 72416	4	1	0	11	Include	0.00	14.00
012	L 81866 72368	3	2	0	9	Include	0.00	12.00
013	L 82251 72397	3	2	1	9	Include	1.30	11.70
014	L 75384 75943	3	2	2	5	Include	2.00	5.00
017	L 76864 74879	3	1	12	11	Include	15.13	13.87

Map A.6.2.1: Showing locations and results of 2019 survey sites on Carrownisky River.



A.6.3. River Owenwee (Belclare)

IFI Salmon Catchment #:	173
2019 survey dates:	24 - 25/9/2018
Mean Salmon Fry/5 min (2019):	4.49 fry/5min.
CWEF Index:	8.87 fry/5min.
Sampling carried out by:	Fish Species Present:
Alex Hahn	Brown Trout
Mick Millane	Salmon

Figure A.6.3.1: Length distribution of salmon captured in 2017 CWEF survey on the Owenwee Catchment.

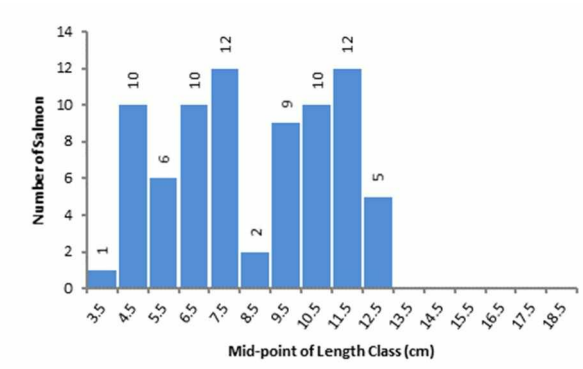
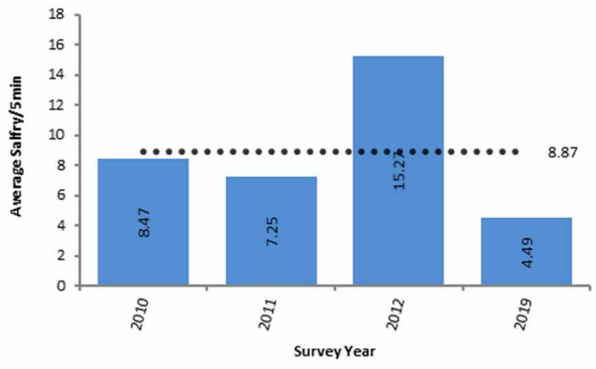


Figure A.6.3.2: Comparison of mean salmon fry/5min for all surveys on the Owenwee catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2009	2010	C&R	10	1				3.76	8.47
2010	2011	C&R	9					4.60	7.25
2011	2012	C&R	11					3.76	15.27
2012	2013	C&R							
2013	2014	C&R							
2014	2015	Open							
2015	2016	Open							
2016	2017	Open							
2017	2018	C&R							
2018	2019	C&R	11					3.76	4.49

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during July and September 2019. The survey comprised 11 sites, all of which were included in the analysis. Salmon fry were present at 8 sites. The maximum fry catch was 12 salmon at site 3. The mean catch of included sites was 4.49 salmon fry/5min. The modal length category of 0+ fry caught was 7.5cm.

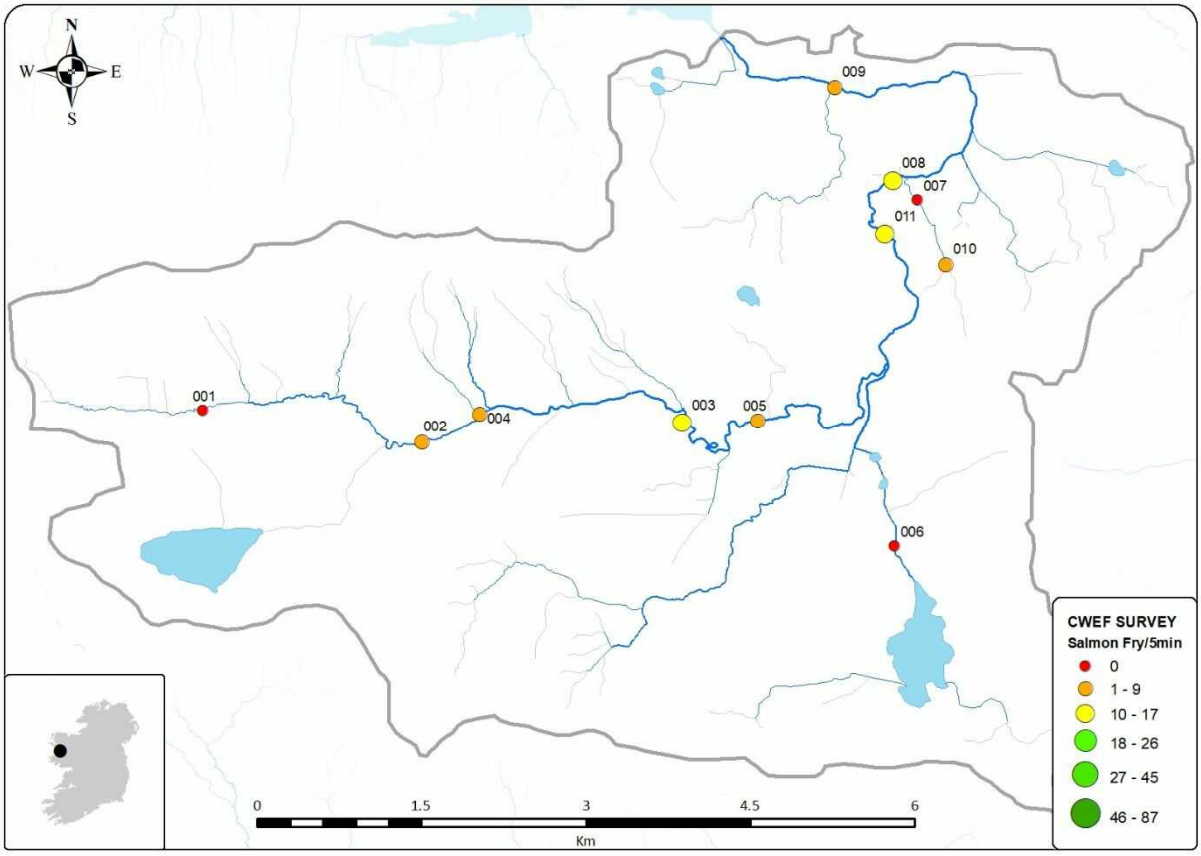
Conclusion

The Owenwee had a mean catch of 4.49 salmon fry/5min in 2019. This results in a cumulative average of 8.87 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.6.3.2: Site specific results of CWEF on the Owenwee catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	L 91117 78854	2	1	14	0	Include	16.00	0.00
002	L 93116 78557	3	2	3	1	Include	3.00	1.00
003	L 95490 78738	4	1	2	12	Include	2.71	16.29
004	L 93642 78812	3	1	7	1	Include	7.88	1.13
005	L 96180 78750	4	1	0	4	Include	0.00	5.00
006	L 97427 77608	3	2	1	0	Include	1.00	0.00
007	L 97637 80771	2	1	6	0	Include	7.00	0.00
008	L 97413 80948	5	1	1	9	Include	1.30	11.70
009	L 96877 81790	5	1	4	2	Include	5.33	2.67
010	L 97892 80179	2	1	13	2	Include	13.00	2.00
011	L 97341 80460	5	1	2	8	Include	2.40	9.60

Map A.6.3.1: Showing locations of 2019 survey sites on the Owenwee River.



A.7.North Western River Basin District.

Summary

Since 2007, thirty-two salmon rivers have been surveyed in the North Western River Basin District (NWRBD) as part of the on-going catchment-wide electrofishing surveys. These are presented in (Table A.7.1). At present eleven rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2019 CWEF six surveys were undertaken. These were in the Erne, Ballintra, Laghy, Bungosteen, Yellow and Leannan.

Table A.7.1: Catchment-wide Electrofishing data for the North Western River Basin District 2009-2019 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate (for surveys prior to 2009 see appendix C).

	Survey Year											Current	# Annual Surveys
Code/River	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Index	Considered
208/Duff	**18.59**	**25.16**							**18.05**	**20.34**		18.29	5
210/Erne	0.17	0.08	0.00	0.00	0.00	1.60	**1.16**	**1.25**	**0.00**	**0.49**	**0.00**	0.58	5
211/Abbey					**7.20**	**28.14**						17.67	2
212/Ballintra	**10.27**				**13.40**	**19.82**					**13.31**	14.20	4
213/Laghy	**8.58**				**14.97**	**11.02**					**8.56**	10.78	4
214/Eske	**16.99**	**16.30**					**13.45**			**10.94**		14.16	5
215/Eany		**15.86**		**30.08**			**12.89**					19.61	3
216/Oily	**9.49**		**33.68**			**16.62**			**21.26**			20.26	4
217/Bungosteen			**27.91**		**19.23**				**13.17**		**13.41**	18.43	4
219/Glen (Ballyshannon)		**19.44**					**18.37**			**18.56**		18.79	3
220/Owenwee (Yellow R)	**14.81**			**20.31**	**19.65**						**14.20**	15.50	5
221/Bracky				**21.57**		**12.24**						14.88	3
222/Owentocker												20.06	1
223/Owenea										**33.94**		33.94	1
226/Owenamarve	**3.76**				**2.64**	**1.00**						2.47	3
228/Gweedore (Crolly R.)			**11.32**									13.65	2
229/Clady				**37.21**								26.67	2
234/Glenna	**16.80**		**3.77**		**7.77**			**4.00**				8.09	4
235/Tullaghobegly		**9.05**						0.0*				8.69	2
236/Ray			**14.89**			**17.31**		3.7*				12.88	3
240/Lackagh	**15.82**		**19.20**	**23.57**				17.5*	**22.5**			19.99	5
248/Leannan	8.73	16.71	12.36	21.51	19.51	**20.87**	**15.27**	15.1*	**18.66**	**20.11**	**21.33**	19.25	5
249/Swilly	**7.36**				**18.08**	**8.05**						10.71	4
250/Isle (Burn)				**2.12**								2.12	1
251/Burnfoot		**2.90**										5.33	2
252/Mill (Letterkenny)		**0.00**					**0.00**					0.00	2
253/Crana	**15.74**							6.0*	6.9*	**16.38**		16.06	2
256/Clonmany		**6.59**					**4.21**					9.14	3
257/Straid		**0.20**					**0.00**					0.10	2
258/Donagh		**4.25**					**0.68**					2.46	2
259/Glennagannon	**16.65**		**4.05**		**7.13**							9.28	3
261/Culoort		**4.03**					**0.00**					2.02	2

Bold annual figures indicate years included in calculation of current CWEF index.
Underlined index figures indicate those exceeding the 17 salmon fry threshold.
* Incomplete surveys not included in calculation of current index.

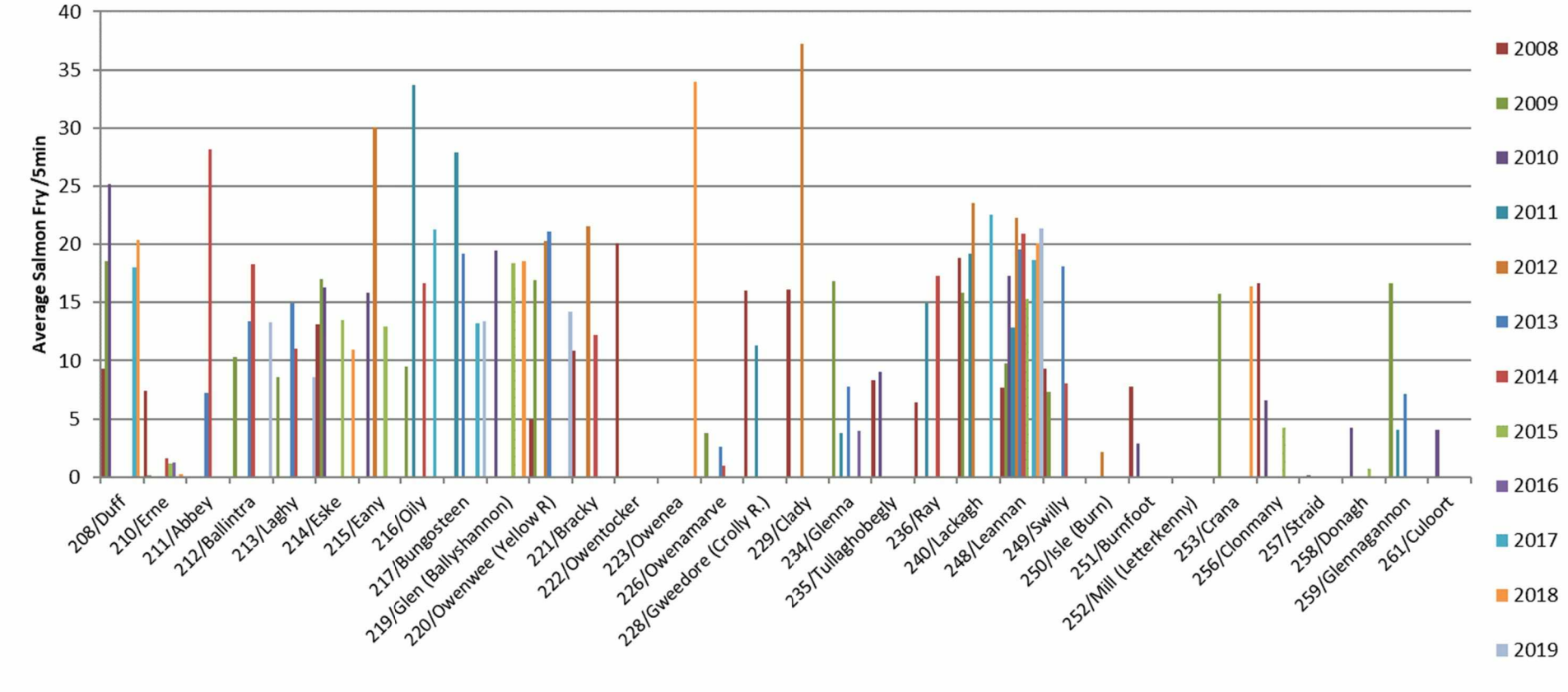


Figure A.7: Summary of CWEF results in North Western River basin district 2009-2019.

A.7.1. River Erne

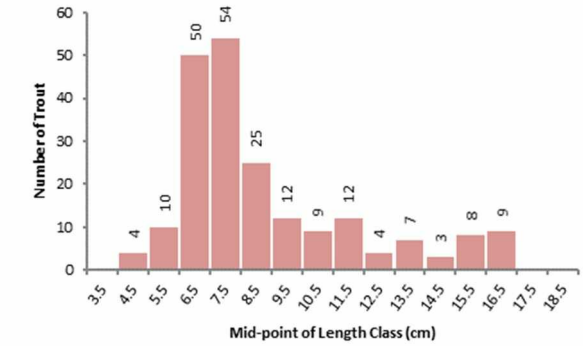
IFI Salmon Catchment #:	210
2019 survey dates:	29/7/19 – 18/9/19
Mean Salmon Fry/5 min (2019):	0.00 fry/5min.

Sampling carried out by:
Dave Bancroft
Kevan Murphy
Tom Bannnon

Fish Species Present:

Brown Trout	Perch
European Eel	Roach
Lamprey sp.	Stone Loach
Minnow	Three Spined Stickleback

Figure A.7.1.1: Length distribution of brown trout captured in 2019 CWEF survey on the Erne Catchment.



This CWEF survey of this catchment was focused on a section of the Aghacashlaun, Bruskey, Bunnoe and Yellow catchments. The survey was carried out from July to Sept 2019 and comprised 30 sites, 26 of which were included in the analysis. Salmon fry were absent from all sites.

Conclusion

The absence of salmon fry and parr observed in 2019 suggests very few or no salmon spawned in these areas in late 2018.

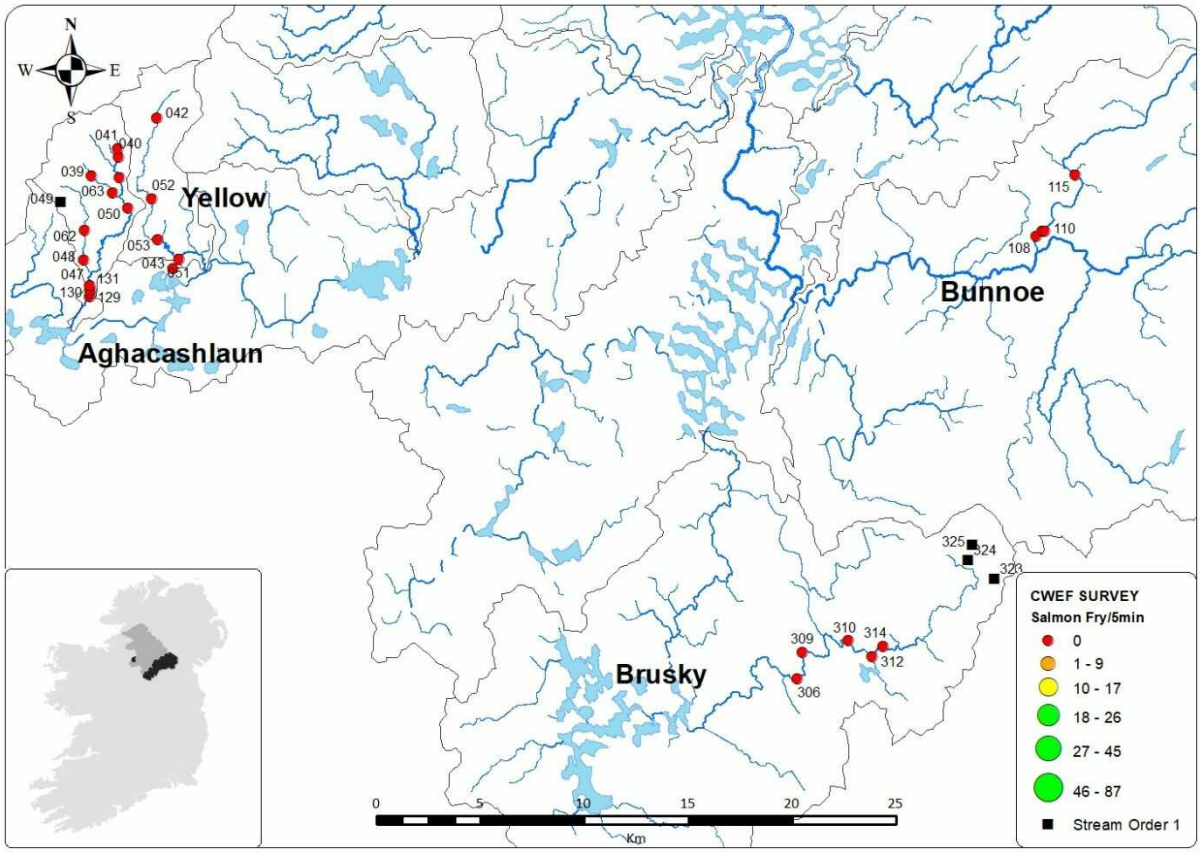
Table A.7.1.1: Site Specific results of CWEF survey on the Erne catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
Aghacashel River								
039	H 04995 16097	2	3	1	0	Include	1.00	0.00
046	H 06320 15992	3	2	0	0	Include	0.00	0.00
047	H 04889 10814	3	2	4	0	Include	4.00	0.00
048	H 04607 12017	2	1	3	0	Include	9.00	0.00
049	H 03516 14816	1	2	0	0	Order<2		
050	H 06751 14523	3	2	0	0	Include	0.00	0.00
062	H 04638 13462	2	2	4	0	Include	4.00	0.00
063	H 05987 15242	2	2	0	0	Include	0.00	0.00
129	H 04876 10265	3	2	12	0	Include	17.00	0.00
130	H 04926 10428	3	1	8	0	Include	8.00	0.00
131	H 04923 10611	3	1	4	0	Include	4.00	0.00
Bruskey River								

Table A.7.1.1: Site Specific results of CWEF survey on the Erne catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
306	N 38934 91864	3	2	8	0	Include	8.00	0.00
309	N 39170 93137	3	2	0	0	Include	0.00	0.00
310	N 41401 93684	3	2	3	0	Include	3.00	0.00
312	N 42555 92902	3	1	16	0	Include	16.00	0.00
314	N 43062 93411	3	2	11	0	Include	11.00	0.00
323	N 48423 96654	1	1	7	0	Order<2		
324	N 47151 97553	1	2	10	0	Order<2		
325	N 47364 98284	1	2	0	0	Order<2		
				Bunnoe River				
108	H 50418 13164	3	2	24	0	Include	24.00	0.00
109	H 50728 13435	3	2	5	0	Include	5.00	0.00
110	H 50863 13411	3	2	9	0	Include	9.00	0.00
115	H 52327 16110	3	1	12	0	Include	17.00	0.00
				Yellow River				
040	H 06276 16976	3	3	0	0	Include	0.00	0.00
041	H 06232 17406	2	3	3	0	Include	7.00	0.00
042	H 08131 18848	2	2	0	0	Include	0.00	0.00
043	H 08902 11615	2	3	0	0	Include	0.00	0.00
051	H 09194 12082	2	1	2	0	Include	2.00	0.00
052	H 07890 14969	2	2	0	0	Include	0.00	0.00
053	H 08188 13002	2	2	9	0	Include	14.00	0.00

Map A.7.1.1: Showing locations of 2019 survey sites on the Erne River.



A.7.2. River Ballintra

IFI Salmon Catchment #:	212
2019 survey dates:	13/7/2019
Mean Salmon Fry/5 min (2019):	13.31 fry/5min.
CWEF Index:	14.20 fry/5min.

Sampling carried out by:	Fish Species Present:	
Dara Timpson	Brown Trout	Flounder
Mark Davey	European Eel	Salmon

Figure A.7.2.1: Length distribution of salmon captured in 2019 CWEF survey on the Ballintra Catchment.

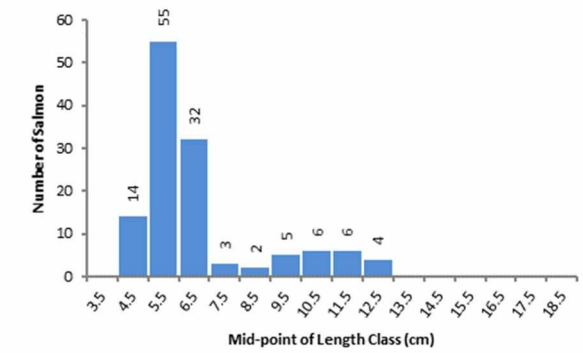
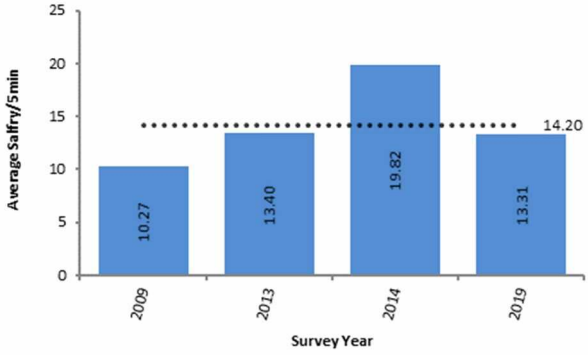


Figure A.7.2.2: Comparison of mean salmon fry/5min for all surveys on the Ballintra catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Closed							
2007	2008	Closed							
2008	2009	Closed	3					27.72	10.27
2009	2010	Closed							
2010	2011	Closed							
2011	2012	Closed							
2012	2013	Closed	16					5.20	13.40
2013	2014	Closed	12				1	6.40	19.82
2014	2015	Closed							
2015	2016	Closed							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	8					10.40	13.31

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during July 2019. The survey comprised 8 sites, all of which were included in the analysis. Salmon fry were present at 7 sites. The maximum fry catch was 22 salmon at site 16. The mean catch of included sites was 13.31 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

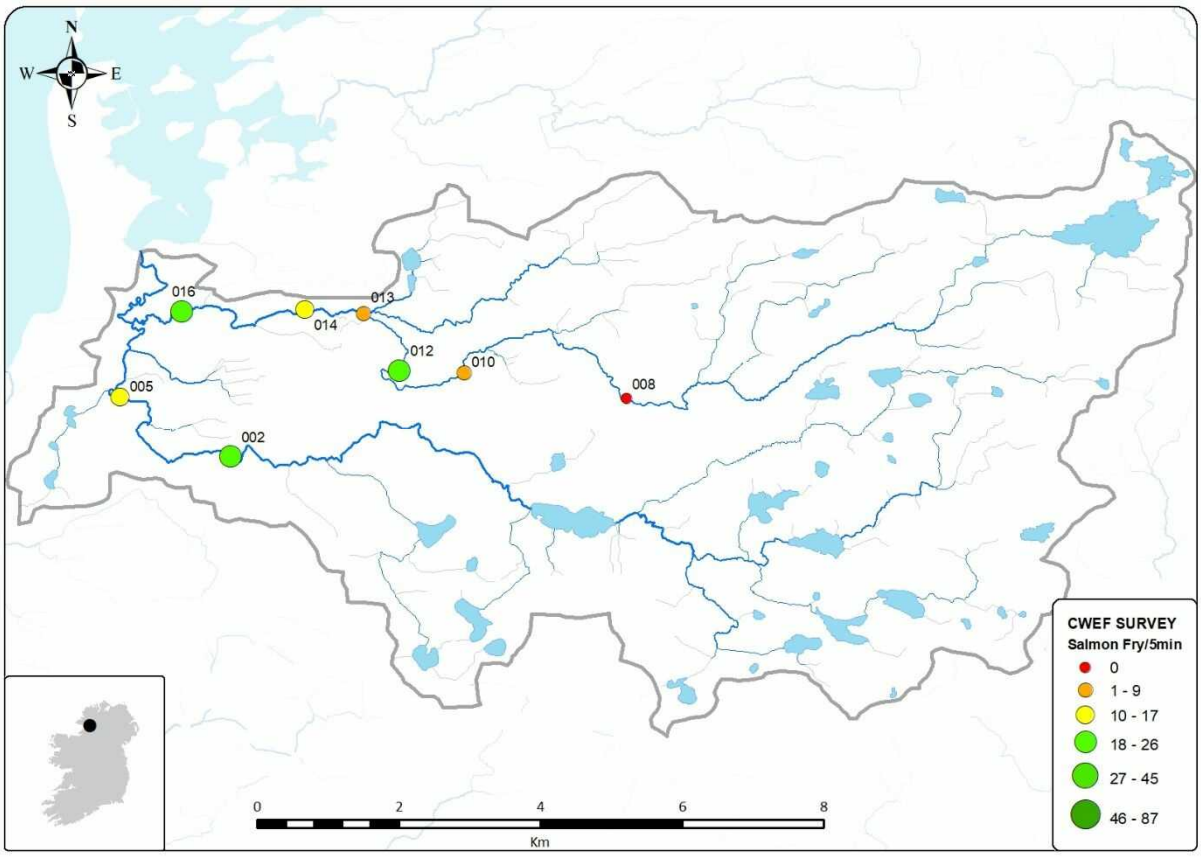
Conclusion

The Ballintra had a mean catch of 13.31 salmon fry/5min in 2019. Taking the four previous surveys into account, this results in a cumulative average of 14.20 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.7.2.2: Site specific results of CWEF on the Ballintra catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
002	G 91768 69771	4	1	2	19	Include	2.19	20.81
005	G 90217 70630	4	1	1	17	Include	1.00	17.00
008	G 97366 70611	3	2	3	0	Include	3.00	0.00
010	G 95075 70959	3	2	8	4	Include	9.33	4.67
012	G 94153 70999	3	1	1	21	Include	1.00	21.00
013	G 93654 71802	4	2	3	9	Include	3.00	9.00
014	G 92820 71857	4	2	1	12	Include	1.00	12.00
016	G 91084 71830	4	1	2	22	Include	2.00	22.00

Map A.7.2.1: Showing locations of 2019 survey sites on Ballintra River.



A.7.3. River Laghy

IFI Salmon Catchment #:	219
2019 survey dates:	4/9/2018
Mean Salmon Fry/5 min (2019):	8.56 fry/5min.
CWEF Index:	10.78 fry/5min.

Sampling carried out by:	Fish Species Present:
J Barrow	Brown Trout
Dara Timpson	Salmon

Figure A.7.3.1: Length distribution of salmon captured in 2019 CWEF survey on the Laghy Catchment.

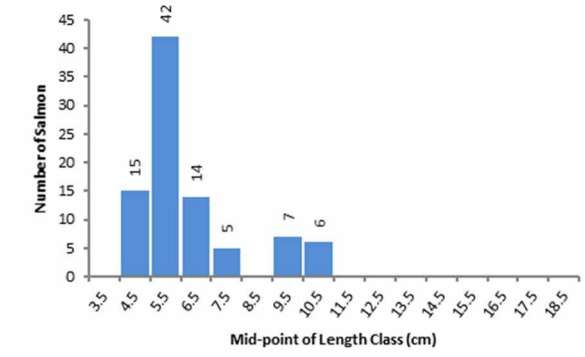
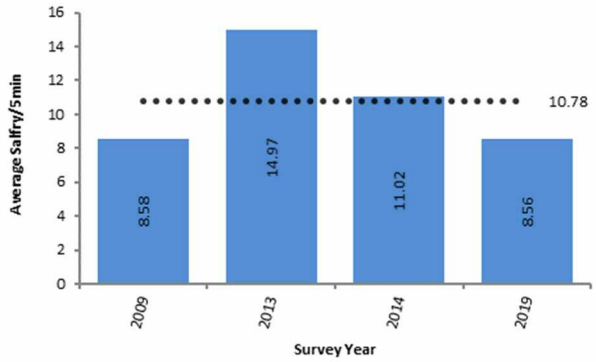


Figure A.7.3.2: Comparison of mean salmon fry/5min for all surveys on the Laghy catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Closed							
2007	2008	Closed							
2008	2009	Closed	9					5.19	8.58
2009	2010	Closed							
2010	2011	Closed							
2011	2012	Closed							
2012	2013	Closed	11					4.25	14.97
2013	2014	Closed	11	1				3.89	11.02
2014	2015	Closed							
2015	2016	Closed							
2016	2017	Closed							
2017	2018	Closed							
2018	2019	Closed	9					5.19	8.56

C&R = Catch and Release; * Incomplete Surveys.

This, the fourth CWEF survey of this catchment in the 2007 to 2019 period, was carried out on 4th Sept 2018. The survey comprised 9 sites, all of which were included in the analysis. Salmon fry were present at 7 sites. The maximum fry catch was 19 salmon at site 7. The mean catch of included sites was 8.56 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm

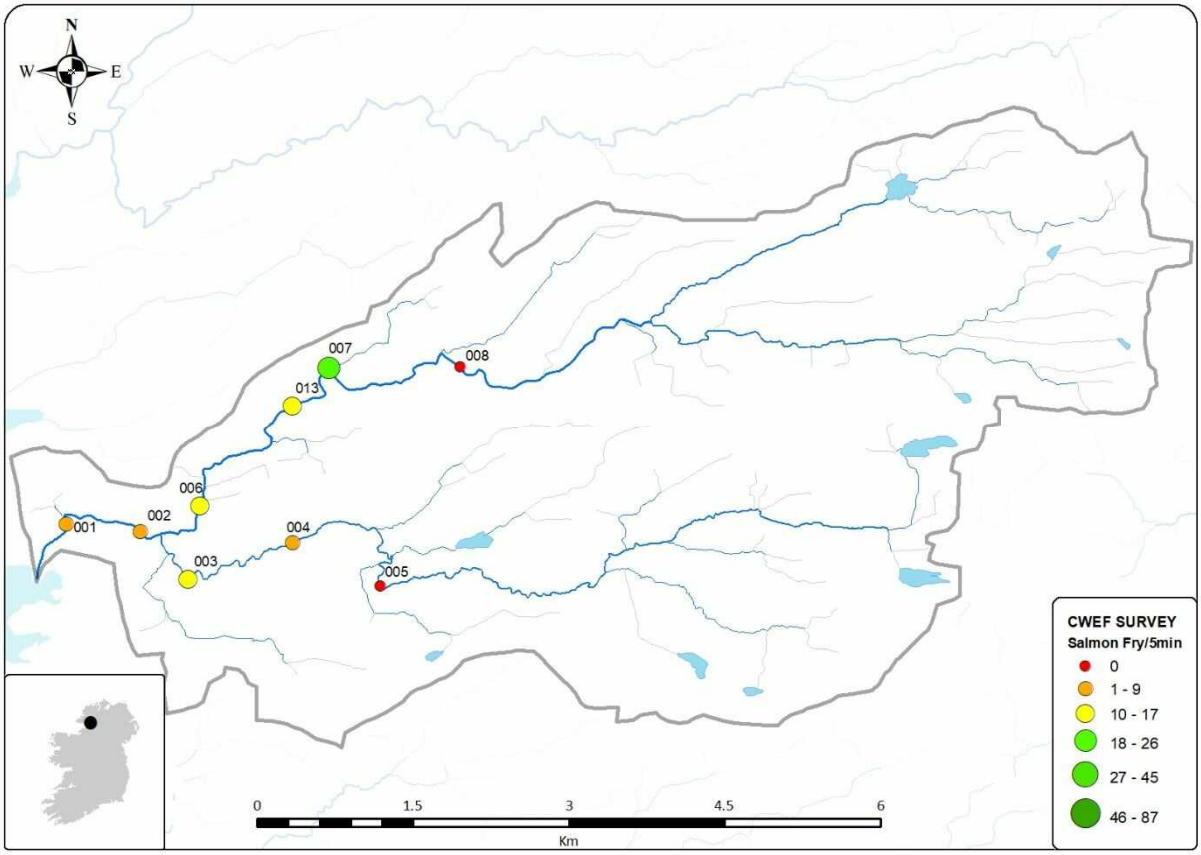
Conclusion

The Laghy had a mean catch of 8.56 salmon fry/5min in 2019. Taking the two previous surveys into account, this results in a cumulative average of 10.78 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.7.3.2: Site specific results of CWEF on the Laghy catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	G 93309 74996	4	2	1	9	Include	1.00	9.00
002	G 94020 74929	4	2	0	5	Include	0.00	5.00
003	G 94485 74467	3	2	2	14	Include	2.00	14.00
004	G 95484 74816	3	2	0	5	Include	0.00	6.00
005	G 96334 74404	3	2	5	0	Include	6.00	0.00
006	G 94601 75172	4	2	2	11	Include	2.00	11.00
007	G 95835 76510	2	1	3	19	Include	3.00	19.00
008	G 97103 76521	4	2	9	0	Include	11.00	0.00
013	G 95487 76140	4	2	5	13	Include	5.00	13.00

Map A.7.3.1: Showing locations of 2019 survey sites on the Laghy River.



A.7.4. River Bungosteen

IFI Salmon Catchment #: 217
2019 survey dates: 26/8/2019 – 18/9/2019
Mean Salmon Fry/5 min (2019): 13.41 fry/5min.
CWEF Index: 18.43 fry/5min.

Sampling carried out by:
Dara Timpson, Hugh Gillespie, Mark Davey

Fish Species Present:
Brown Trout, European Eel, Salmon

Figure A.7.4.1: Length distribution of salmon captured in 2019 CWEF survey on the Bungosteen Catchment.

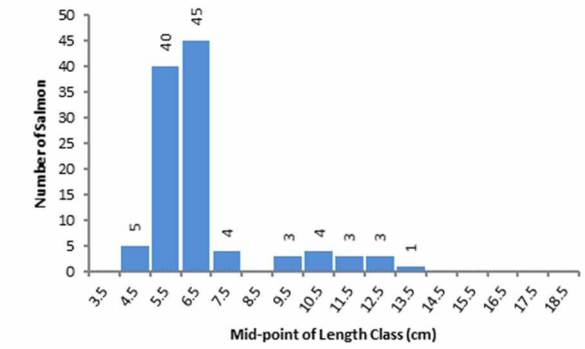
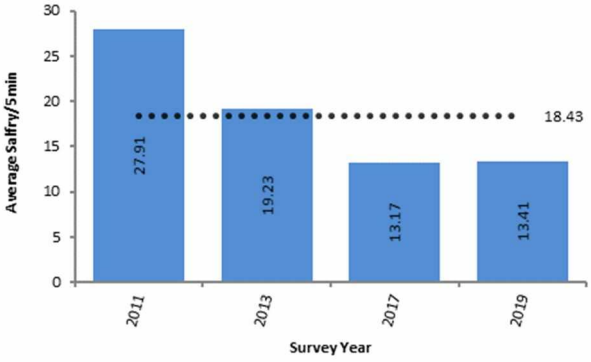


Figure A.7.4.2: Comparison of mean salmon fry/5min for all surveys on the Bungosteen catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Closed							
2007	2008	Closed							
2008	2009	Closed							
2009	2010	Closed							
2010	2011	Closed	9			1		4.41	27.91
2011	2012	Closed							
2012	2013	C&R	8	1		1		4.41	19.23
2013	2014	C&R							
2014	2015	C&R							
2015	2016	C&R							
2016	2017	C&R	9			1		4.41	13.17
2017	2018	C&R							
2018	2019	C&R	8					5.51	13.41

C&R = Catch and Release; * Incomplete Surveys.

This is the fourth CWEF survey of this catchment in the 2007 to 2019 period, it was carried out during August and Sept 2019. The survey comprised 8 sites, all of which were included in the analysis. Salmon fry were present at all sites. The maximum catch was 18 salmon at site 8. The mean catch of included sites was 13.41 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

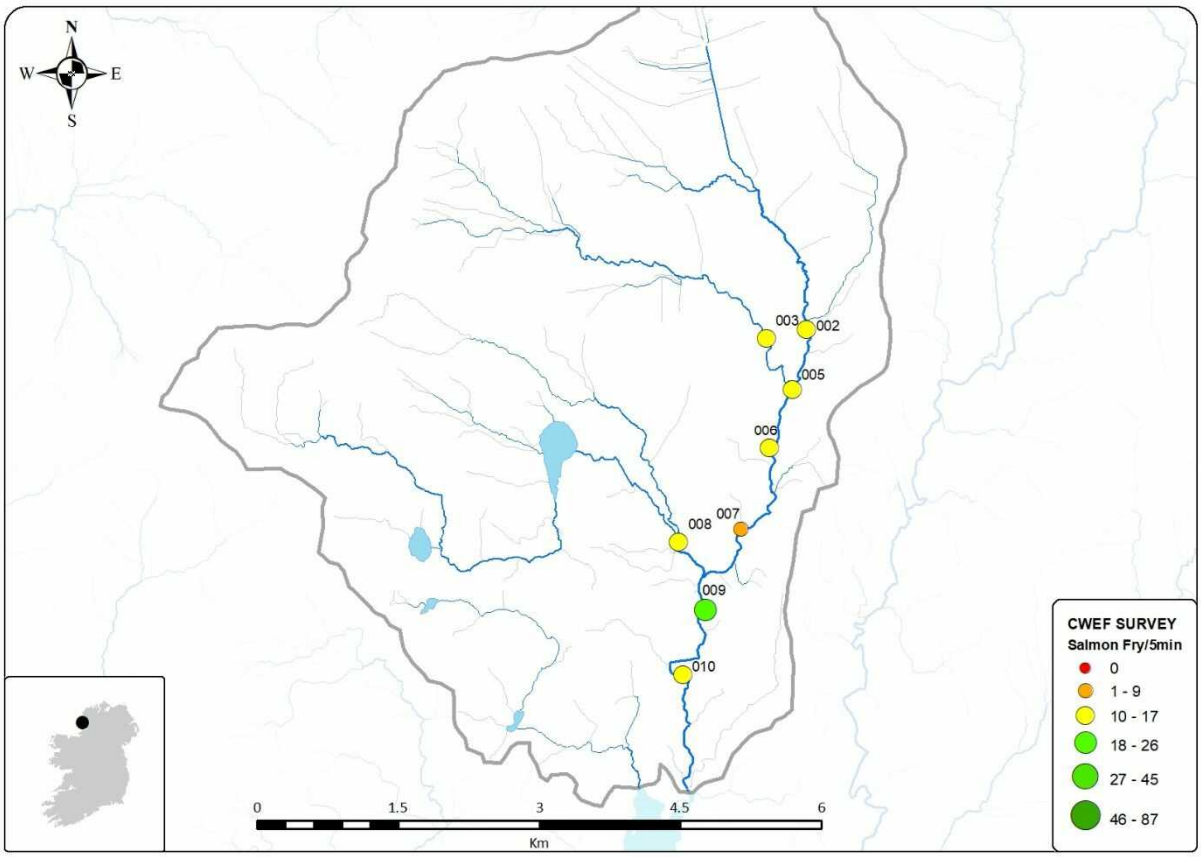
Conclusion

The Bungosteen had a mean catch of 13.41 salmon fry/5min in 2019. This results in a cumulative average is also 18.43 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.7.4.2: Site specific results of CWEF on the Bungosteen catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
002	G 74205 83030	4	2	1	12	Include	1.08	12.92
003	G 73778 82937	3	2	1	10	Include	1.00	10.00
005	G 74052 82396	4	2	1	13	Include	1.14	14.86
006	G 73808 81766	4	2	0	7	Include	0.00	10.00
007	G 73504 80901	4	2	2	7	Include	2.22	7.78
008	G 72847 80771	3	2	2	14	Include	2.25	15.75
009	G 73126 80051	5	2	0	18	Include	0.00	21.00
010	G 72890 79366	5	2	0	13	Include	0.00	15.00

Map A.7.4.1: Showing locations of 2019 survey sites on the Bungosteen River.



A.7.5. River Owenwee (Yellow)

IFI Salmon Catchment #:	102
2019 survey dates:	15/7/2019 - 18/9/2109
Mean Salmon Fry/5 min (2019):	14.20 fry/5min.
CWEF Index:	15.50 fry/5min.

Sampling carried out by:
Dara Timpson
Hugh Gillespie

Fish Species Present:

Brown Trout	3-Spined Stickleback
European Eel	Salmon

Figure A.7.5.1: Length distribution of salmon captured in 2019 CWEF survey on the Owenwee Catchment.

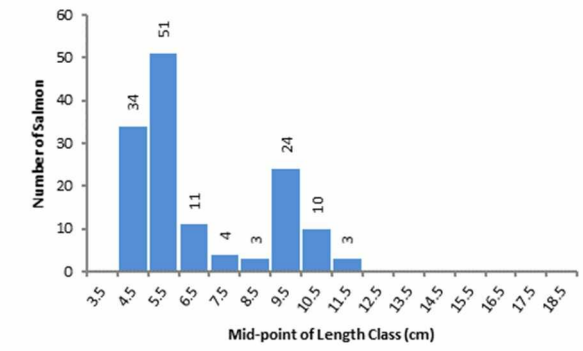
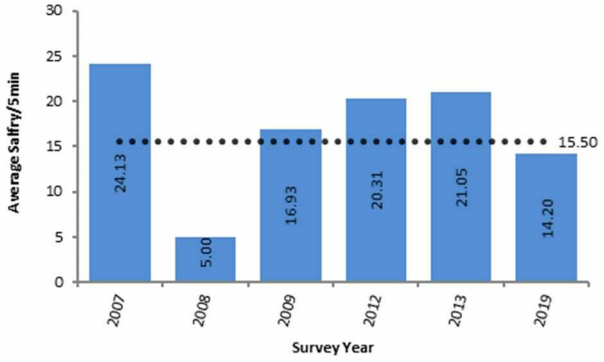


Figure A.7.5.2: Comparison of mean salmon fry/5min for all surveys on the Owenwee catchment to 2019.



Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	C&R	8	1	1	1		1.58	24.13
2007	2008	C&R	3					5.78	5.00
2008	2009	C&R	7			1		2.17	16.93
2009	2010	C&R							
2010	2011	C&R							
2011	2012	C&R	4					4.33	20.31
2012	2013	C&R	14	1		1		1.08	21.05
2013	2014	C&R							
2014	2015	C&R							
2015	2016	Closed							
2016	2017	C&R							
2017	2018	C&R							
2018	2019	C&R	8					2.17	14.20

C&R = Catch and Release; * Incomplete Surveys.

This, the Sixth complete CWEF survey of this catchment in the 2007 to 2019 period, it was carried out during August and September 2019. The survey comprised 8 sites, all of which were included in the analysis. Salmon fry were present at all sites. The maximum fry catch was 23 salmon at site 8. The mean catch of included sites was 14.20 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

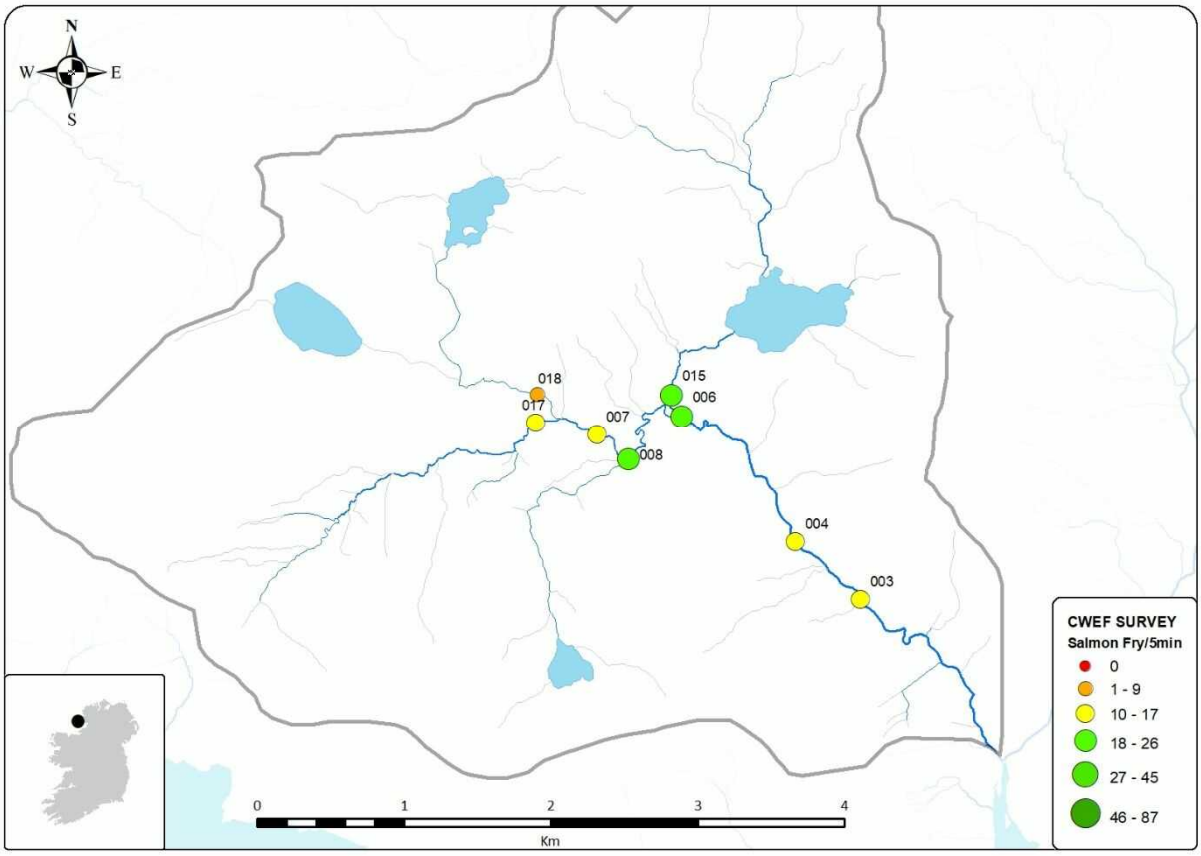
Conclusion

The Owenwee had a mean catch of 14.20 salmon fry/5min in 2019. Taking the five most recent surveys into account this results in a cumulative average of 15.50 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.7.5.2: Site specific results of CWEF on the Owenwee catchment in 2019.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
003	G 57551 79262	4	2	2	9	Include	2.18	9.82
004	G 57107 79654	4	2	2	11	Include	2.31	12.69
006	G 56334 80505	4	2	0	22	Include	0.00	25.00
007	G 55761 80381	3	1	4	11	Include	4.53	12.47
008	G 55969 80212	2	1	3	23	Include	3.35	25.65
015	G 56261 80651	3	2	2	16	Include	2.22	17.78
017	G 55341 80465	3	2	5	8	Include	5.77	9.23
018	G 55353 80655	2	2	0	1	Include	0.00	1.00

Map A.7.5.1: Showing salmon abundances at CWEF survey sites on the Owenwee (Yellow) River 2019.



A.7.6. River Leannan

IFI Salmon Catchment #:	248
2019 survey dates:	15 – 30/7/2019
Mean Salmon Fry/5 min (2019):	21.33 fry/5min.
CWEF Index:	19.25 fry/5min.

Sampling carried out by:	Fish Species Present:
Emmet Moore	Brown Trout
James Doherty	European Eel
James McCallig	Salmon

Figure A.7.6.1: Length distribution of salmon captured in 2019 CWEF survey on the Leannan Catchment.

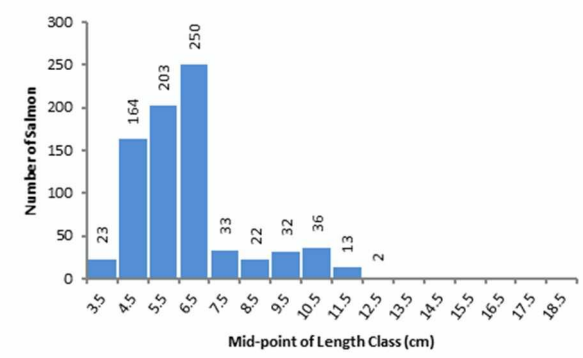
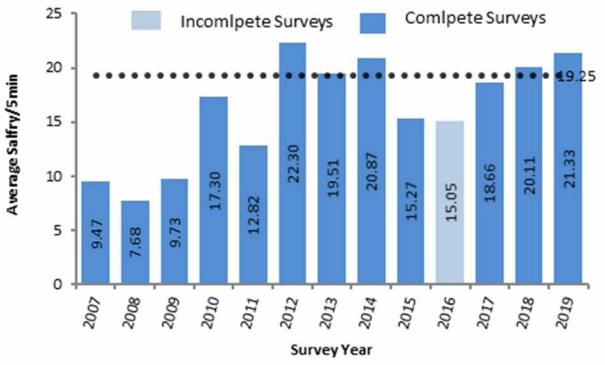


Figure A.7.6.2: Comparison of mean salmon fry/5min for all surveys on the Leannan catchment to 2019.



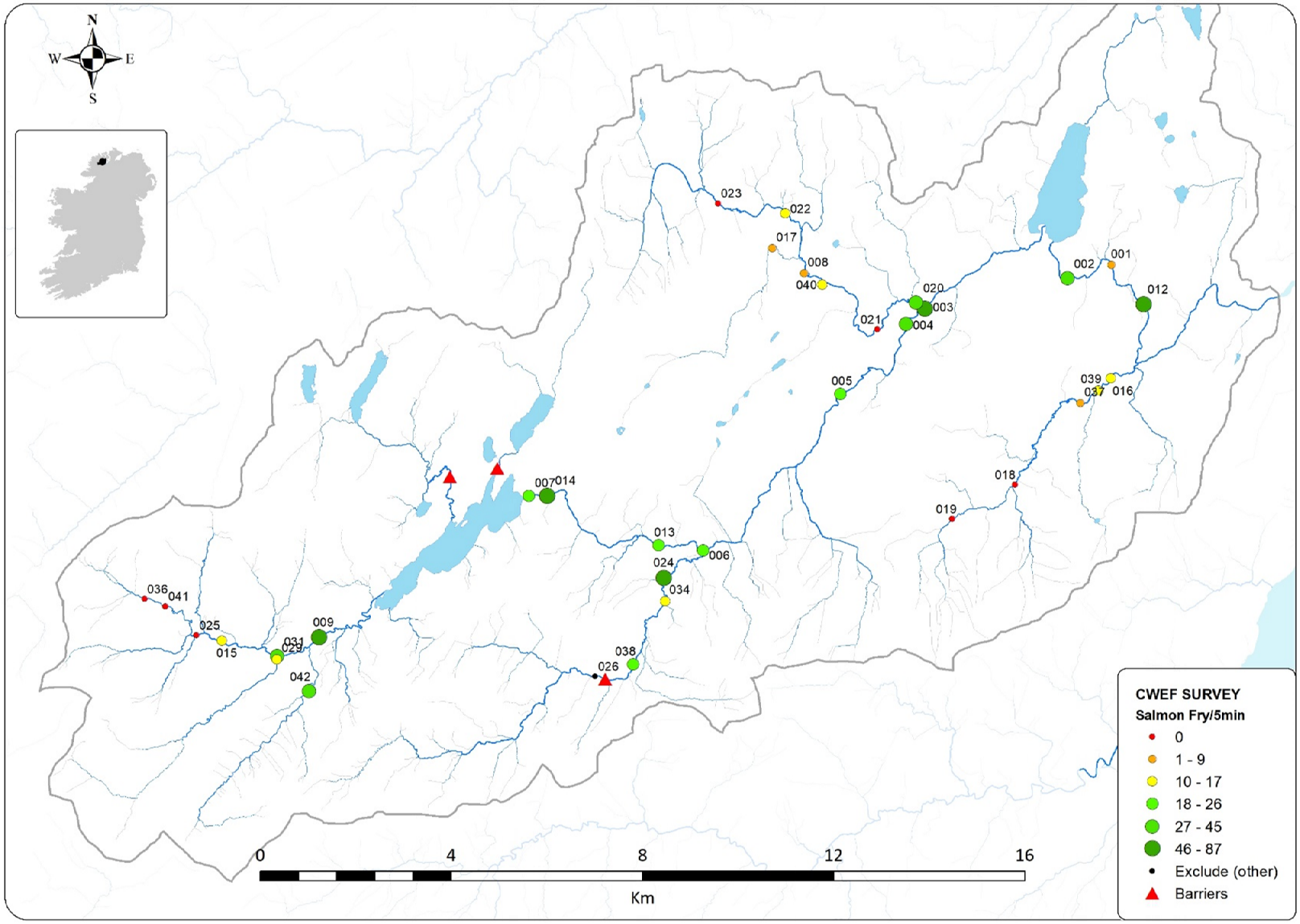
Spawning Year	Fry Year	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	Closed	9					24.34	9.47
2007	2008	Closed	28			1		7.55	7.68
2008	2009	Closed	26			3		7.55	9.73
2009	2010	Closed	28			1		7.55	17.30
2010	2011	Closed	27	1		1		7.55	12.82
2011	2012	Closed	27			1	1	7.55	22.30
2012	2013	Closed	26					8.42	19.51
2013	2014	Closed	26					8.42	20.87
2014	2015	Closed	25	1				8.42	15.27
2015	2016	C&R	20					10.95	15.05*
2016	2017	C&R	24	5				7.55	18.66
2017	2018	C&R	35			1		6.08	20.11
2018	2019	C&R	33			1		6.44	21.33

C&R = Catch and Release; * Incomplete Surveys.

This, the thirteenth CWEF survey of this catchment in the 2007 to 2019 period, was carried out during July 2018. The survey comprised 34 sites, 33 of which were included in the analysis. Salmon fry were present at 26 sites. The maximum fry catch was 84 salmon at site 9. The mean catch of included sites was 21.33 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

Conclusion

The Leannan had a mean catch of 21.33 salmon fry/5min in 2019. Taking the five most recent surveys into account this results in a cumulative average of 19.25 salmon fry/5min which is above the 17 salmon fry threshold.



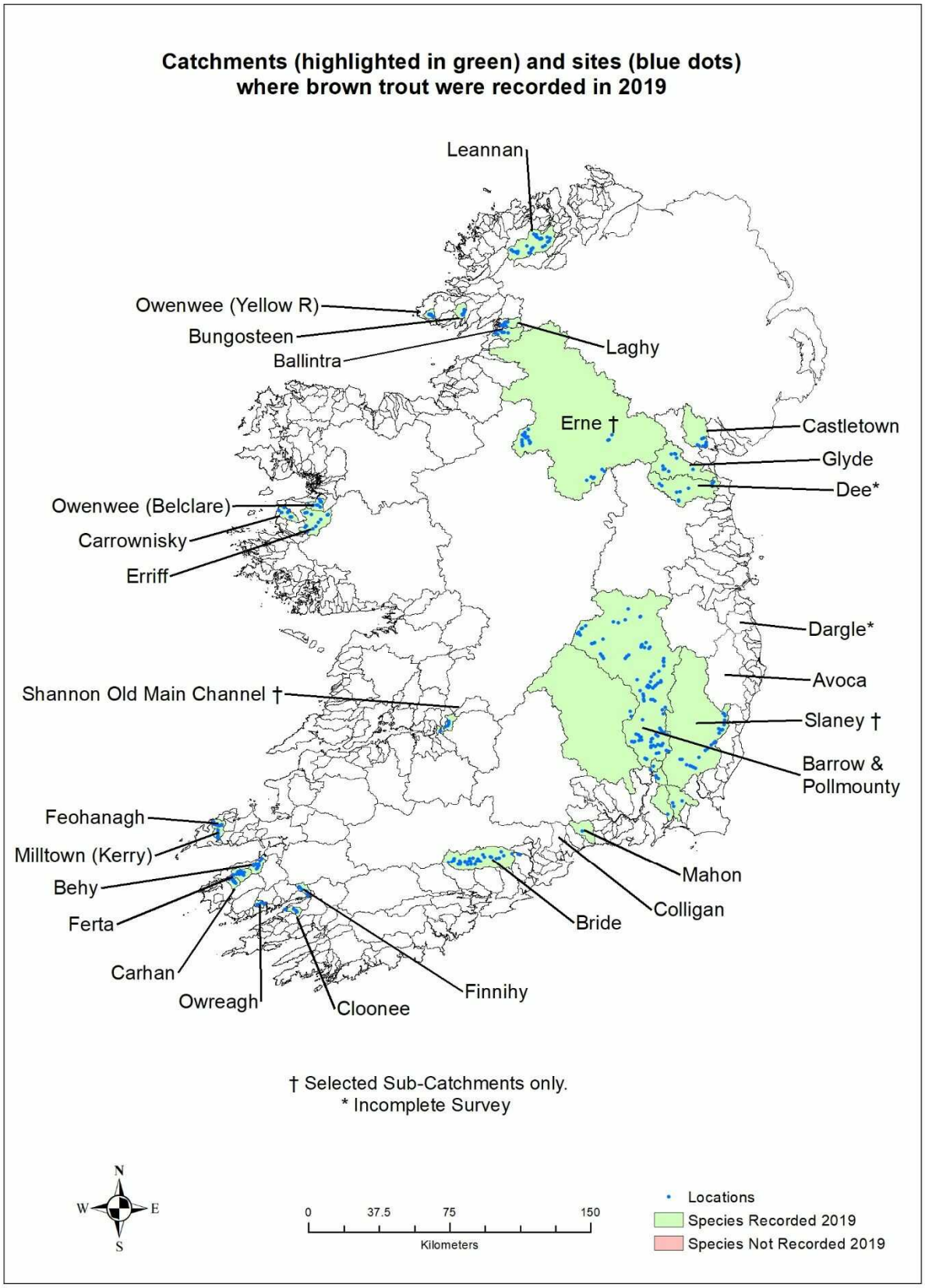
Map A.7.6.1: Showing locations of 2019 survey sites on the Leannan River.

Table A.6.5.2: Site specific results of CWEF on the Leannan catchment in 2019.

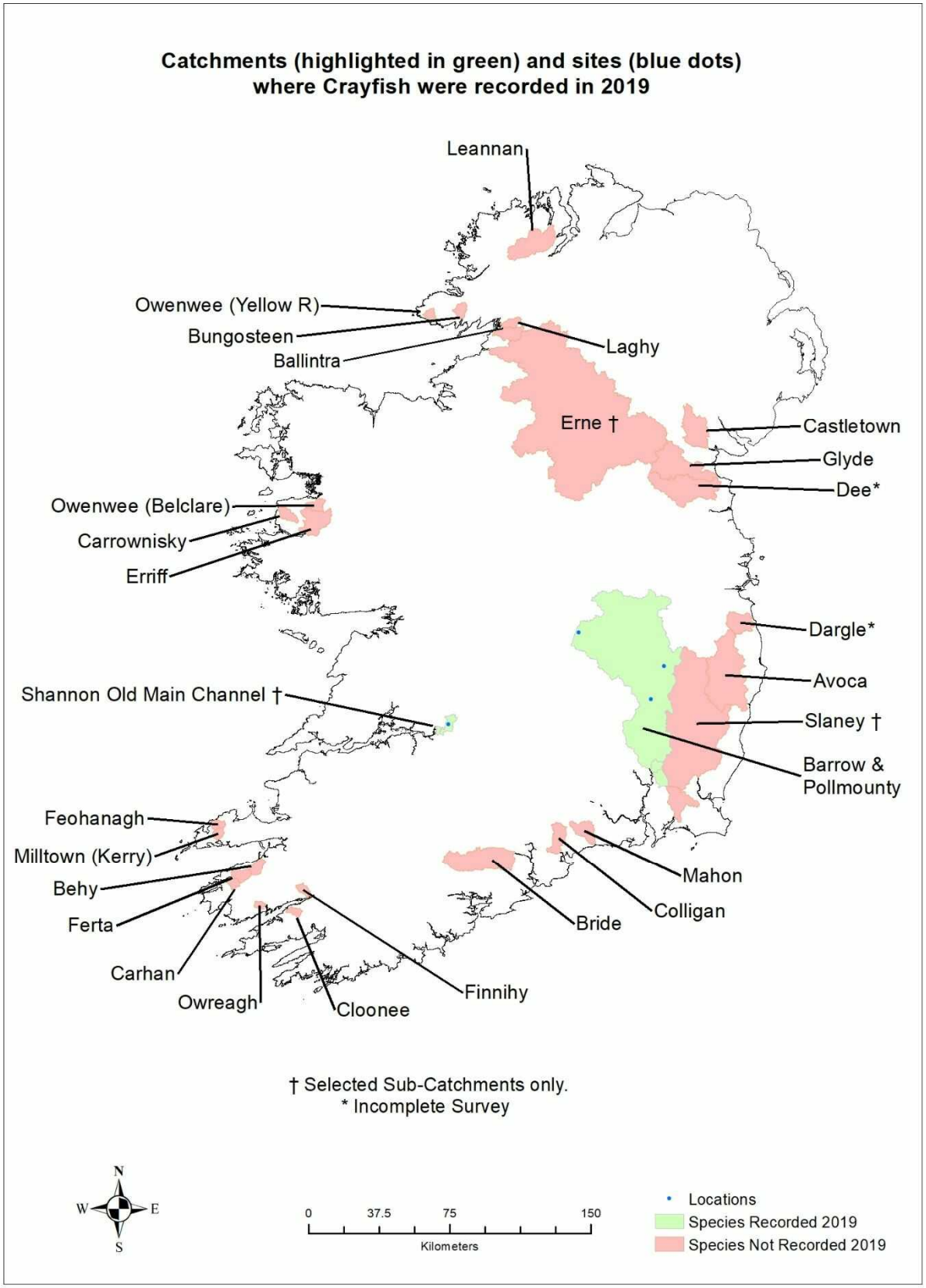
Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	C 19032 21832	5	3	0	6	Include	0.00	7.00
002	C 18110 21555	5	1	8	29	Include	8.65	31.35
003	C 15115 20910	5	1	0	45	Include	0.00	50.00
004	C 14722 20597	5	1	0	28	Include	0.00	30.00
005	C 13349 19129	5	3	0	21	Include	0.00	21.00
006	C 10470 15850	5	1	7	26	Include	7.00	26.00
007	C 06817 16987	5	1	0	24	Include	0.00	26.00
008	C 12588 21655	4	3	16	7	Include	16.00	7.00
009	C 02422 14028	4	1	2	84	Include	2.05	85.95
012	C 19710 21001	5	2	0	53	Include	0.00	58.00
013	C 09540 15957	5	3	0	21	Include	0.00	23.00
014	C 07206 16991	5	1	0	60	Include	0.00	65.00
015	C 00385 13956	4	1	0	13	Include	0.00	13.00
016	C 19019 19448	4	2	12	11	Include	12.00	11.00
017	C 11925 22178	2	1	53	7	Include	54.77	7.23
018	C 17013 17222	4	1	22	0	Include	22.00	0.00
019	C 15696 16505	3	1	21	0	Include	21.00	0.00
020	C 14938 21045	4	1	4	24	Include	4.43	26.57
021	C 14125 20475	4	1	11	0	Include	11.00	0.00
022	C 12199 22907	4	2	29	9	Include	31.29	9.71
023	C 10793 23117	4	1	33	0	Include	35.00	0.00
024	C 09643 15275	4	1	19	51	Include	19.00	51.00
025	B 99853 14070	4	3	0	0	Include	0.00	0.00
026	C 08212 13214	4	3	6	0	Above Impassable Barrier		
029	C 01542 13558	3	2	0	15	Include	0.00	15.00
031	C 01544 13637	4	1	1	31	Include	1.00	31.00
034	C 09680 14776	4	2	10	17	Include	10.00	17.00
036	B 98773 14828	3	3	2	0	Include	2.00	0.00
037	C 18382 18934	4	3	2	7	Include	2.00	7.00
038	C 09004 13462	4	1	6	22	Include	6.00	22.00
039	C 18760 19189	4	2	23	15	Include	23.00	15.00
040	C 12972 21411	4	3	19	11	Include	19.00	11.00
041	B 99203 14674	3	3	1	0	Include	1.00	0.00
042	C 02211 12907	3	2	15	37	Include	15.00	37.00

B. Other Species

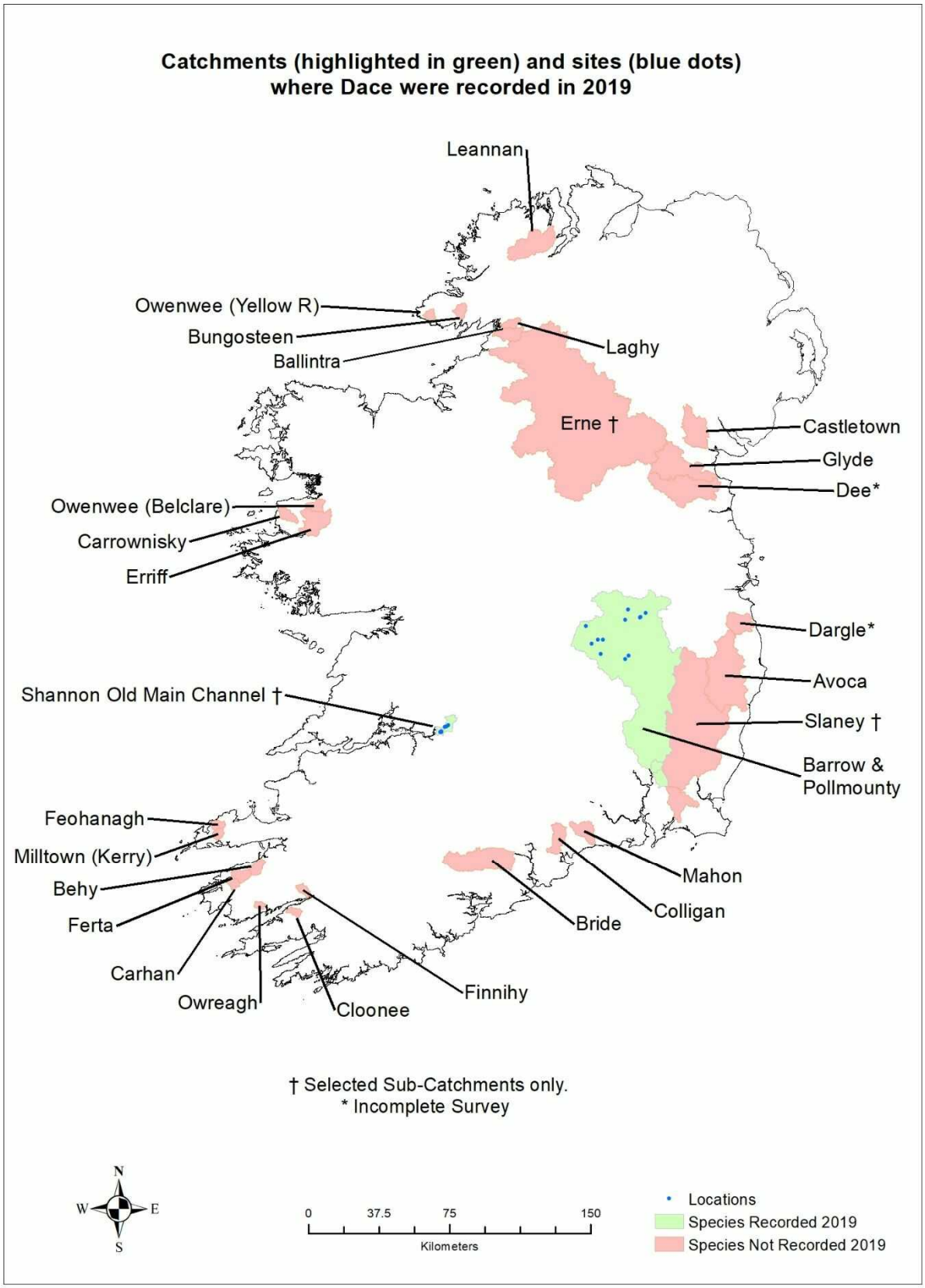
B.1. Brown Trout



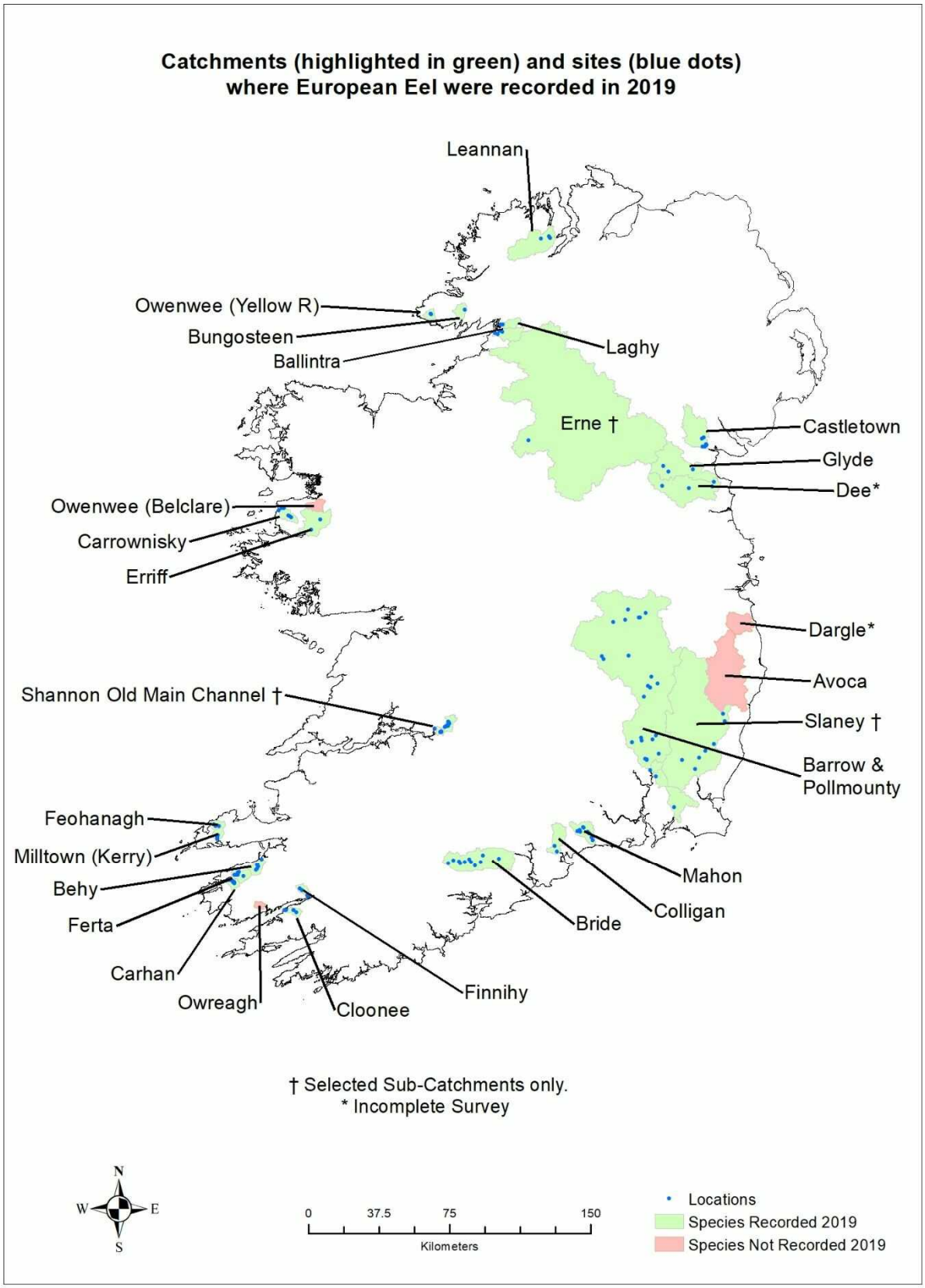
B.2. Crayfish


Catchments (highlighted in green) and sites (blue dots)
where Crayfish were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Slaney †
Barrow &
Pollmounty
Shannon Old Main Channel †
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Mahon
Colligan
Bride
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

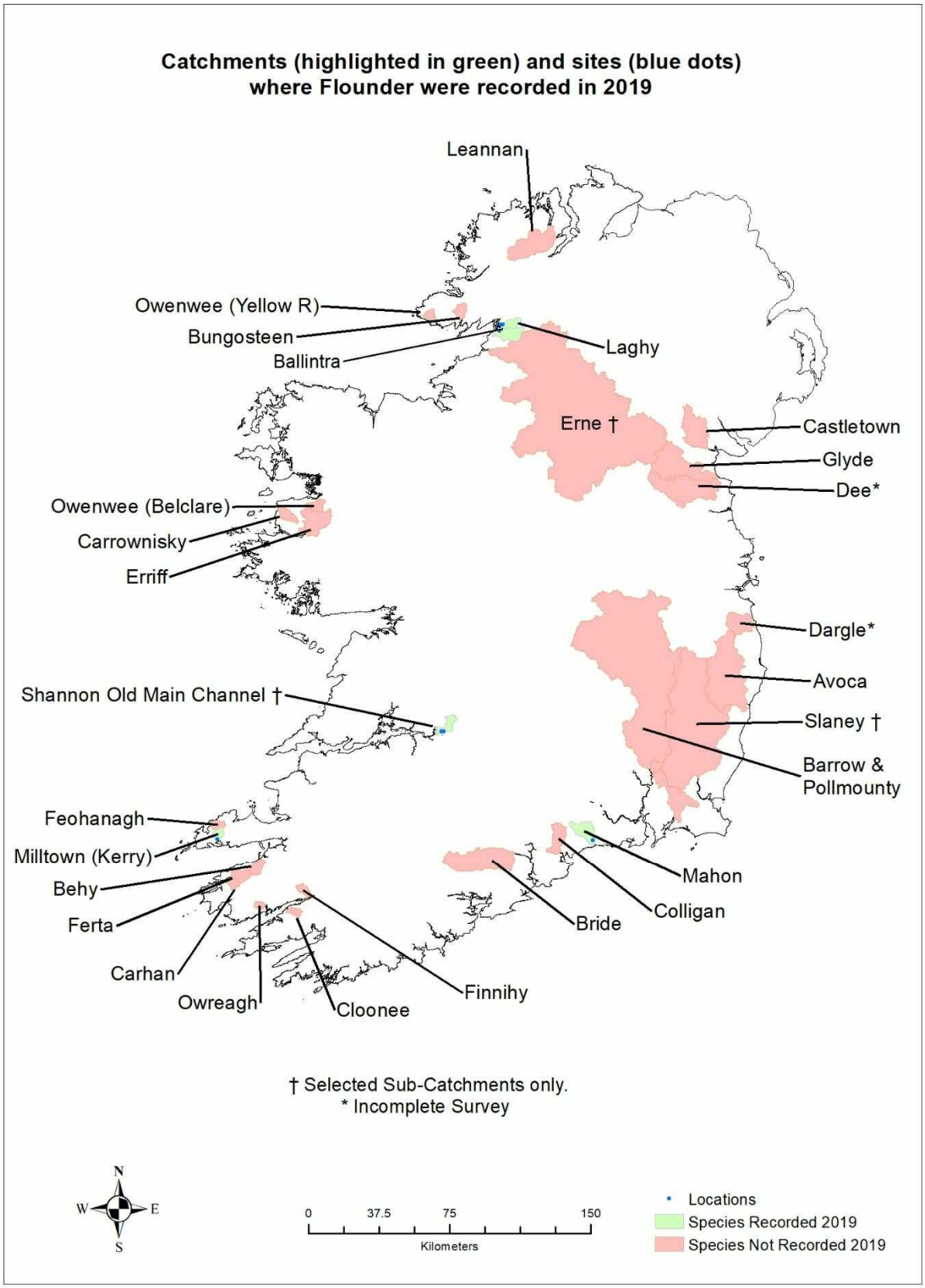
B.3. Dace


Catchments (highlighted in green) and sites (blue dots)
where Dace were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Slaney †
Barrow &
Pollmounty
Shannon Old Main Channel †
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Bride
Colligan
Mahon
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

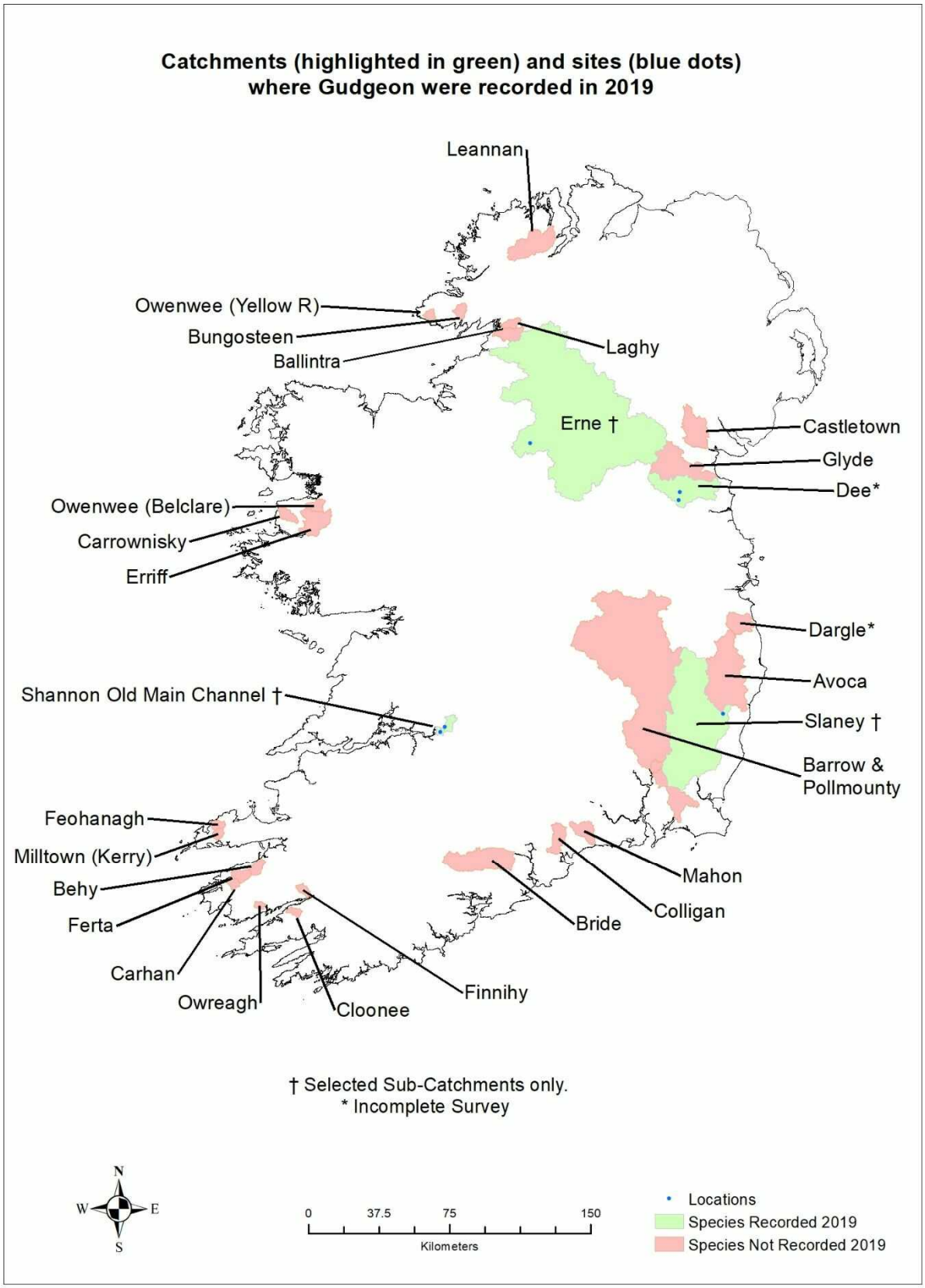
B.4. Eel


Catchments (highlighted in green) and sites (blue dots)
where European Eel were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Slaney †
Barrow &
Pollmounty
Shannon Old Main Channel †
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Mahon
Colligan
Bride
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

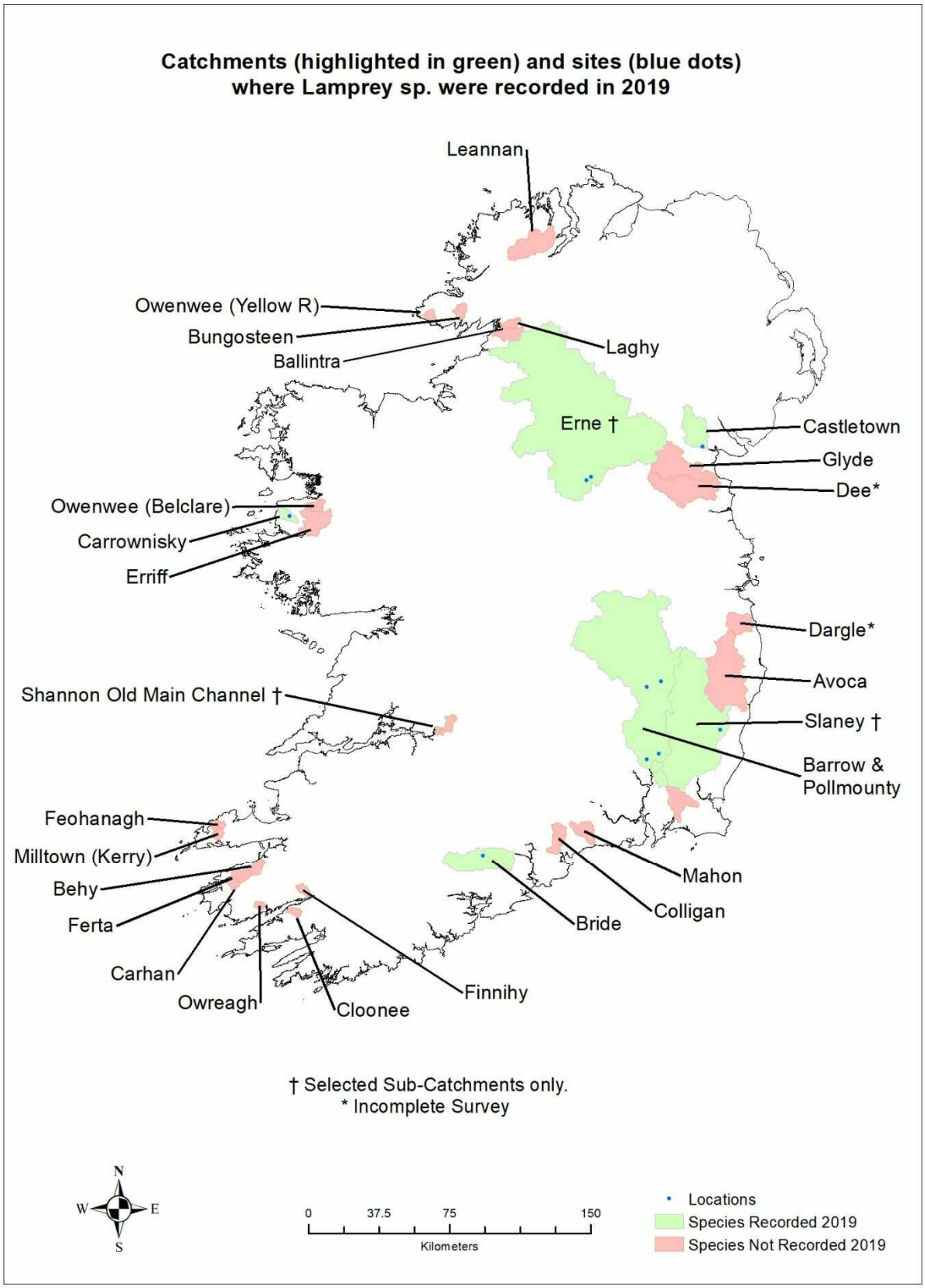
B.5. Flounder


Catchments (highlighted in green) and sites (blue dots)
where Flounder were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Slaney †
Barrow &
Pollmounty
Shannon Old Main Channel †
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Bride
Colligan
Mahon
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

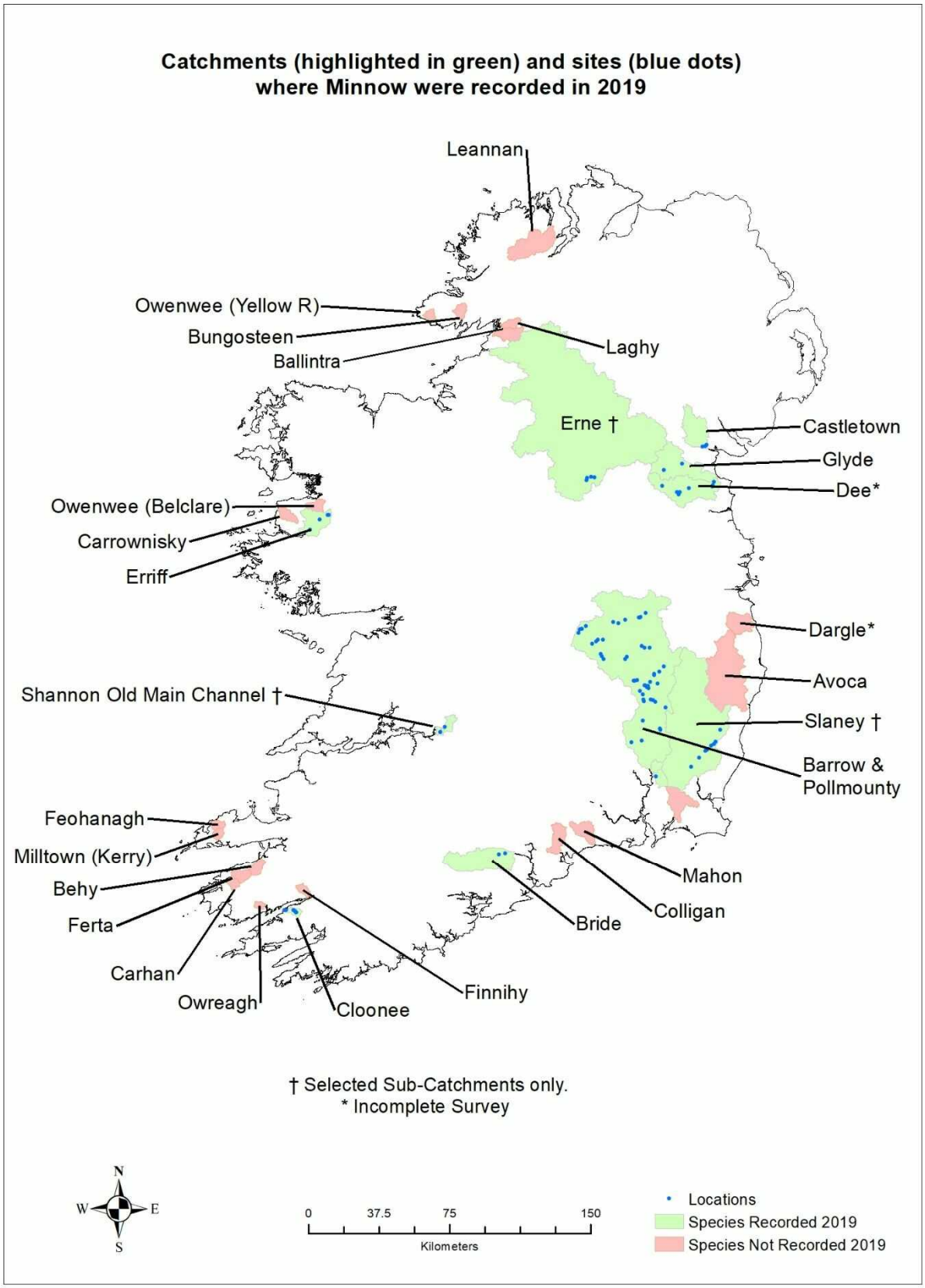
B.6. Gudgeon


Catchments (highlighted in green) and sites (blue dots)
where Gudgeon were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Shannon Old Main Channel †
Slaney †
Barrow &
Pollmounty
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Bride
Colligan
Mahon
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

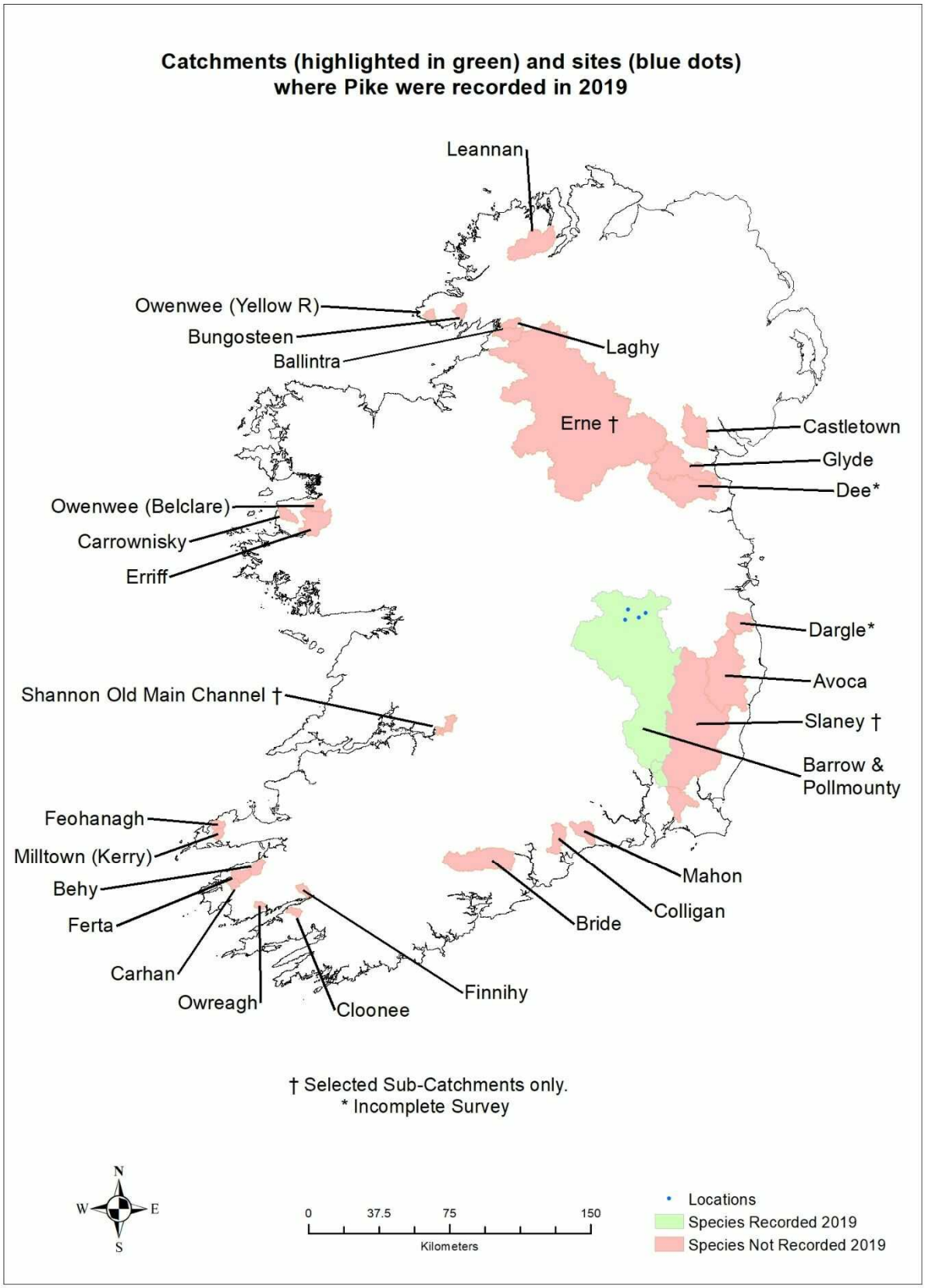
B.7. Lamprey Spp.



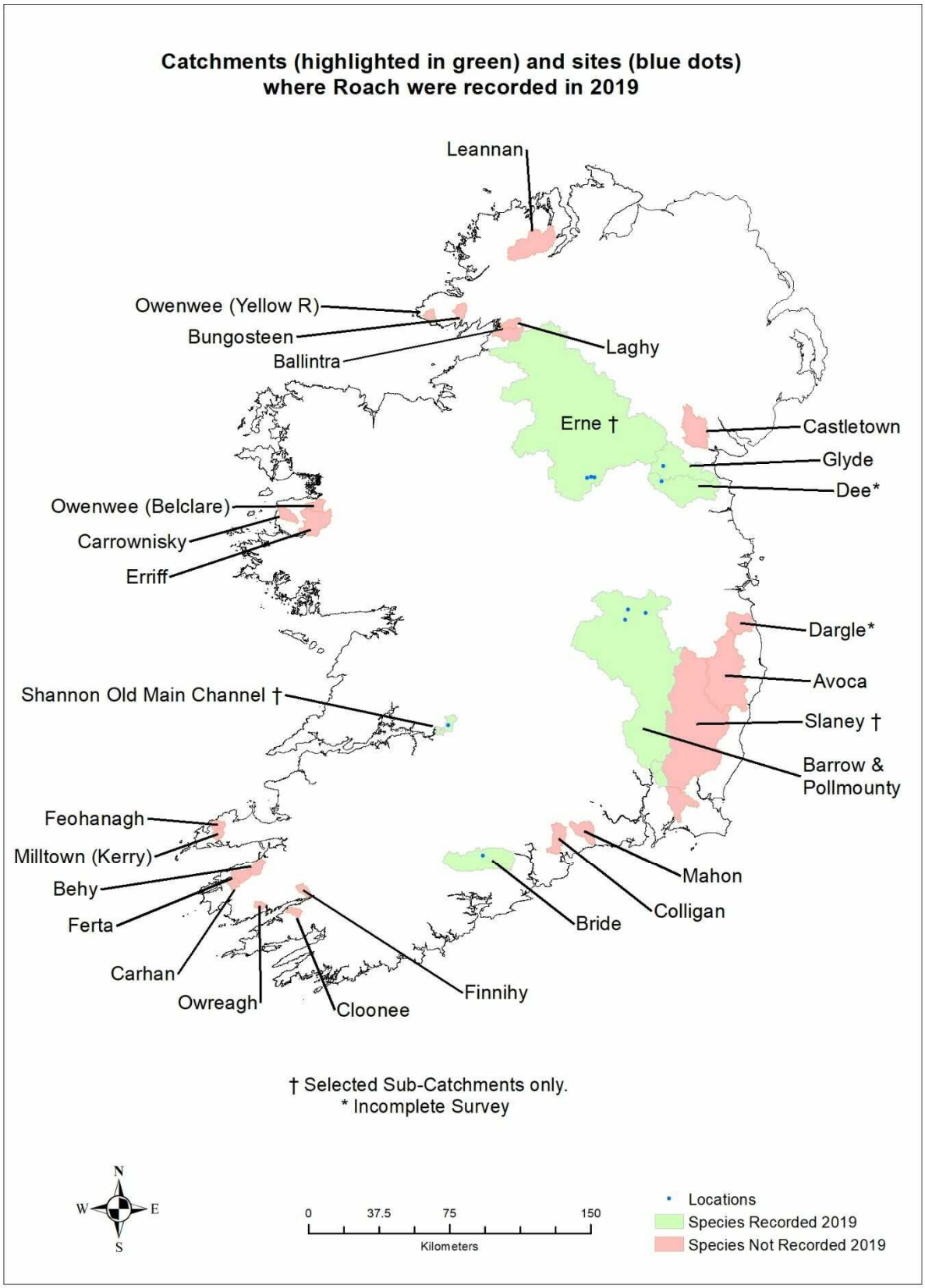
B.8. Minnow


Catchments (highlighted in green) and sites (blue dots)
where Minnow were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Shannon Old Main Channel †
Slaney †
Barrow &
Pollmounty
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Bride
Colligan
Mahon
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

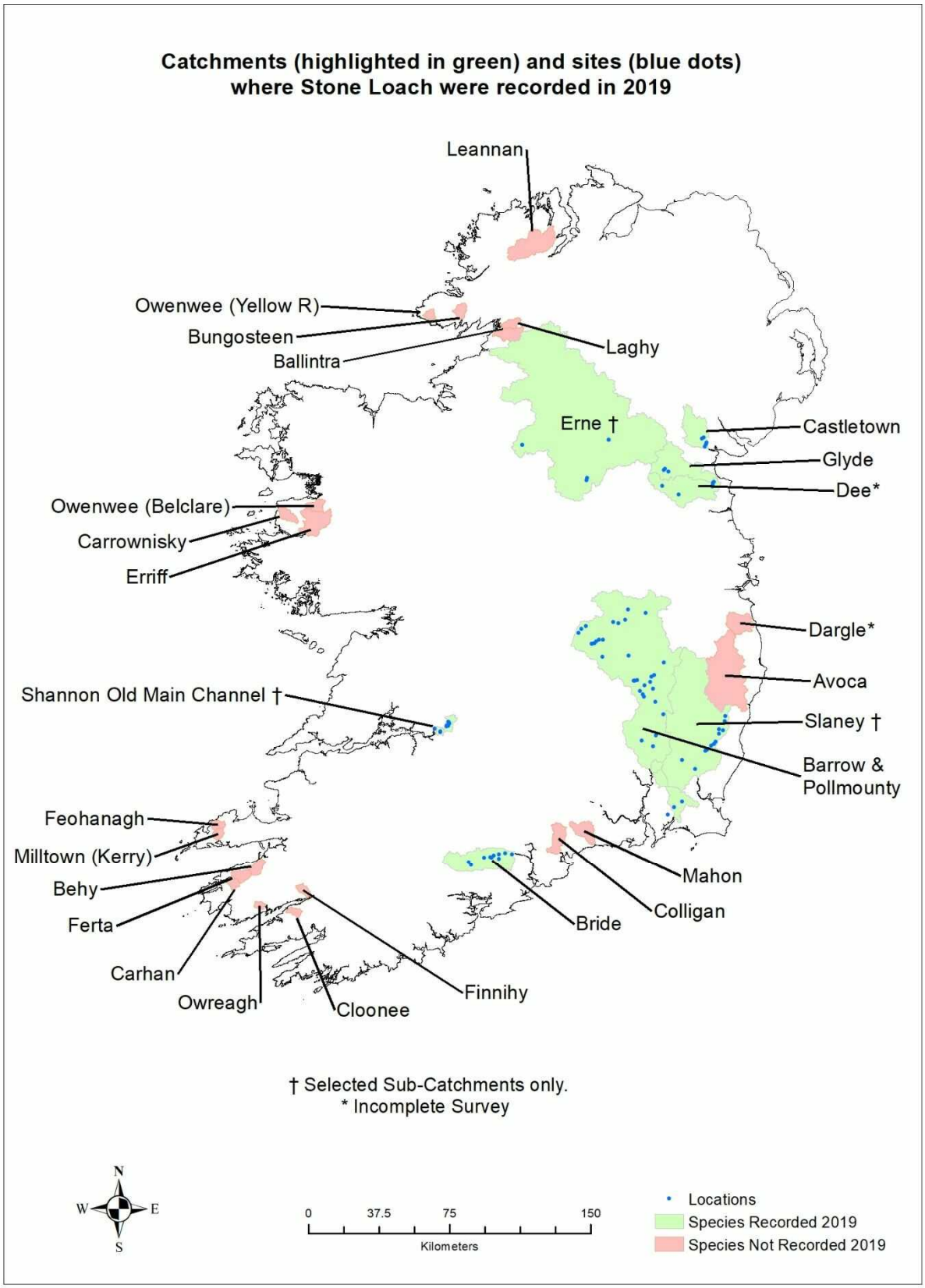
B.9. Pike


Catchments (highlighted in green) and sites (blue dots)
where Pike were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Slaney †
Barrow &
Pollmounty
Shannon Old Main Channel †
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Bride
Colligan
Mahon
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

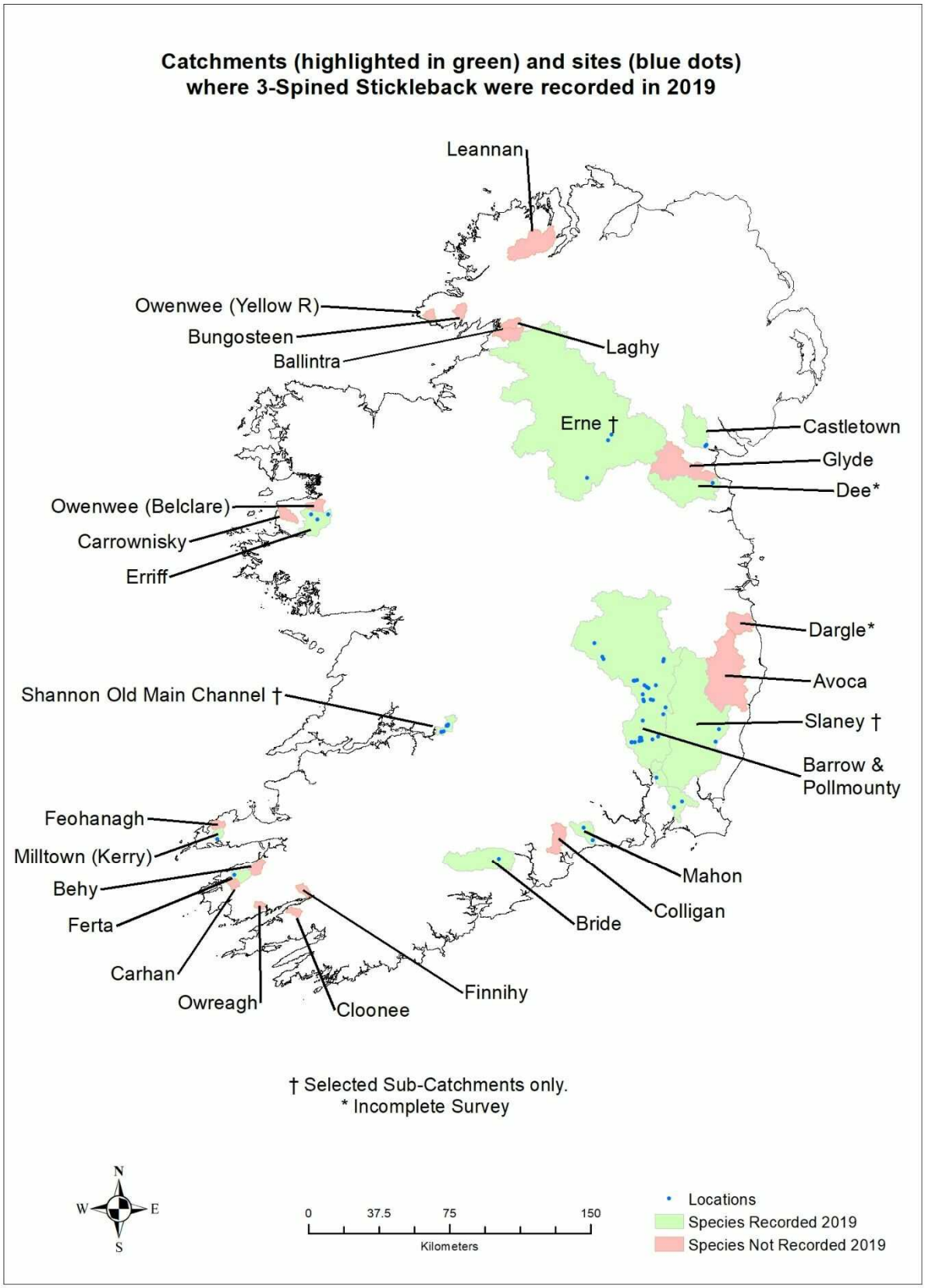
B.10. Roach


Catchments (highlighted in green) and sites (blue dots)
where Roach were recorded in 2019
Leannan
Owenwee (Yellow R)
Bungosteen
Ballintra
Laghy
Erne †
Castletown
Glyde
Dee*
Owenwee (Belclare)
Carrownisky
Erriff
Dargle*
Avoca
Shannon Old Main Channel †
Slaney †
Barrow &
Pollmounty
Feohanagh
Milltown (Kerry)
Behy
Ferta
Carhan
Owreagh
Cloonee
Finnihy
Bride
Colligan
Mahon
† Selected Sub-Catchments only.
* Incomplete Survey
N
W
E
S
0
37.5
75
150
Kilometers
Locations
Species Recorded 2019
Species Not Recorded 2019

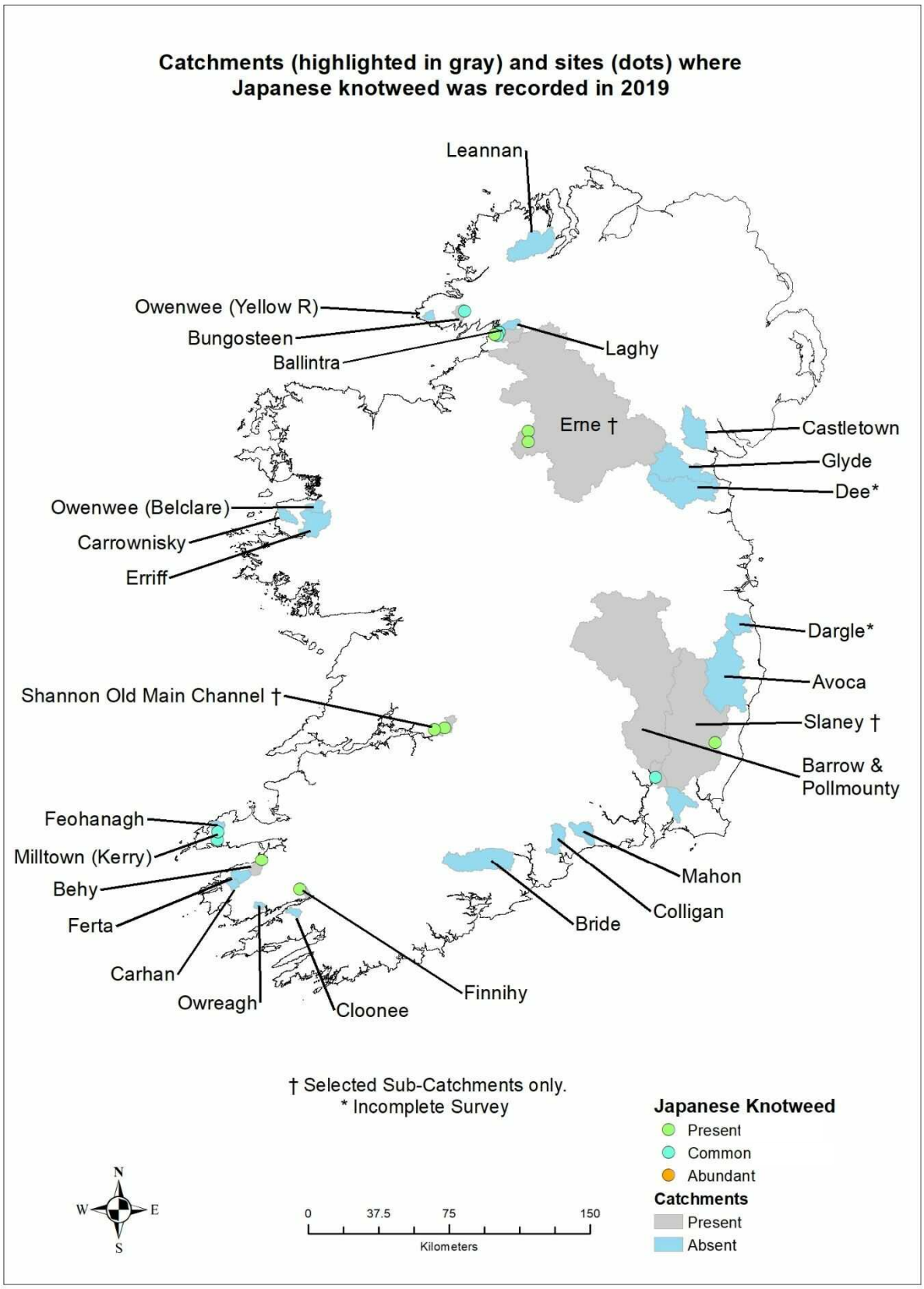
B.11. Stone Loach



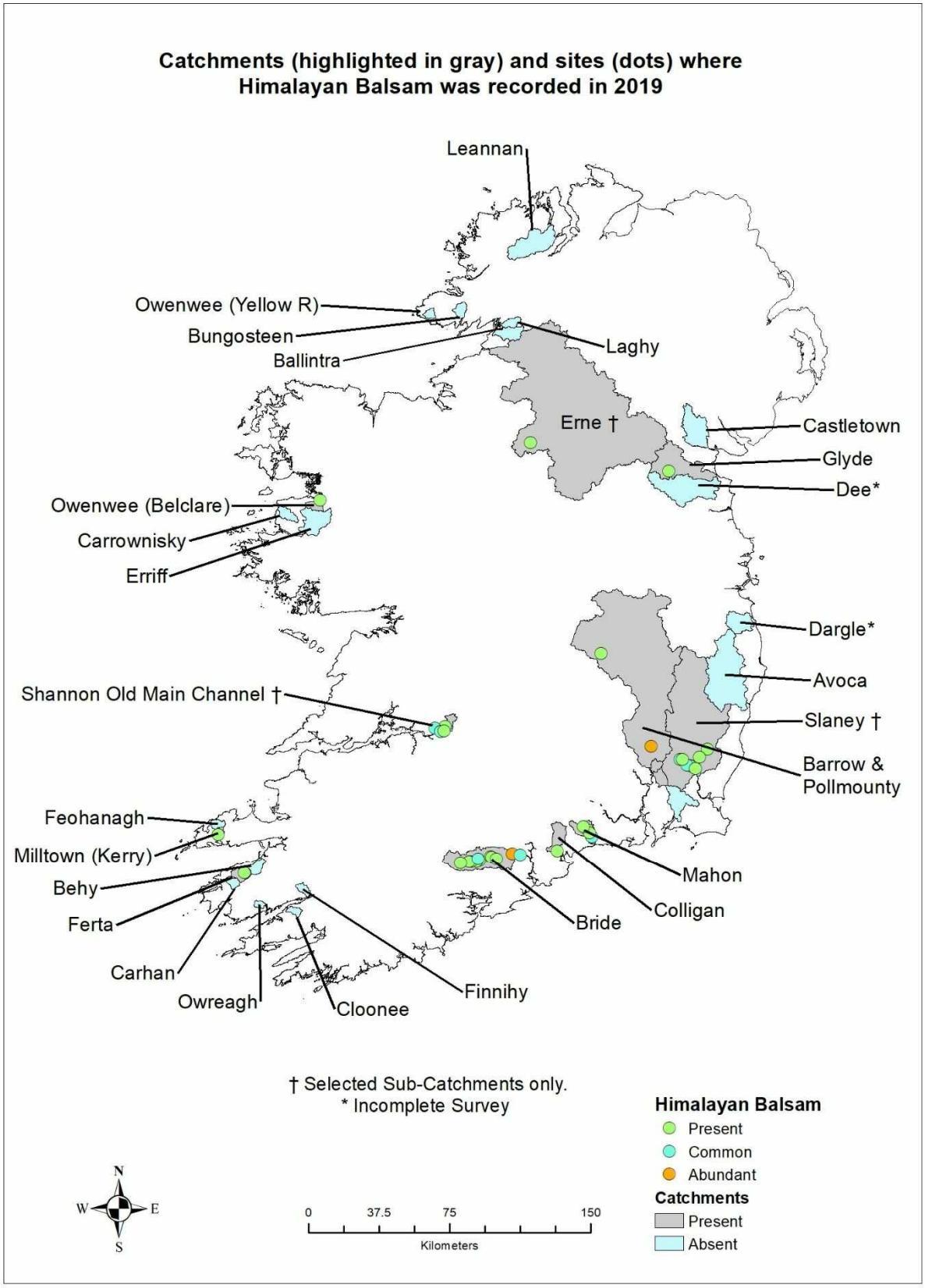
B.12. Three-Spined Stickleback.



B.13. Japanese Knotweed.



B.14. Himalayan Balsam



C. Annual CWEF results and averages to date.

	Fry Year													Most recent 5 surveys			Most Recent 5yrs Data	
Code/River	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CWEF	#Surveys		CWEF	#Surveys
002/Flurry				5.24					17.15					11.19	2		17.15	1
003/Castletown			26.41				22.96	13.59					5.58	17.13	4		5.58	1
004/Fane			16.17			22.09			8.94*		0.50*	3.65		13.97	3		3.65	1
005/Glyde		2.49	17.08	31.61					5.19				4.02	12.08	5		4.61	2
006/Dee		8.55	16.92	21.72	20.13				10.51				4.17*	15.57	5		10.51	1
008/Boyne		21.91	17.54	19.38				13.21		14.37				17.28	5		14.37	1
013/Broadmeadow				0.00										0.00	1			
014/Tolka					1.08	0.00						0.00		0.36	3		0.00	1
015/Liffey Lower		21.33	40.12	25.16	17.47	12.12				6.75		16.69		15.64	5	5	11.72	2
015/Liffey Upper		12.93	5.11	8.15	16.20	10.13				2.63*		5.33*		10.51	5			
016/Dodder					13.93									13.93	1			
018/Dargle			1.40	2.53	7.52				4.19				1.03	3.33	5		2.61	2
020/Newcastle												0.00		0.00	1		0.00	1
021/Vartry		10.00	15.11	2.54	15.07				5.34	1.75				7.96	5	5	3.55	2
026/Avoca		3.79	5.56	5.20	18.88	5.15				1.89		8.37*	3.95	7.01	5	5	2.92	2
028/Owenavorragh				19.76			0.33		4.61			5.75		7.61	4		5.18	2
031/Slaney	19.05		15.94	18.42				17.68		8.70	14.30		3.45†	15.01	5	5	11.50	2
032/Duncormick								11.54						11.54	1			
033/Corock					37.11					5.47	1.23		6.47	14.60	3		3.35	2
034/Owenduff (Wexford)				4.97	10.65	15.91				3.47	0.40			7.08	5		1.93	2
037/Barrow	17.72		10.93	8.71	21.23	26.72				8.93*	11.54		16.50	16.94	5	5	14.02	2
038/Nore				18.83						11.77				15.30	2		11.77	1
043/Suir										10.27				10.27	1		10.27	1
050/Mahon		2.11						10.72	3.92				8.60	6.34	4		6.26	2
051/Tay					8.75				3.07	1.40				4.41	3		2.24	2
053/Colligan					29.32			9.50		3.62			4.84	11.82	4		4.23	2
055/Lickey		12.37							14.14					13.26	2		14.14	1
059/Blackwater (Munster)	22.72	10.67								13.53				15.64	3		13.53	1
060/Bride		10.40		24.70				19.85			7.65		18.93	16.31	5		13.29	2
061/Tourig						9.40					0.73			5.06	2		0.73	1
062/Womanagh		15.45						2.39			1.43			6.42	3		1.43	1
064/Owennacurra	15.76										1.77			8.77	2		1.77	1
066/Lee (Cork)			0.26*															
066/ Shournagh/Martin (Lee)												18.34†		18.34	1		18.34	1
069/Bandon										11.01				11.01	1		11.01	1
070/Argideen	17.15													17.15	1			
077/Mealagh						12.82								12.82	1			

*- Partial or incomplete surveys not included in calculation of CWEF average. † - Sub-catchment Surveys

	Fry Year													Most recent 5 surveys			Most Recent 5yrs Data	
Code/River	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**CWEF**	**#Surveys**		**CWEF**	**#Surveys**
080/Glengarriff			5.93											5.93	1			
081/Adrigole							4.01	1.33				15.64		6.99	3		15.64	1
082/Kealincha	0.00								0.00					0.00	2		0.00	1
083/Lough Fada	3.23								1.68					2.45	2		1.68	1
084/Croanshagh										23.38				23.38	1		23.38	1
085/Owenshagh							4.32		6.73			19.27		10.11	3		13.00	2
086/Cloonee						16.18	33.06				24.09		26.48	24.95	4		25.29	2
088/Roughty					19.78									19.78	1			
089/Finnihy						8.61	0.00				0.58		0.89	2.52	4		0.73	2
090/Blackwater (Kerry)	30.54	15.52	13.35					18.01						19.35	4			
093/Owreagh	8.94						2.07	2.81					8.51	5.58	4		8.51	1
097/Currane								24.51						24.51	1			
098/Inny	24.63		19.78									17.67		20.69	3		17.67	1
099/Emlaghmore	2.07								1.45					1.76	2		1.45	1
101/Carhan	15.76						6.05	8.61					7.55	9.49	4		7.55	1
102/Ferta	19.42							10.74			6.88		12.06	12.27	4		9.47	2
103/Behy	15.41	6.14	4.03	8.71	7.17					2.89			6.60	5.88	5	5	4.75	2
106/Laune		17.42†									21.41			21.41	1		21.41	1
107/Maine	31.88	32.81	34.23*								22.05†	19.61†		32.34	2			
108/Emlagh	10.37	3.66	13.38	3.84	2.59					2.10				5.11	5	5	2.10	1
109/Owenascaul	20.41		22.27				16.08	16.28				9.51		16.91	5		9.51	1
110/Owenalondrig			21.90											21.90	1			
111/Milltown (Kerry)		15.33		26.44			13.02		8.76				11.25	14.96	5		10.01	2
112/Feohanagh			16.61				3.20	11.93					13.75	11.37	4		13.75	1
114/Owenmore (Kerry)	25.07													25.07	1			
115/Scorid										1.86				1.86	1		1.86	1
115/Glenahoo										1.87				1.87	1		1.87	1
116/Aghacashla										4.89				4.89	1		4.89	1
116/Owenamallagh										0.00				0.00	1		0.00	1
116/Meennascarty										0.00				0.00	1		0.00	1
117/Lee (Kerry)		0.67						0.68			0.69			0.68	3		0.69	1
118/Brick	0.00													0.00	1			
119/Feale							24.15							24.15	1			
120/Galey			12.99											12.99	1			
125/Deel					0.14			0.21		1.87*	0.04			0.13	3		0.04	1
126/Maigue			2.82	16.05			12.05							10.31	3			
128/Shannon Kilcrow				0.69										0.69	1			
128/Shannon Graney				0.19										0.19	1			

*- Partial or incomplete surveys not included in calculation of CWEF average. † - Sub-catchment Surveys

Code/River	Fry Year													Most recent 5 surveys		Most Recent 5yrs Data	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CWEF	#Surveys	CWEF	#Surveys
128/Shannon Woodford				0.00										0.00	1		
128/Shannon Mulkear												8.00*		0.00	0		
128/Shannon Blackwater											10.74	10.74		10.74	2	10.74	2
128/Shannon Groody											0.00	7.45		3.73	2	3.73	2
128/Shannon Kilmastula											10.35	24.45		17.40	2	17.40	2
128/Shannon Old Main Channel											5.50*	18.25*	35.68	35.68	1	35.68	1
130/Owenagarney (Ratty)							16.97	8.87						12.92	2		
131/Fergus	12.96		4.10	6.84			5.89		6.66					7.29	5	6.66	1
133/Doonbeg				12.28				17.39		16.14*	18.77			16.15	3	18.77	1
134/Skivaleen					14.82				11.70	14.54*				13.26	2	11.70	1
135/Annageeragh							1.82	9.24						5.53	2		
142/Inagh								5.60	3.59					4.60	2	3.59	1
143/Aughyvackeen					1.00						1.70			1.35	2	1.70	1
145/Kilcolgan			2.51								0.10*	0.79		1.65	2	0.79	1
146/Clarinbridge					7.26									7.26	1		
147/Corrib Owenriff	15.75											10.35*		15.75	1		
148/Knock					12.53							1.5		12.53	1		
149/Owenboliska (Spiddal)		4.06						4.52				0.60		3.06	3	0.60	1
152/Cashla							10.83							10.83	1		
154/L. Na Furnace stream									0.00					0.00	1	0.00	1
155/Screeb											10.70			10.70	1	10.70	1
163/Owenglin			11.57											11.57	1		
167/Culfin		30.83												30.83	1		
168/Erriff	29.51	24.10	16.03	20.43	20.86	24.45	27.45	24.90	28.52	21.72	13.69	22.81	22.25	21.80	5	21.80	5
171/Carrownisky		18.25				20.60	18.22				4.25*		15.24	18.08	4	15.24	1
172/Bunowen			13.62											13.62	1		
173/Owenwee (Belclare)				8.47	7.25	15.27							4.49	8.87	4	4.49	1
178/Newport (L. Beltra)	16.06		5.53					17.40						13.00	3		
179/Srahmore			4.33											4.33	1		
181/Owengarve			5.51					6.19	0.72					4.14	3	0.72	1
185/Owenduff (Bangor)			6.00					6.20						6.10	2		
186/Owenmore - MC							27.65							27.65	1		
186/Owenmore- Carrowmore (Muinhin)							25.77							25.77	1		
187/Glenamoy	28.16		5.65											16.91	2		
188/Muingnabo	0.78								1.88					1.33	2	1.88	1
193/Ballinglen	10.65				15.09		6.37			4.97				9.27	4	4.97	1

*- Partial or incomplete surveys not included in calculation of CWEF average. † - Sub-catchment Surveys

Code/River	Fry Year													Most recent 5 surveys			Most Recent 5yrs Data	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	CWEF	#Surveys		CWEF	#Surveys
194/Cloonaghmore (Palmerstown)		8.96		9.71	22.27	17.32	15.02				5.07*	14.63		15.79	5	5	14.63	1
196/Brusna			4.70				14.16	14.74						11.20	3			
198/Leaffony	5.76		7.95						1.73					5.15	3		1.73	1
203/Garvogue (Bonnet)	18.41	13.26	16.83	11.31	7.08	18.54								13.41	5	5		
205/Drumcliff				17.72										17.72	1			
207/Grange	5.75		3.29						4.56					4.53	3		4.56	1
208/Duff	7.84	9.31	18.59	25.16							18.05	20.34		18.29	5	5	19.20	2
210/Erne		7.37†	0.17†	0.08†	0.00†	0.00†	0.00†	1.60†	1.16†	1.25†	0.00†	0.49†	0.00†	0.58	5	5	0.58	5
211/Abbey							7.20	28.14						17.67	2			
212/Ballintra			10.27				13.40	19.82					13.31	14.20	4		13.31	1
213/Laghy			8.58				14.97	11.02					8.56	10.78	4		8.56	1
214/Eske		13.10	16.99	16.30					13.45			10.94		14.16	5		12.20	2
215/Eany				15.86		30.08			12.89					19.61	3		12.89	1
216/Oily			9.49		33.68			16.62			21.26			20.26	4		21.26	1
217/Bungosteen					27.91		19.23				13.17		13.41	18.43	4		13.29	2
219/Glen (Ballyshannon)				19.44					18.37			18.56		18.79	3		18.46	2
220/Owenwee (Yellow R)	24.13	5.00	16.93			20.31	21.05						14.20	15.50	5	5	14.20	1
221/Bracky		10.82				21.57		12.24						14.88	3			
222/Owentocker		20.06												20.06	1			
223/Owenea												33.94		33.94	1		33.94	1
226/Owenamarve			3.76				2.64	1.00						2.47	3			
228/Gweedore (Crolly R.)		15.99			11.32									13.65	2			
229/Clady		16.12				37.21								26.67	2			
234/Glenna			16.80		3.77		7.77			4.00				8.09	4		4.00	1
235/Tullaghobegly		8.33		9.05						0.00*				8.69	2			
236/Ray		7.35			14.89			17.31		3.71*				13.18	3			
240/Lackagh		18.86	15.82		19.20	23.57				17.50*	22.50			19.99	5		22.50	1
248/Leannan	9.47	7.68	9.73	17.30	12.82	22.19	19.51	20.87	15.27	15.05*	18.66	20.11	21.33	19.25	5	5	18.84	4
249/Swilly		9.33	7.36				18.08	8.05						10.71	4			
250/Isle (Burn)						2.12								2.12	1			
251/Burnfoot		7.77		2.90										5.33	2			
252/Mill (Letterkenny)				0.00					0.00					0.00	2		0.00	1
253/Crana			15.74							6.00*	6.93*	16.38		16.06	2		16.38	1
256/Clonmany		16.61		6.59					4.21					9.14	3		4.21	1
257/Straid				0.20					0.00					0.10	2		0.00	1
258/Donagh				4.25					0.68					2.46	2		0.68	1
259/Glennagannon			16.65		4.05		7.13							9.28	3			
261/Culoort				4.03					0.00					2.02	2		0.00	1

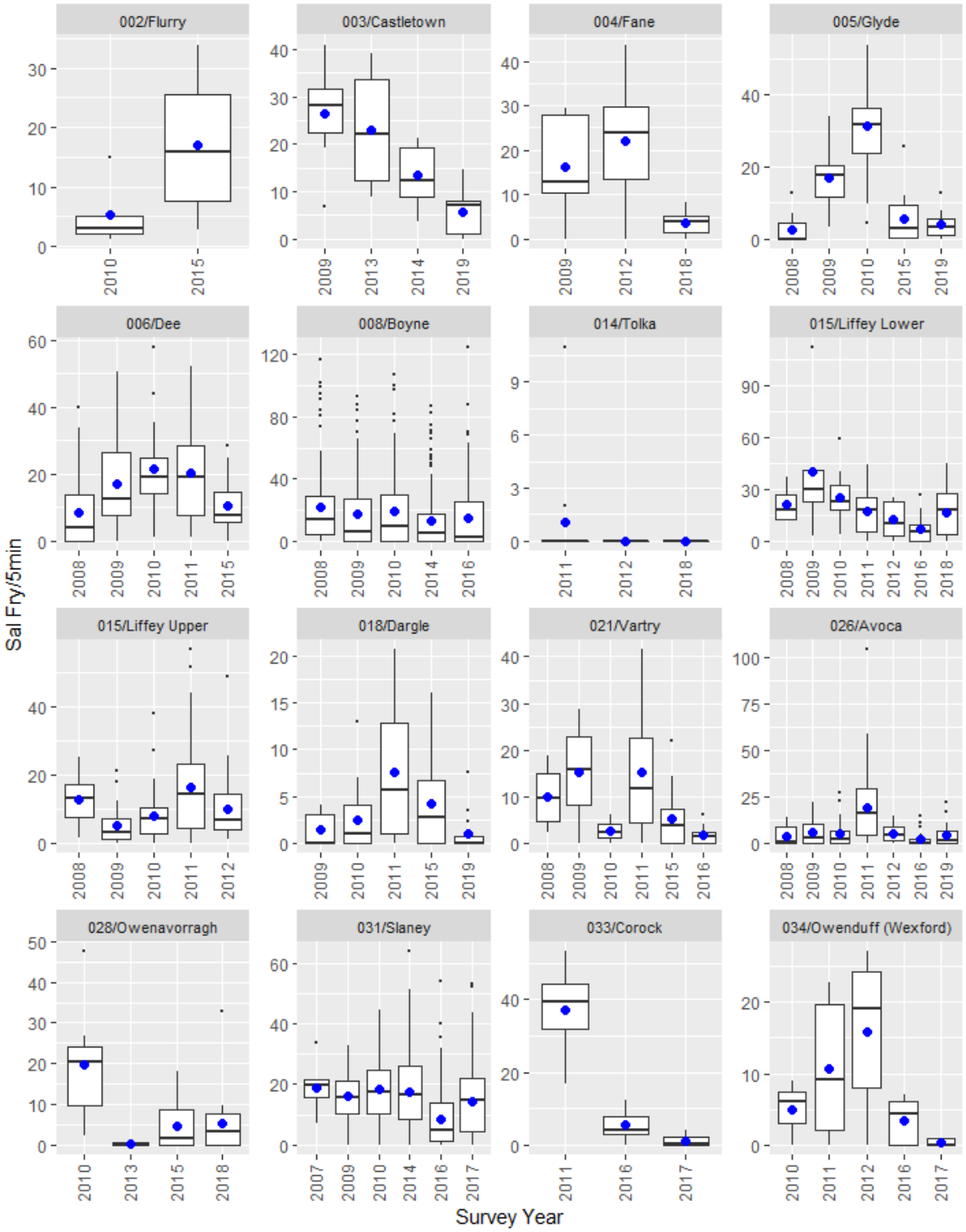
*- Partial or incomplete surveys not included in calculation of CWEF average. † - Sub-catchment Surveys

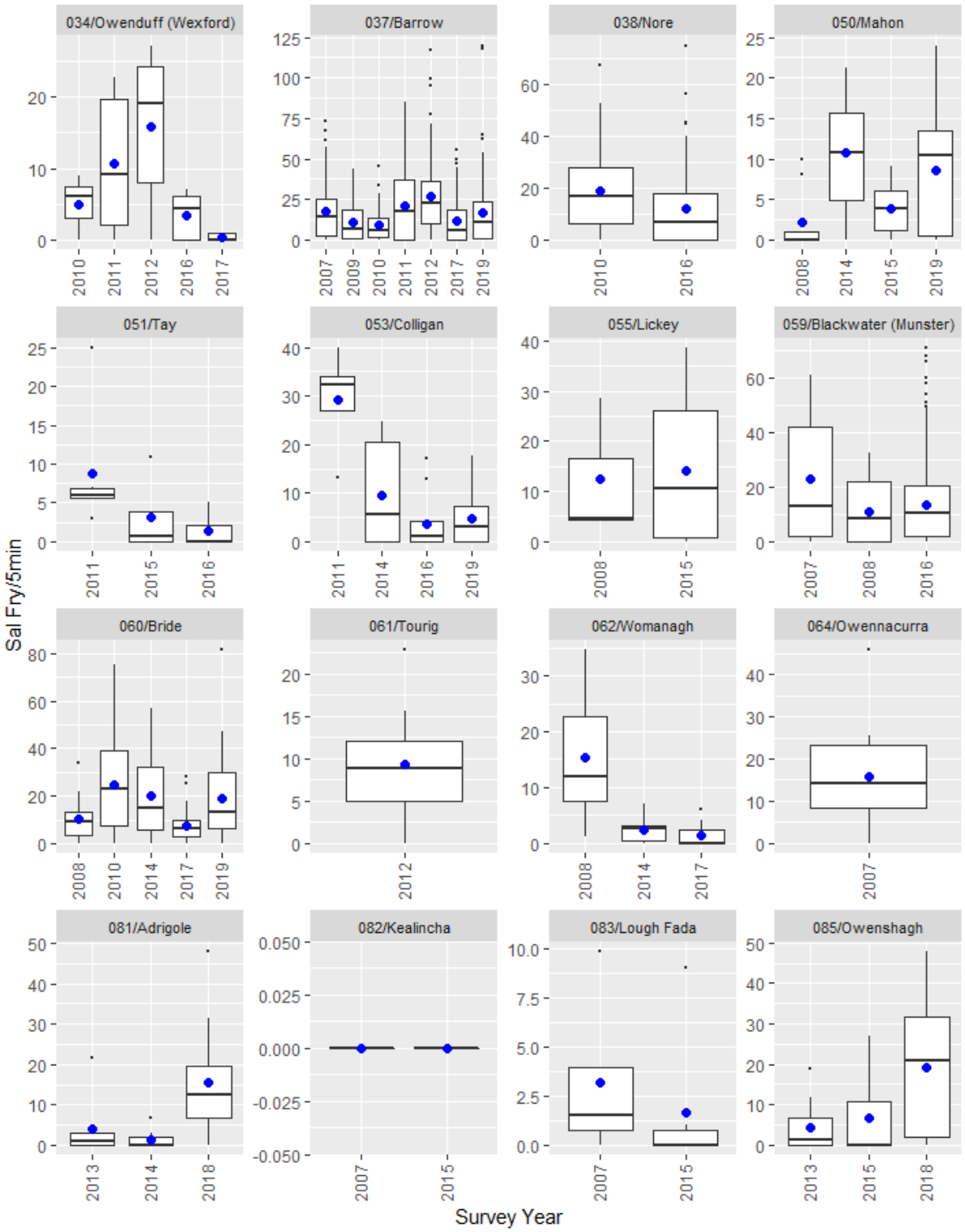
	Fry Year													Most recent 5 surveys		Most Recent 5yrs Data	
Code/River	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**CWEF**	**#Surveys**	**CWEF**	**#Surveys**
930/Quin									5.97					5.97	1	5.97	1
1461/Oranmore												0.63		0.00	0		
1551/Loch An Mhuillin											0.00			0.00	0		

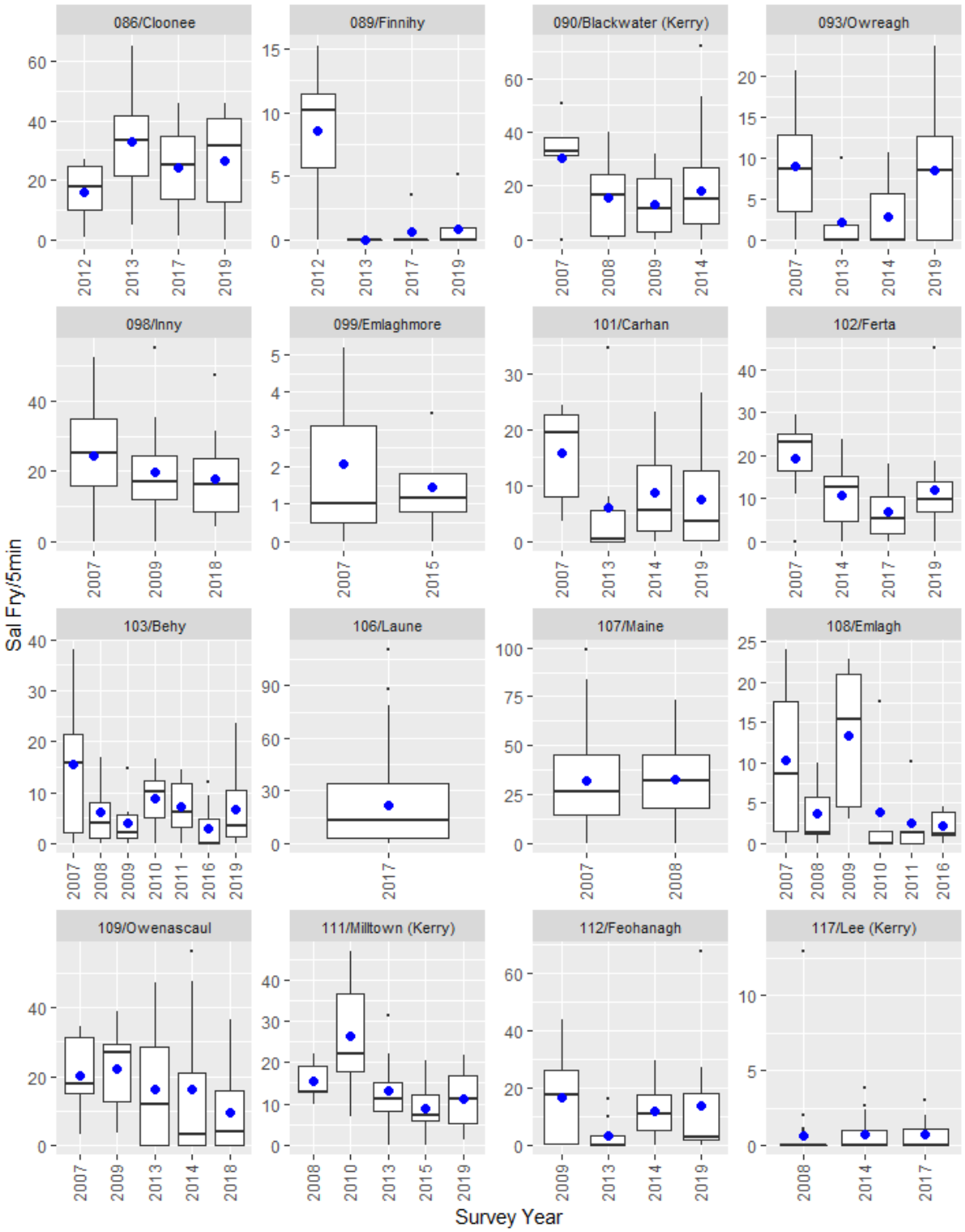
*- Partial or incomplete surveys not included in calculation of CWEF average. † - Sub-catchment Surveys

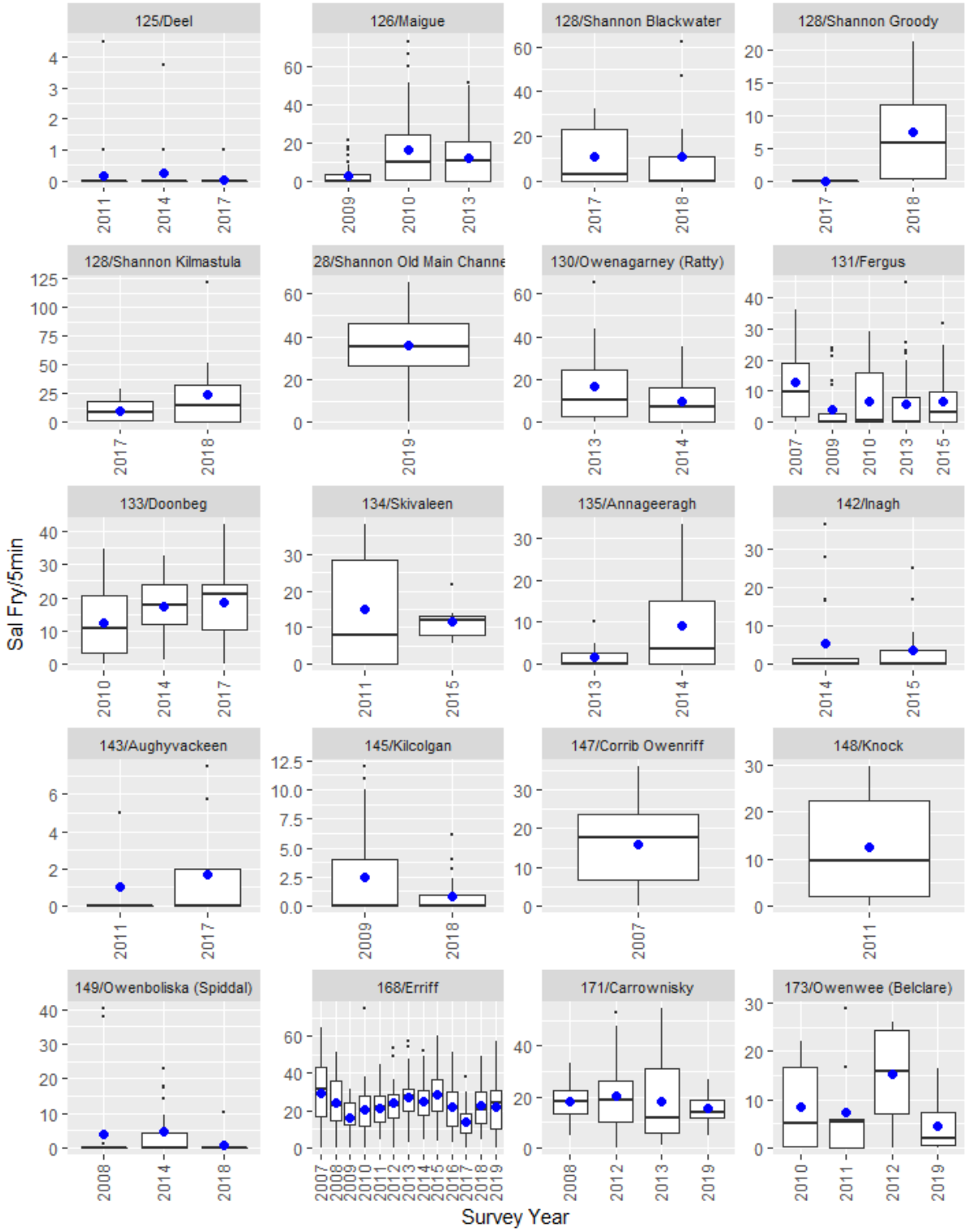
D. Boxplots: CWEF results included in analysis for each catchment >2 surveys from 2007-2019.

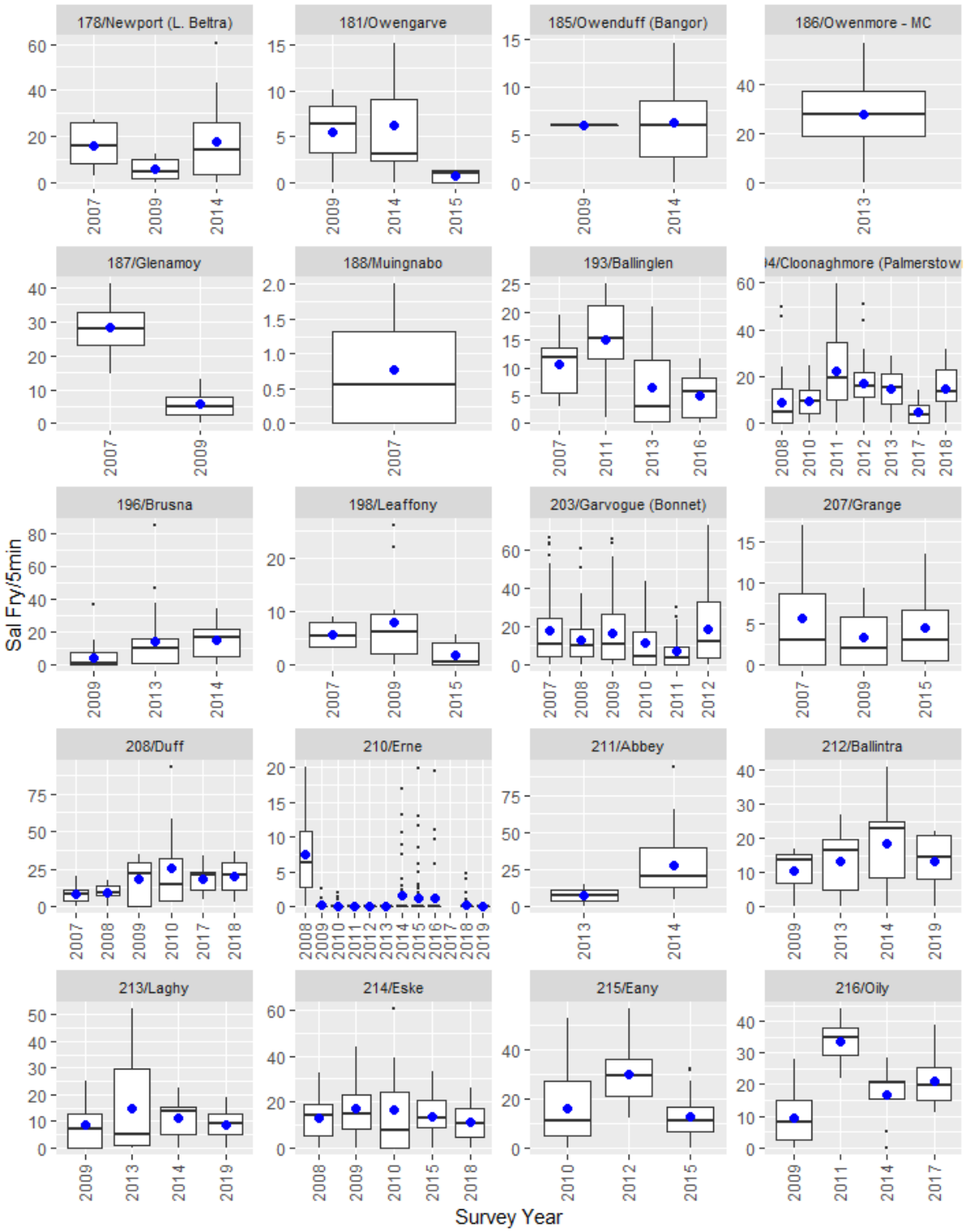
Boxplots represent the distribution of individual site abundances; blue points indicate the average.

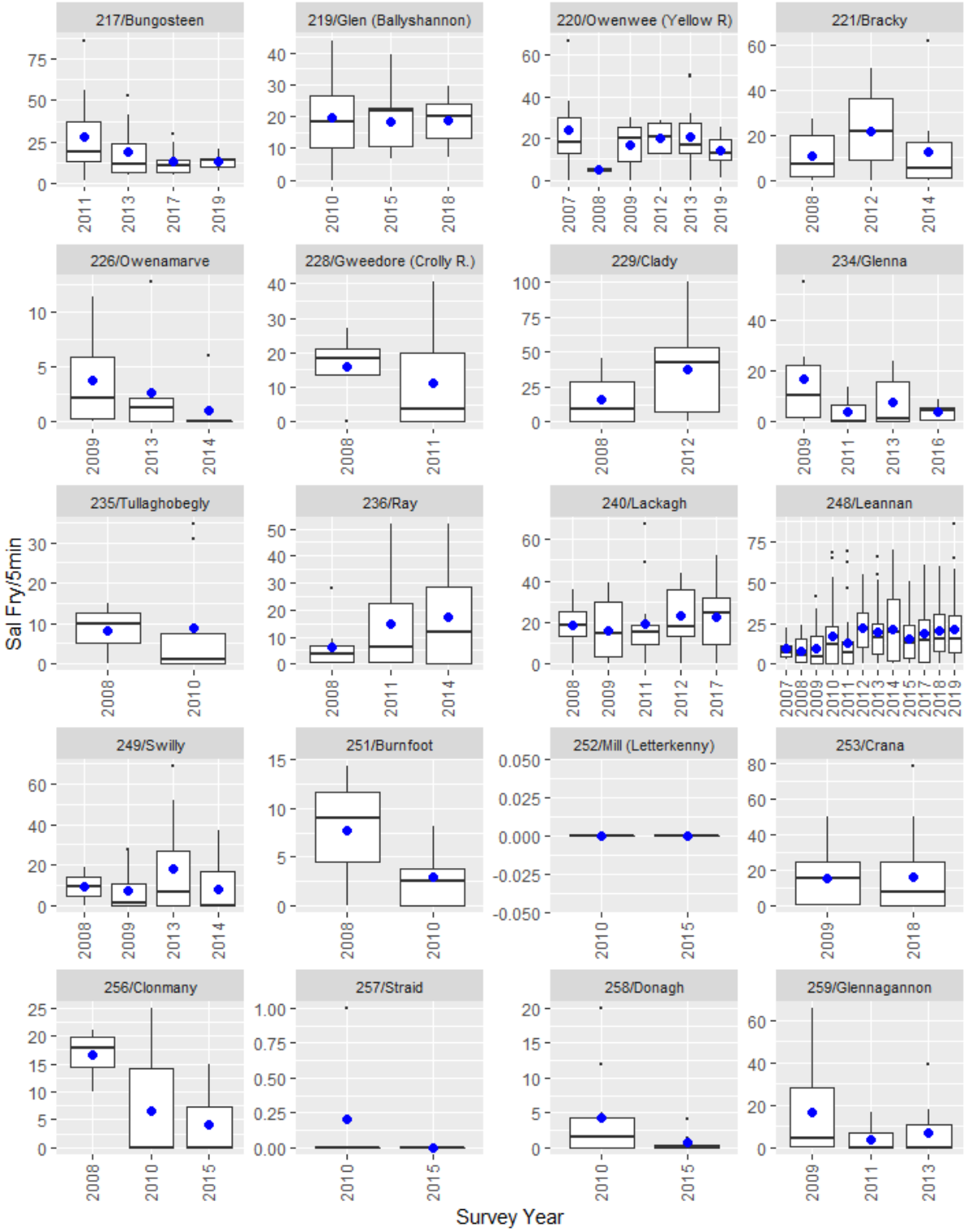



034/Owenduff (Wexford)
037/Barrow
038/Nore
050/Mahon
051/Tay
053/Colligan
055/Lickey
059/Blackwater (Munster)
060/Bride
061/Tourig
062/Womanagh
064/Owennacurra
081/Adrigole
082/Kealincha
083/Lough Fada
085/Owenshagh
Sal Fry/5min
Survey Year


086/Cloonee
089/Finnihy
090/Blackwater (Kerry)
093/Owreagh
098/Inny
099/Emlaghmore
101/Carhan
102/Ferta
103/Behy
106/Laune
107/Maine
108/Emlagh
109/Owenascaul
111/Milltown (Kerry)
112/Feohanagh
117/Lee (Kerry)
Sal Fry/5min
Survey Year


125/Deel
126/Maigue
128/Shannon Blackwater
128/Shannon Groody
128/Shannon Kilmastula
28/Shannon Old Main Channe
130/Owenagarney (Ratty)
131/Fergus
133/Doonbeg
134/Skivaleen
135/Annageeragh
142/Inagh
143/Aughyvackeen
145/Kilcolgan
147/Corrib Owenriff
148/Knock
149/Owenboliska (Spiddal)
168/Erriff
171/Carrownisky
173/Owenwee (Belclare)
Sal Fry/5min
Survey Year


178/Newport (L. Beltra)
181/Owengarve
185/Owenduff (Bangor)
186/Owenmore - MC
187/Glenamoy
188/Muingnabo
193/Ballinglen
4/Cloonaghmore (Palmerstow
196/Brusna
198/Leaffony
203/Garvogue (Bonnet)
207/Grange
208/Duff
210/Erne
211/Abbey
212/Ballintra
213/Laghy
214/Eske
215/Eany
216/Oily
Sal Fry/5min
Survey Year


217/Bungosteen
219/Glen (Ballyshannon)
220/Owenwee (Yellow R)
221/Bracky
226/Owenamarve
228/Gweedore (Crolly R.)
229/Clady
234/Glenna
235/Tullaghobegly
236/Ray
240/Lackagh
248/Leannan
249/Swilly
251/Burnfoot
252/Mill (Letterkenny)
253/Crana
256/Clonmany
257/Straid
258/Donagh
259/Glennagannon
Sal Fry/5min
Survey Year

E. Survey Density

Survey density achieved during CWEF surveys 2008 -2019 expressed as number of kilometres of river>stream order1 per survey in each catchment. The lower the figure the more intensive the survey.

Table D.1: Approximate calculated river lengths and survey densities for all CWEF surveys.

IFI Code/ River	2 km per Site	5 km per Site	Length>SO1	Km/Site Achieved												
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Min
2/Flurry	16	6	32			4.0					8.1					4.0
3/Castletown	15	6	31		2.4				2.8	2.8					3.1	2.4
4/Fane	55	22	111		15.8			7.9			10.1		22.1	8.5		7.9
5/Glyde	82	33	165	10.3	11.0	11.8					11.0				16.5	10.3
6/Dee	100	40	201	6.9	10.6	10.0	10.0				10.0				15.4	6.9
8/Boyne	555	222	1111	8.4	7.6	7.7				7.5		7.6				7.5
13/Broadmeadow	57	23	116			38.7										38.7
14/Tolka	41	16	82				6.9	41.2						16.5		6.9
15.1/Liffey Lower	60	24	122	20.3	20.3	11.1	7.2	17.4				7.2		5.8		5.8
15.2/Liffey Upper	206	82	412	24.3	12.9	11.1	7.6	15.9				103.1		103.1		7.6
16/Dodder	46	18	93				15.5									15.5
18/Dargle	38	15	77	38.7	12.9	4.3	4.8				4.6				5.5	4.3
20/Newcastle	4	1	9											3.0		3.0
21/Vartry	22	8	44	11.0	11.0	3.4	4.0				2.9	3.7				2.9
26/Avoca	172	68	345	16.4	11.1	13.3	4.3	11.5				7.7		23.0	9.1	4.3
28/Owenavorragh	47	18	95			13.5			15.8		5.3			5.9		5.3
31/Slaney	432	173	866		18.0	11.0				7.2		6.3	6.4		36.1	6.3
32/Duncormick	15	6	31							15.7						15.7
33/Corock	47	18	95			31.5	15.8	23.6				18.9	15.8		31.5	15.8
34/Owenduff (Wexford)	16	6	33			10.9	5.5	5.5				6.5	6.5		32.7	5.5
37/Barrow	547	219	1095		13.0	13.2	13.0	10.4				273.8	8.5		8.8	8.5
38/Nore	555	222	1111			10.8						9.3			555.3	9.3
43/Suir	825	330	1650									11.9				11.9
50/Mahon	32	12	64	6.4						8.0	8.0				4.3	6.4
51/Tay	20	8	41				6.8			41.1	8.2	5.9				5.9
53/Colligan	27	11	55				11.1			4.6		4.3			4.0	4.3
55/Lickey	9	3	20	4.9							2.2					2.2
59/Blackwater (Munster)	638	255	1278	67.3								4.0	85.2	71.0		4.0

Table D.1: Approximate calculated river lengths and survey densities for all CWEF surveys.

IFI Code/ River	2 km per Site	5 km per Site	Length>SO1	Km/Site Achieved												
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Min
60/Bride	80	32	161	7.7		6.2				4.3			4.1		4.3	4.1
61/Tourig	8	3	17					2.1					2.1			2.1
62/Womanagh	26	10	53	4.8						3.5			4.1			3.5
64/Owennacurra	32	13	66										4.4			4.4
66.1/Lee (Cork)	217	87	436		18.9											18.9
66.2/Lower Lee (Cork)N (Shournagh)	60	24	122											3.8		3.8
69/Bandon	154	61	309									3.2				3.2
72/Ilen	92	37	186					26.5								26.5
77/Mealagh	24	9	49					4.5								4.5
80/Glengarriff	22	8	44		4.9											4.9
81/Adrigole	17	7	35						3.9	3.2				3.2		3.2
82/Kealincha	11	4	24								4.8					4.8
83/Lough Fada	12	5	26								4.3					4.3
84/Croanshagh	27	10	55									4.2				4.2
85/Owenshagh	26	10	53						3.3		5.3			3.8		3.3
86/Cloonee	9	3	18					2.6	3.0				2.6		2.6	2.6
88/Roughty	99	39	199				15.3									15.3
89/Finnihy	11	4	22					3.7	3.7				3.7		2.8	3.7
90/Blackwater (Kerry)	40	16	81	6.2	5.8					1.9						1.9
93/Owreagh	8	3	17						2.9	2.2					2.2	2.2
97/Currane	38	15	78							1.4		6.5	6.5	6.5		1.4
98/Inny	42	17	85		4.3									4.3		4.3
99/Emlaghmore	7	2	15								3.7					3.7
101/Carhan	9	3	18						2.3	1.8					1.8	1.8
102/Ferta	17	6	34							2.6			2.2		2.6	2.2
103/Behy	14	5	28	2.8	2.8	3.1	2.8					2.6			2.8	2.6
106/Laune	269	107	540	45.0									4.9			4.9
107/Maine	93	37	187	3.6	11.0								7.5	7.2		3.6
108/Emlagh	10	4	20	4.0	4.0	4.0	4.0					4.0				4.0
109/Owenascaul	17	6	35		3.5				3.5	2.7				2.7		2.7
110/Owenalondrig	8	3	16		2.3											2.3
111/Milltown (Kerry)	8	3	16	2.7		2.0			1.8		2.0				2.0	1.8

Table D.1: Approximate calculated river lengths and survey densities for all CWEF surveys.

IFI Code/ River	2 km per Site	5 km per Site	Length>SO1	Km/Site Achieved												
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Min
112/Feohanagh	14	5	29		2.9				2.7	2.4					2.4	2.4
115.1/Scorid	5	2	11									2.1				2.1
115.2/Glenahoo	5	2	12									1.2				1.2
116/Aghacashla	7	2	14									2.0				2.0
116.1/Owenamallagh	2	0	5									2.3				2.3
116.2/Meennascarty	4	1	8									2.1				2.1
117/Lee (Kerry)	43	17	88	2.6						4.6			6.7			2.6
119/Feale	167	67	336						5.7							5.7
120/Galey	167	67	336		10.5											10.5
125/Deel	125	50	251				2.5			2.4		10.5	8.7			2.4
126/Maigue	209	83	418		6.5	4.8			3.0							3.0
128.01/Shannon Kilcrow	96	38	193			3.4										3.4
128.02/Shannon Graney	77	31	156			2.5										2.5
128.03/Shannon Woodford	13	5	28			1.9										1.9
128.04/Shannon Mulkear	225	90	451											9.2		9.2
128.06/Shannon Blackwater	15	6	32										1.6	1.6		1.6
128.07/Shannon Groody	17	6	34										2.6	4.3		2.6
128.08/Shannon Kilmastula	32	12	65										3.8	2.8		2.8
128.09/Shannon Old Main Channel	11	4	24										4.7	4.7	0.9	4.7
130/Owenagarney (Ratty)	44	17	89						3.0	3.9						3.0
131/Fergus	116	46	233		6.5	6.0			3.2		4.4					3.2
133/Doonbeg	34	13	69			2.6				3.3		5.8	4.3			2.6
134/Skivaleen	14	5	30				2.5				3.0	7.5				2.5
135/Annageeragh	17	7	36						2.0	2.0						2.0
142/Inagh	60	24	121							4.0	5.2					4.0
143/Aughyvackeen	17	6	35				2.0						1.7			1.7
145/Kilcolgan	81	32	162		4.6								16.2	4.8		4.6
146/Clarinbridge	20	8	42				6.0									6.0
147.1/Corrib Owenriff	26	10	53											5.9		5.9
148/Knock	9	3	20				3.3							3.3		3.3
149/Owenboliska (Spiddal)	29	11	58	2.2						2.8				2.9		2.2
152/Cashla	24	9	49						1.5							1.5

Table D.1: Approximate calculated river lengths and survey densities for all CWEF surveys.

IFI Code/ River	2 km per Site	5 km per Site	Length>SO1	Km/Site Achieved												
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Min
154/L. Na Furnace stream	5	2	12								2.9					2.9
155/Screeb	9	3	19										0.9			0.9
163/Owenglin	19	7	40		2.1											2.1
167/Culfin	10	4	21	3.0												3.0
168/Erriff	70	28	142	2.9	2.7	2.8	4.1	4.1	4.2	4.1	3.8	4.3	4.3	4.2	3.9	2.7
171/Carrownisky	20	8	42	2.1				2.2	2.5				10.4		3.2	2.1
172/Bunowen	34	13	70		23.2											23.2
173/Owenwee (Belclare)	20	8	41			3.8	4.6	3.8							3.8	3.8
178/Newport (L. Beltra)	53	21	108		13.4					3.8						3.8
179/Srahmore	34	13	69		23.1											23.1
181/Owengarve	12	4	25		6.2					2.8	5.0					2.8
185/Owenduff (Bangor)	63	25	127		63.7					9.1						9.1
186/Owenmore - MC	100	40	201		33.5				5.3							5.3
186.1/Owenmore- Carrowmore (Muinhin)	32	12	64						3.2							3.2
187/Glenamoy	32	13	65		9.3											9.3
188/Muingnabo	16	6	34								16.9					16.9
193/Ballinglen	19	7	39				2.8		3.6			3.3				2.8
194/Cloonaghmore (Palmerstown)	60	24	121	2.9		3.5	2.9	3.7	4.2				4.2	4.5		2.9
196/Brusna	51	20	103		2.9				3.4	3.7						2.9
198/Leaffony	12	5	25		1.8						1.8					1.8
203/Garvogue (Bonnet)	128	51	257	4.9	4.7	4.7	9.9	6.1								4.7
205/Drumcliff	31	12	62			3.5										3.5
207/Grange	21	8	42		7.0						6.0					6.0
208/Duff	48	19	96	9.6	10.7	8.8							8.8	8.8		8.8
210/Erne	138	55	277	17.3	12.0	4.6	13.8	4.5	8.1	5.5	3.8	6.9	18.5	5.5	9.2	3.8
211/Abbey	14	5	30						14.8	1.6						1.6
212/Ballintra	41	16	83		27.7				5.2	6.4					10.4	5.2
213/Laghy	23	9	47		5.2				4.2	3.9					5.2	3.9
214/Eske	57	23	116	8.3	7.2	6.8					5.0			5.8		5.0
215/Eany	72	28	144			4.8		6.9			5.8					4.8
216/Oily	23	9	46		4.2		6.6			3.6			4.2			3.6
217/Bungosteen	22	8	44				4.4		4.4				4.4		5.5	4.4

Table D.1: Approximate calculated river lengths and survey densities for all CWEF surveys.

IFI Code/ River	2 km per Site	5 km per Site	Length>SO1	Km/Site Achieved												
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Min
219/Glen (Ballyshannon)	41	16	82			4.6					5.9			5.5		4.6
220/Owenwee (Yellow R)	8	3	17	5.8	2.2			4.3	1.1						2.2	1.1
221/Bracky	17	7	35	4.4				2.5		2.9						2.5
222/Owentocker	21	8	43	4.3												4.3
223/Owenea	61	24	124											11.3		11.3
226/Owenamarve	8	3	16		2.3				2.3	2.3						2.3
228/Gweedore (Crolly R.)	14	5	29	5.8			2.4									2.4
229/Clady	29	11	58	9.7				5.3								5.3
234/Glenna	9	3	19		3.2		3.2		3.2			3.2				3.2
235/Tullaghobegly	8	3	17	5.7		1.7						8.6				1.7
236/Ray	22	9	45	5.6			4.1			3.8		6.4				3.8
240/Lackagh	45	18	91	9.1	7.6		6.5	6.5				15.1	8.2			6.5
248/Leannan	109	43	219	7.6	7.6	7.6	7.6	7.6	8.4	8.4	8.4	11.0	7.6	6.1	6.4	6.1
249/Swilly	45	18	91	30.3	5.3				6.5	5.7						5.3
250/Isle (Burn)	24	9	49					4.9								4.9
251/Burnfoot	11	4	24	6.0		4.8										4.8
252/Mill (Letterkenny)	14	5	29			9.7					9.7					9.7
253/Crana	43	17	87		3.6							43.3	12.4	2.2		2.2
256/Clonmany	17	7	35	8.8		2.9					3.9					2.9
257/Straid	11	4	23			4.5					4.5					4.5
258/Donagh	15	6	31			3.1					3.4					3.1
259/Glennagannon	13	5	27		2.7		2.4		2.4							2.4
261/Culoort	9	3	18			2.3					6.0					2.3
930/Quin	38	15	78								3.5					3.5

Inland Fisheries Ireland
3044 Lake Drive,
Citywest Business Campus,
Dublin 24,
Ireland.
D24 Y265

www.fisheriesireland.ie
info@fisheriesireland.ie

+353 1 8842 600