Report on Salmon Monitoring Programmes 2018 funded under Salmon Conservation Fund

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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 2018 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.

- Catchment-wide electro-fishing 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 CWEF programme is to determine if mean salmon fry abundance exceeds a catchment threshold value of 17 salmon fry/5-min (computed by the Standing Scientific Committee on Salmon 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 33 catchments nationally in 2018 (July – September). A total of 566 sites were visited. 26 catchments or sub-catchments, mostly in the south and east of the country, were surveyed completely. Very low water levels and high temperatures in the early summer followed by persistently high water levels throughout the later summer prevented the completion of several surveys in 6 catchments, primarily in the west and northwest. Abundance for this year alone ranged from an average of zero fry/5min on the Tolka and Newcastle in Eastern River Basin District, to a catchment average of 33.94 salmon fry per 5 min on the Owenea. The Adrigole, Crana, Liffey Lower, Inny, Shournagh (Lower Lee Cork), Glen (Ballyshannon), Owenshagh, Leannan, Duff, Erriff, Shannon Kilmastula and Owenea recorded respective annual catchment-wide averages of >15 fry. The Erriff (the 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 2007-2018 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 CWEF surveys.

- The long-term objective of the CWEF programme is 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 better understand the marine survival of 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 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.

- In 2018, a total of 11 PIT tagged adult salmon returned to the Erriff representing a provisional marine survival of 2% for the cohort tagged in 2017. Any multi-sea-winter fish which will return in 2019 will have to be considered when finalising this estimate. An additional six adult salmon returned as two-sea-winter fish from the cohort tagged in 2016 which has revised their marine survival estimate upwards to 3.5%. Marine survival of PIT tagged fish in the Corrib from the cohort tagged in 2017 was provisionally estimated as 7.4%. 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.

- Salmon scales were collected and analysed for life history information from the Bandon, Suir and Cork Harbour commercial and recreational fisheries. Of the scales read the Bandon fishery recorded 67% grilse and 30% multi sea-winter (MSW). The Suir recorded 40% grilse, 58% MSW and 2% previously spawned grilse (PSG). Cork harbour recorded 53% grilse and 47% MSW.

1. Assessment of Attainment of Conservation Limits for Atlantic Salmon in Irish Rivers in 2018: Report on Activities.

Introduction

In spring 2009, the Standing Scientific Committee on Salmon (SSCS) 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 CLs. 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 SSCS to assess salmon stock status.

Funding was secured under the Salmon Conservation Fund (SCF) to assess the attainment of salmon conservation limits nationally in 2018. This report presents the results of activities undertaken in 2018 to assess attainment of salmon CLs nationally. The project had three elements:

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 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. Up to 1000 wild smolts per annum will be PIT tagged (depending on smolt output) and the proportion of returning tagged fish will provide a direct estimate of marine 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 2018.

2. Catchment-wide Electrofishing Programme 2018.

Sampling Methodology

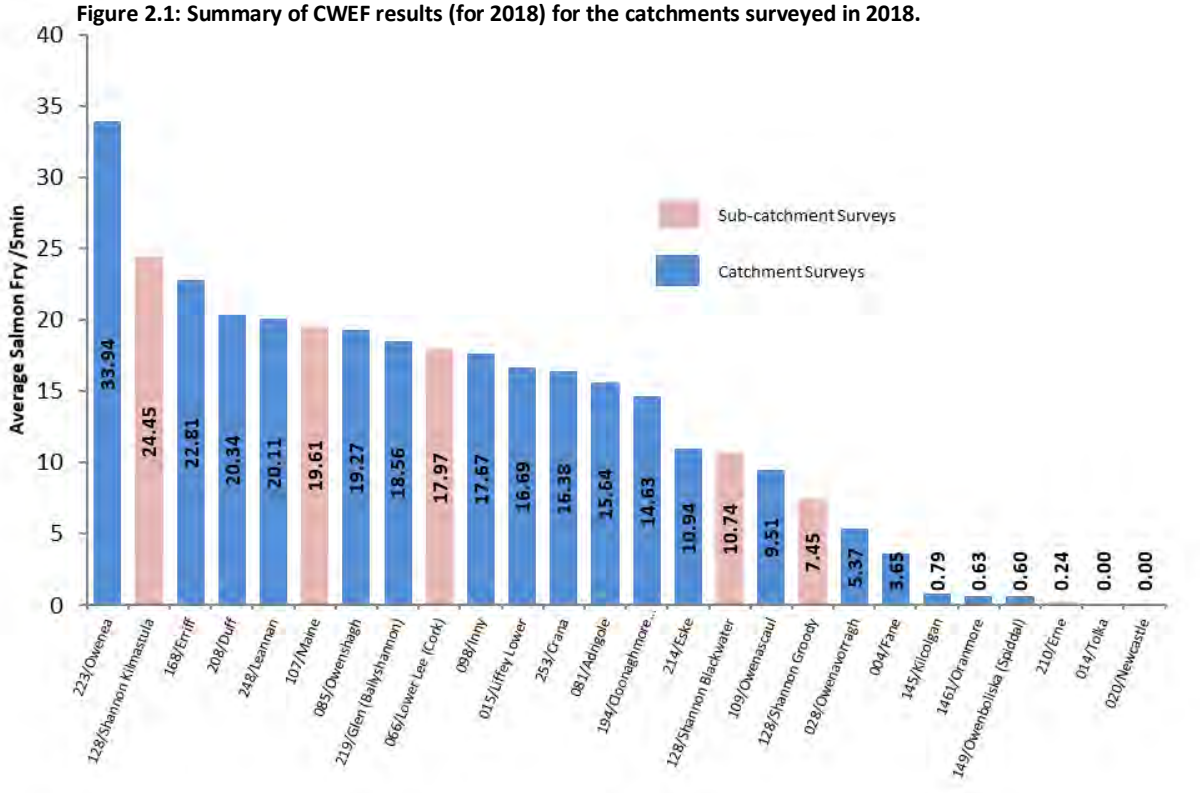
The sampling methodology was similar to that described in Gargan, P., Roche, W., Keane, S. & Stafford, T. 2009. Report on Salmon Monitoring Programmes 2008 (June 2009), Central & Regional Fisheries Board.

2.1. Results 2018

During 2018, catchment-wide electro-fishing was undertaken in 31 catchments or sub-catchments to assess abundance and distribution of salmon fry. Very low water levels and high temperatures in the early summer followed by persistently high water levels throughout the later summer in a number of catchments, primarily in the west and northwest, prevented the completion of several surveys. Despite poor fishing conditions for much of the summer 26 catchments were surveyed completely (Figure 2.1). Planned surveys of certain sub-catchments were also completed as follows: The Groody, Kilmastula, and the Blackwater on the Lower Shannon, the Shournagh River in the Lower Lee and the Glenfarne, Swanlinbar and Blackwater on the upper Erne, plus a survey on the Maine River in the Maine catchment. A total of 566 sites were visited.

For the catchments surveyed in 2018, the salmon fry abundance for this year alone ranged from an average of zero fry/5min on the Tolka and Newcastle in Eastern River Basin District, to a catchment average of 33.94 salmon fry per 5 min on the Owenea. The Inny, Shournagh, Glen (Ballyshannon), Owenshagh, Leannan, Duff, Erriff, Shannon Kilmastula and Owenea recorded an annual catchment-wide average of >17 fry in 201

Figure 2.1: Summary of CWEF results (for 2018) for the catchments surveyed in 2018.



Summary of annual results (2007-2018) and current CWEF indices for catchments surveyed in 2018.

	Fry Year												Most recent 5 surveys		Most Recent 5yrs Data (2014-2018)	
Code/River	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**CWEF**	**#Surveys**	**CWEF**	**#Surveys**
004/Fane			**16.17**			**22.09**			8.94*		0.5*	**3.65**	13.97	3	3.65	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	11.72	2
020/Newcastle												0.00	0.00	1	0.00	1
028/Owenavorragh				**19.76**			**0.33**		**4.61**			**5.37**	7.52	4	4.99	2
066/Lower Lee (Cork)												17.97	17.97	1	17.97	1
081/Adrigole							**4.01**	**1.33**				**15.64**	6.99	3	8.49	2
085/Owenshagh							**4.32**		**6.73**			**19.27**	10.11	3	13.00	2
098/Inny	**24.63**		**19.78**									**17.67**	20.69	3	17.67	1
107/Maine	**31.88**	**32.81**	34.23*								22.05†	19.61†	32.35	2		
109/Owenascaul	**20.41**		**22.27**				**16.08**	**16.28**				**9.51**	16.91	5	12.90	2
128/Shannon Blackwater											10.74†	10.74†	10.74	2		
128/Shannon Groody											0.00†	7.45†	3.73	2		
128/Shannon Kilmastula											10.35†	24.45†	17.40	2		
145/Kilcolgan			**2.51**									**0.79**	1.65	2	0.79	1
1461/Oranmore												**0.63**	0.63	1	0.63	1
149/Owenboliska (Spiddal)		**4.06**						**4.52**				**0.60**	3.06	3	2.56	2
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**	22.32	5	22.32	5
194/Cloonaghmr (Palmerstn)		8.96		**9.71**	**22.27**	**17.32**	**15.02**				5.07*	**14.63**	15.79	5	14.63	1
208/Duff	7.84	9.31	18.59	25.16							18.05	20.34	18.29	5	19.20	2
210/Erne		7.37†	0.17†	0.08†	0.00†	0.00†	0.00†	1.6†	1.16†	1.25†	0.00†	0.24†				
214/Eske		**13.10**	**16.99**	**16.30**					**13.45**			**10.94**	14.16	5	12.20	2
219/Glen (Ballyshannon)				**19.44**					**18.37**			**18.56**	18.79	3	18.47	2
223/Owenea												**33.94**	33.94	1	33.94	1
248/Leannan	9.47	7.41	8.73	16.71	12.36	21.51	**19.51**	**20.87**	**15.27**	15.05*	**18.66**	**20.11**	18.88	5	18.73	4
253/Crana			**15.74**							6.00*	6.93*	**16.38**	16.06	2	16.38	1

† -Sub catchment surveys.

2.2.Results 2007 to 2018

Update for 2018.

From 2007 to 2018 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 455 catchment surveys amounting to 9,903 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 data collated since 2007. Annualised CWEF results 2007 to 2018 for all catchment surveyed are presented in Appendix C.

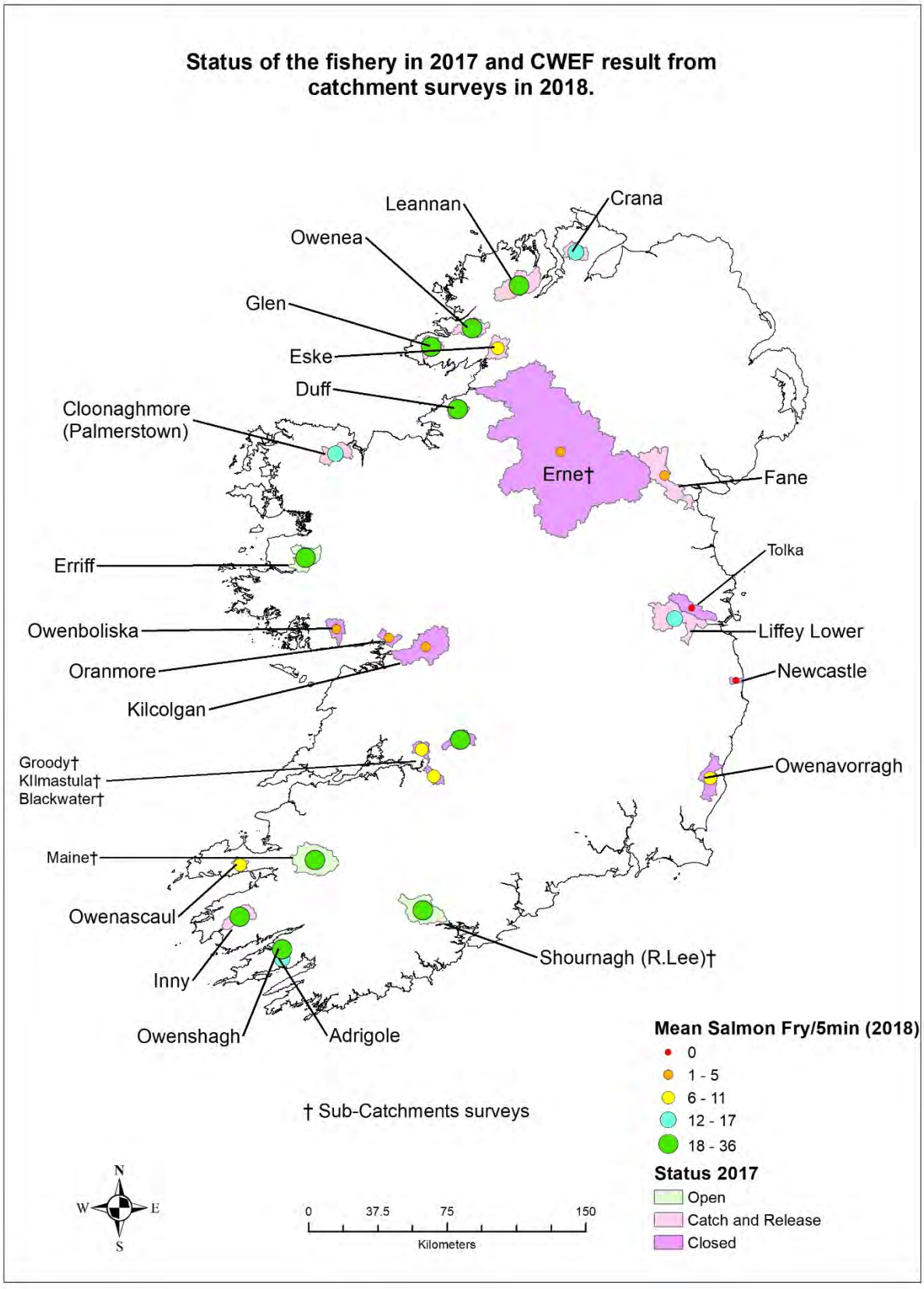
Trends in Salmon Fry Abundance over Time

Data in Figures 2.2 and 2.3 present the CWEF annual mean abundances of salmon fry in 146 catchments where electro-fishing results are available. Figure 2.4 shows the current average salmon index for all catchments surveyed to date. 45 catchments have only one survey within the period used to calculate the CWEF index.

Highest salmon fry numbers were recorded in rivers in Kerry 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 2018 is presented (Map 2.2).

Map 2.1: For rivers completely surveyed in 2018 the mean salmon fry per 5 minutes found in 2018 is indicated along with the fishery status during the 2017 fishing season.



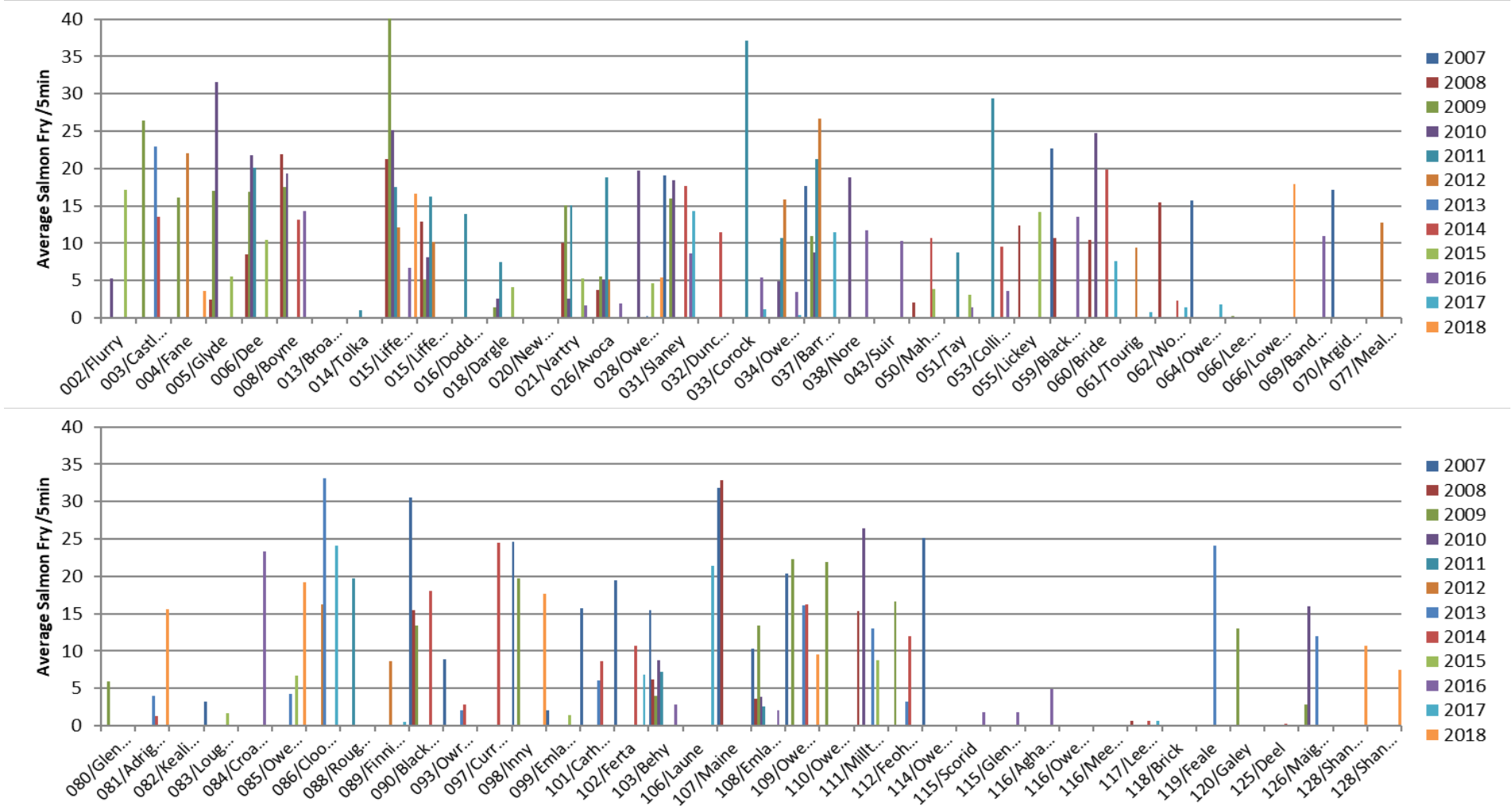


Fig 2.2: Annual catchment-wide electrofishing results 2007-2018.

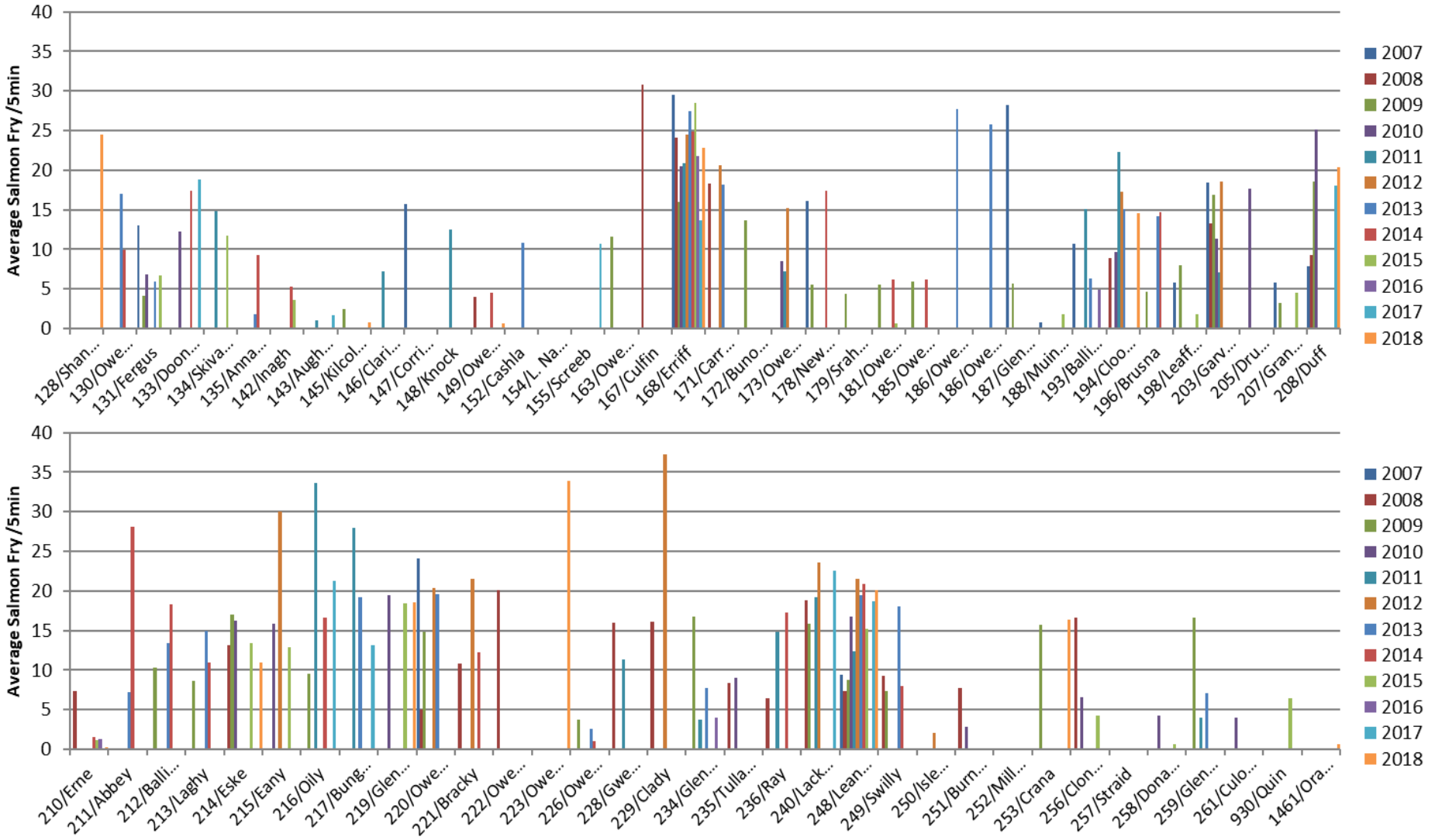
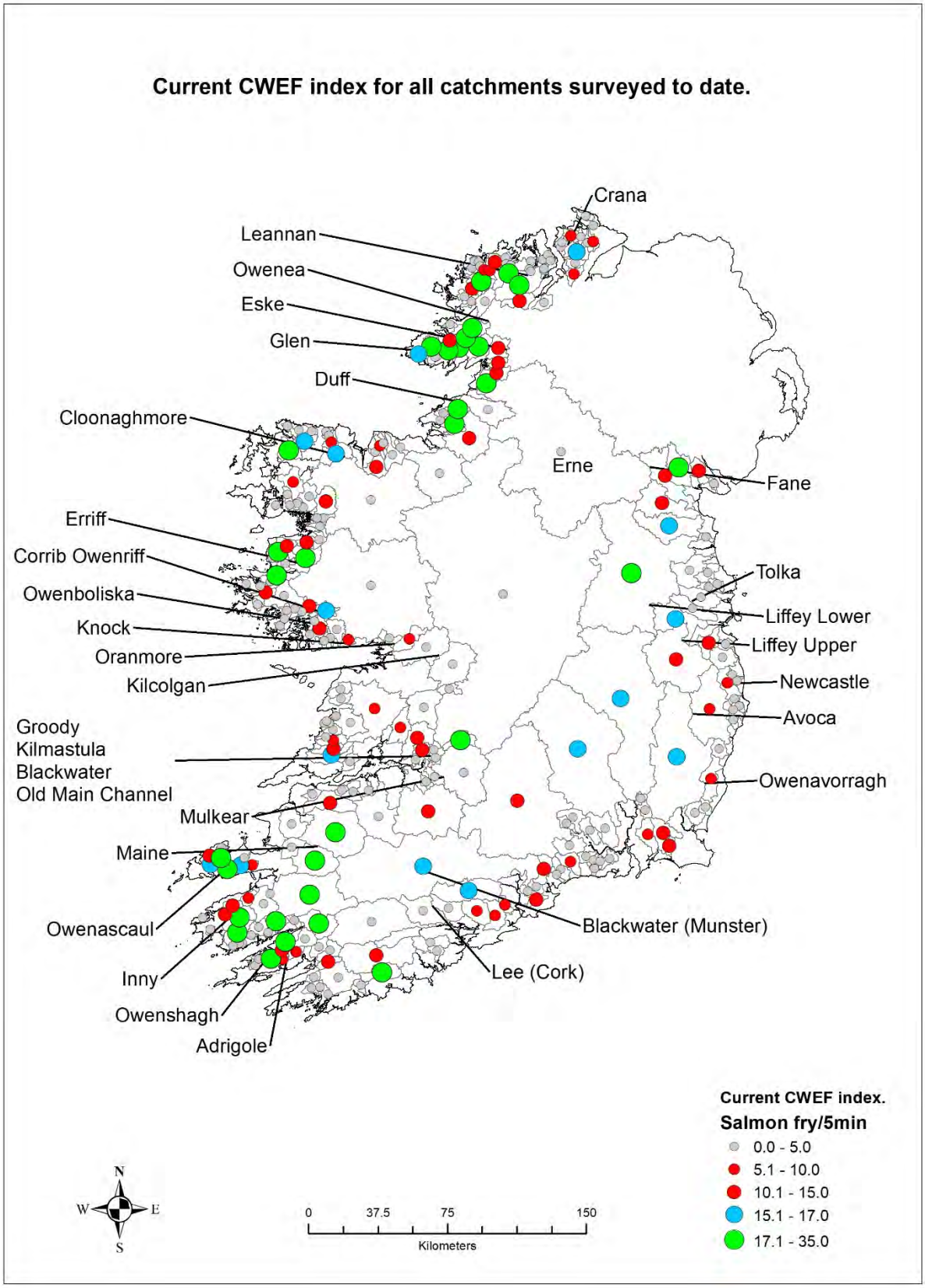


Fig 2.3: Annual catchment-wide electrofishing results 2007-2018.



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 PIT tag antenna 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.

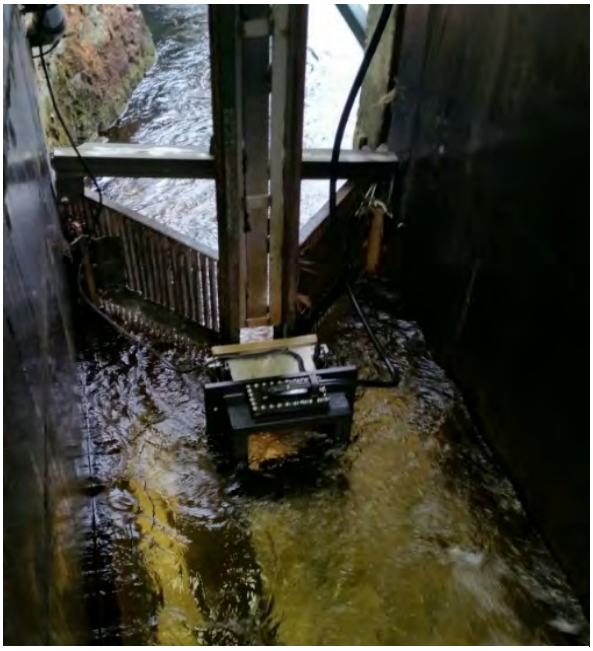


Fig 3.1. Erriff upstream trap with VAKI Riverwatcher counter and Biomark antenna (dark rectangular unit).

Smolt to adult salmon returns to the Erriff and Corrib systems

In 2018, a total of 11 PIT tagged adult salmon returned to the Erriff representing a provisional marine survival of 2% for the cohort tagged in 2017. Any multi-sea-winter fish which will return in 2019 will have to be considered when finalising this estimate. An additional six adult salmon returned as two-sea-winter fish from the cohort tagged in 2016 which has revised their marine survival estimate upwards to 3.5%. Marine survival of PIT tagged fish in the Corrib from the cohort tagged in 2017 was provisionally estimated as 7.4%. 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

Table 3.2. PIT tag detections from returning adult salmon.

Tagging year	Location	No. of smolts tagged	No. of returning salmon detected	% marine survival
2016	Erriff	1022	36	3.5
2017	Erriff	553	11	2
2017	Corrib	1600	119	7.4

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. Figure 5.1 shows the proportions of fish of different lifestyles changing throughout the year. 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.

4.1.Salmon Life History.

Salmon scales have been collected from the commercial draft net fisheries and from anglers, building up a scale collection for analysis. Over the course of this year there has been some consolidation of archival data and data from other IFI projects to enhance the scale collection. To date the collection consists of scales of 22037 fish from 60 fisheries around the country (appendix e). A sample of scales of these fish has been read.

Of the 2503 fish for which age has been determined, 803 of fish were Multi-sea winter fish (MSW), 1598 were grilse; the remaining 102 fish were previously spawned grilse (PSG). Of these three fish types the MSW were on average the largest, with a mean weight of 5.04 kg, PSG had an average weight of 4.70kg and grilse an average weight of 2.51kg. It can be seen on figure 4.4 that most of the grilse were below 4kg and most MSW and PSG were 4kg or above.

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

Fish Type	Mean	SD	n
Grilse	2.51	0.85	1261
MSW	5.04	1.49	730
PSG	4.70	1.89	76
Total			2067

Figure 4.1: The number of salmon scales in the sample collection by week of capture (where known) (n=22257).

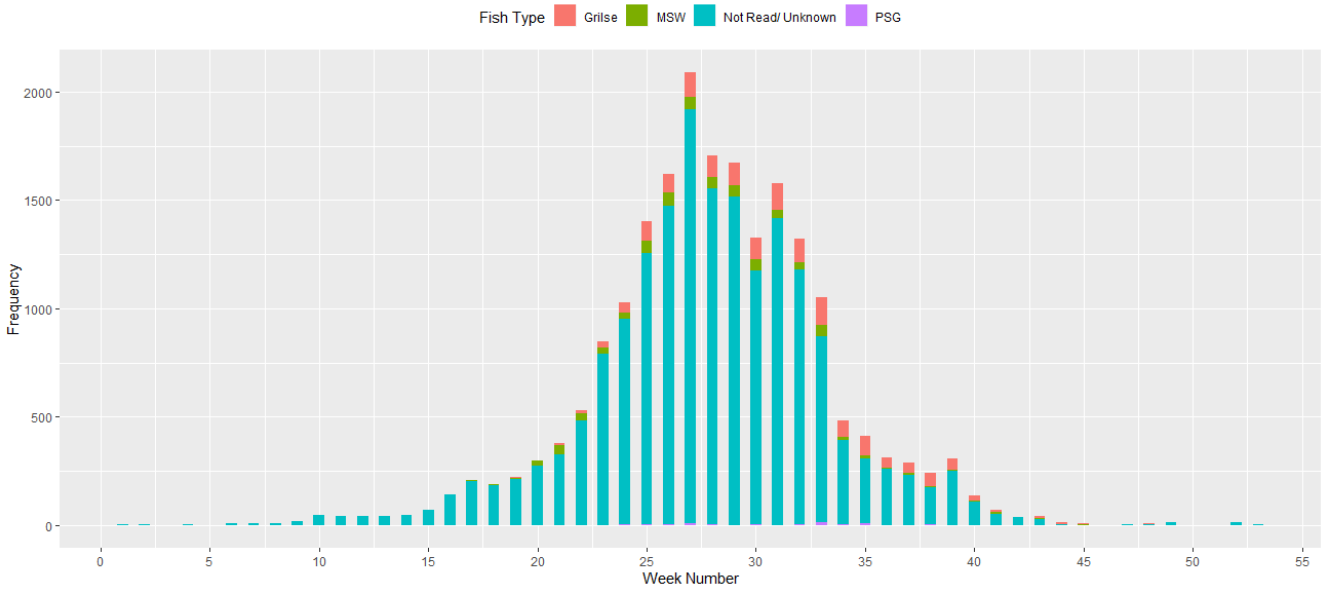


Figure 4.2 Boxplots of weight (kg) of fish life history in different catchments 2005-2018, where both age and weight are known, total=1837.

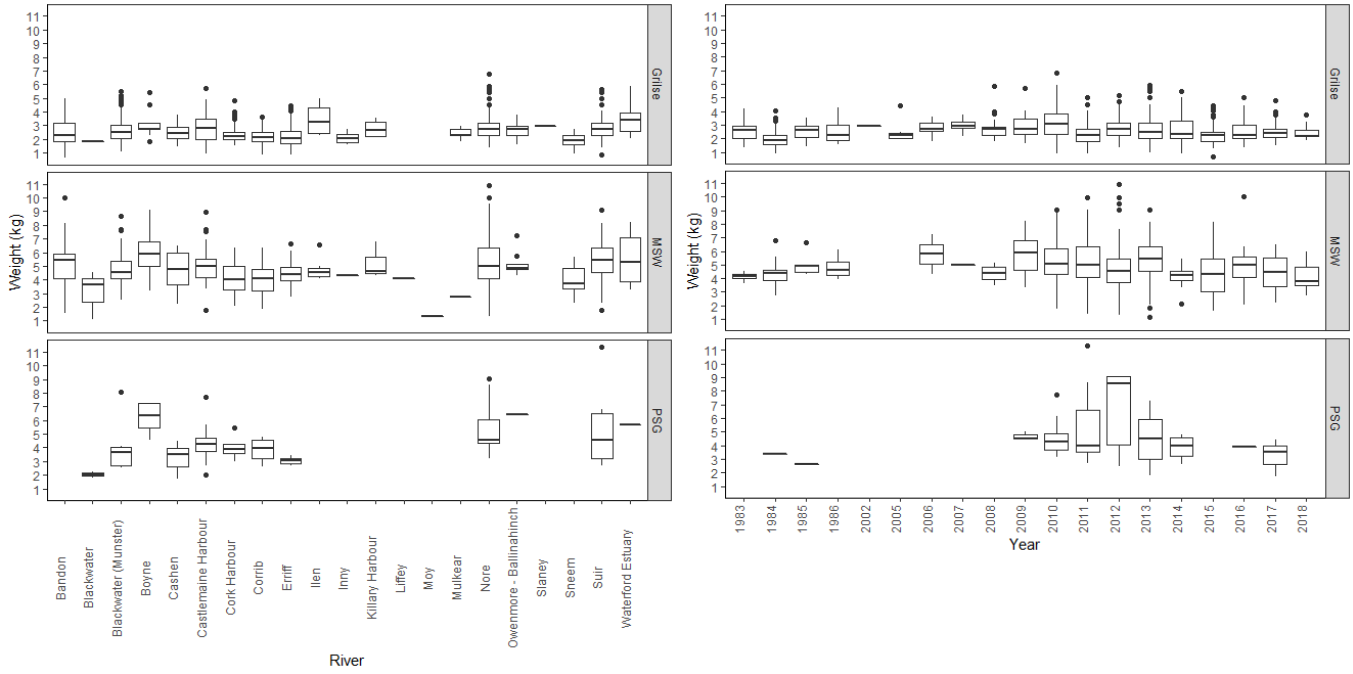


Figure 4.3: Occurrence of fish life history in different catchments.

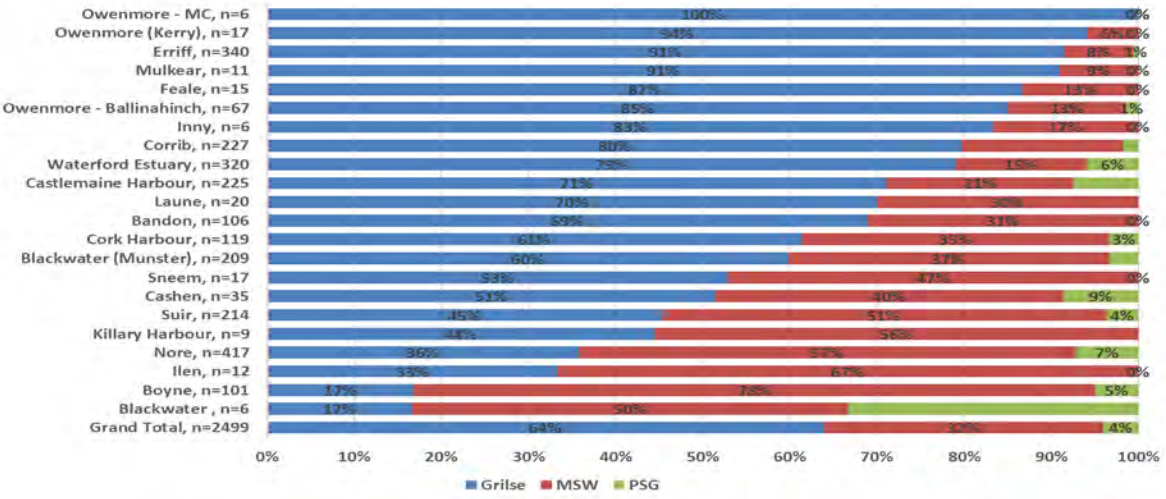
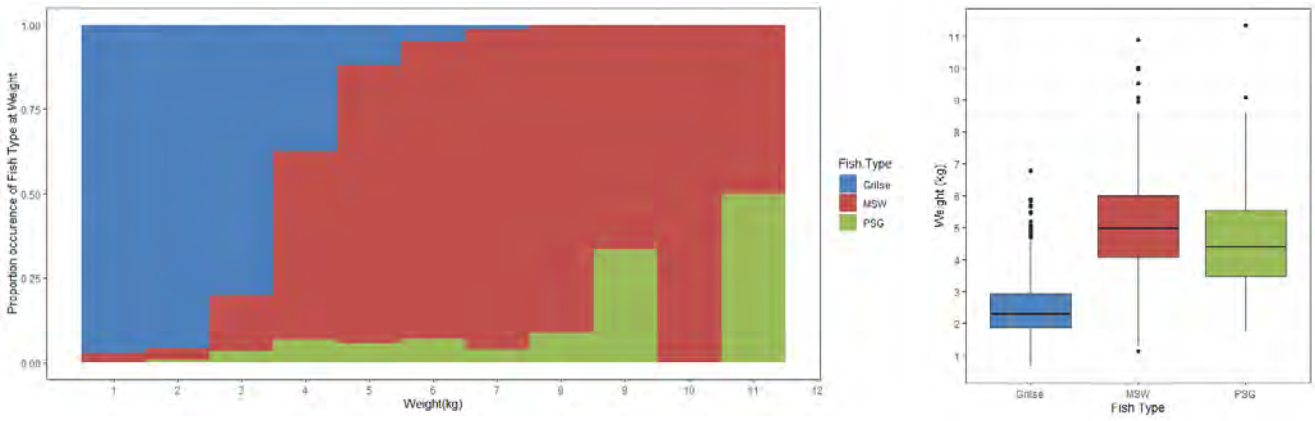
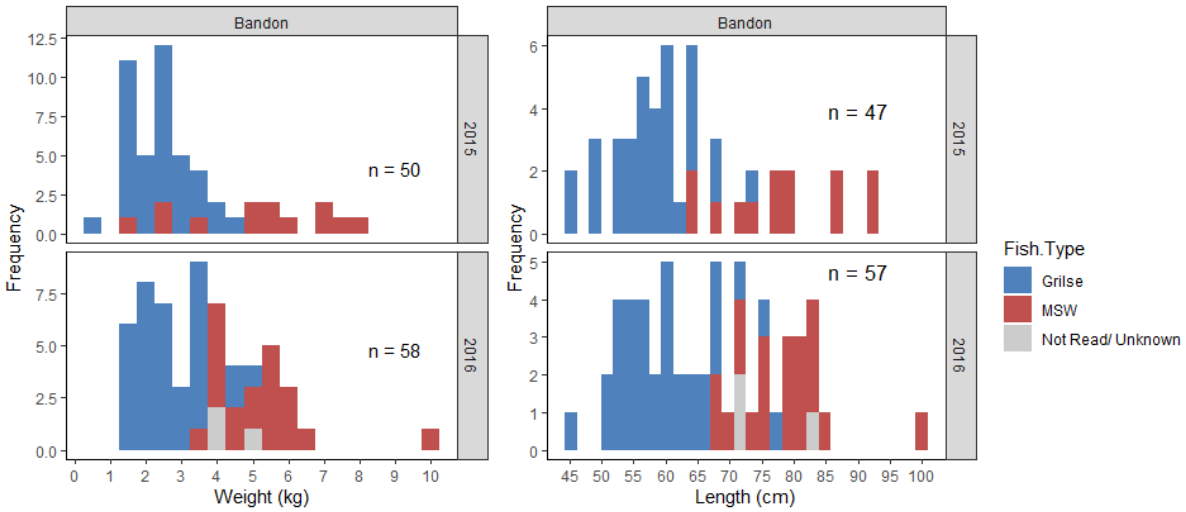


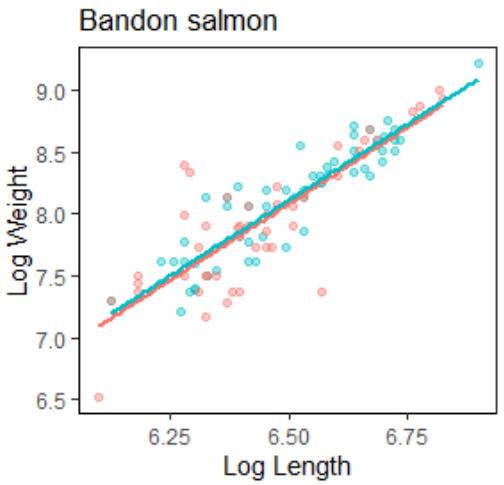
Figure 4.4: Left: Occurrence of fish life history by weight (kg). Right: Boxplots of weights (kg) of individual fish of different types. (n: Grilse-1261, MSW- 730, PSG- 76)



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

Anglers on the Bandon returned scales from 51 fish in 2015 and 58 in 2016. Of these 103 had both length and weight information, these showed a strong length weight relationship. Age was determined by scale reading for 106 salmon, this found that 67% were grilse and 30% MSW. The mean weight of MSW salmon was 5.19.kg (standard deviation 1.69kg, n=33), grilse had a mean weight of 2.54kg (SD 0.93, n=33).

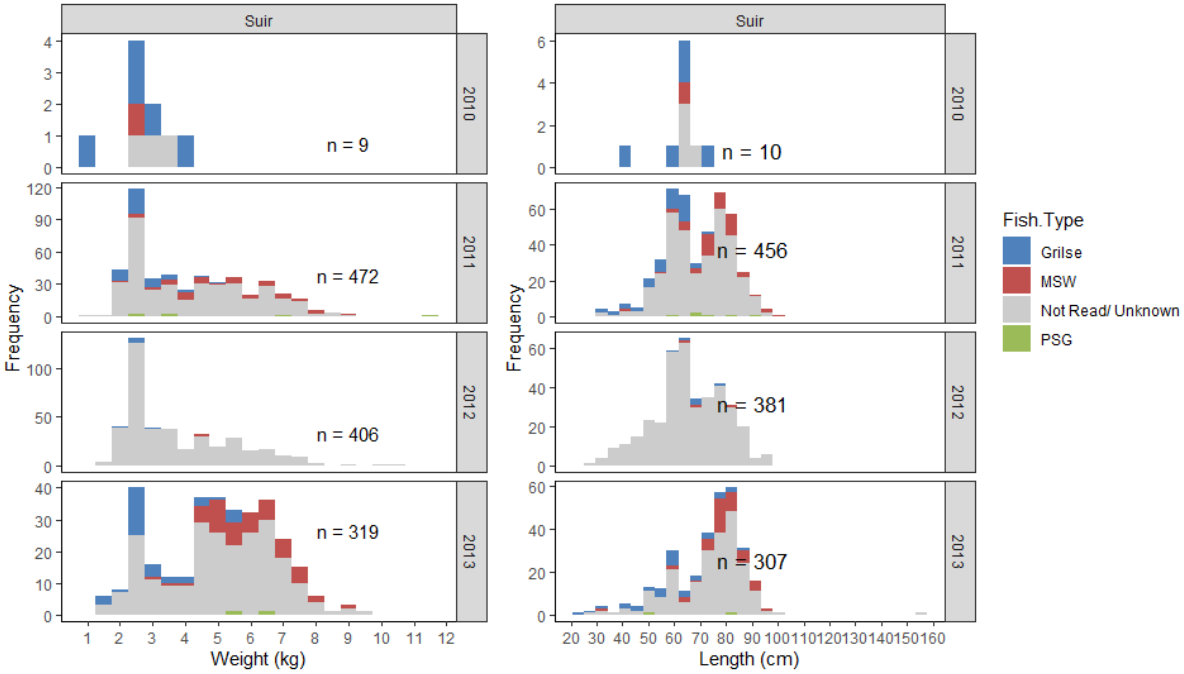


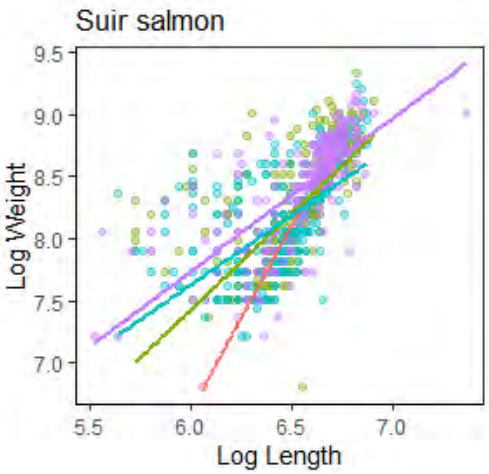


Year	n
2015	46
2016	57

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

Commercial fishers in the Suir Harbour, returned scales from 346 fish in 2013, 296 had both length and weight information, these exhibited a well-defined length weight relationship. The age of 88 salmon was determined by scale reading, this found that 40% were grilse and 58% MSW and 2% PSG. The mean weight of MSW salmon was 5.86kg (standard deviation 1.18kg, n=51), grilse had a mean weight of 3.24kg (SD 1.23kg, n=35), and PSG 5.90kg (SD 0.64, n=2). It is noticeable that the proportion of large fish was greater in the 2013 returns than in samples from previous years.



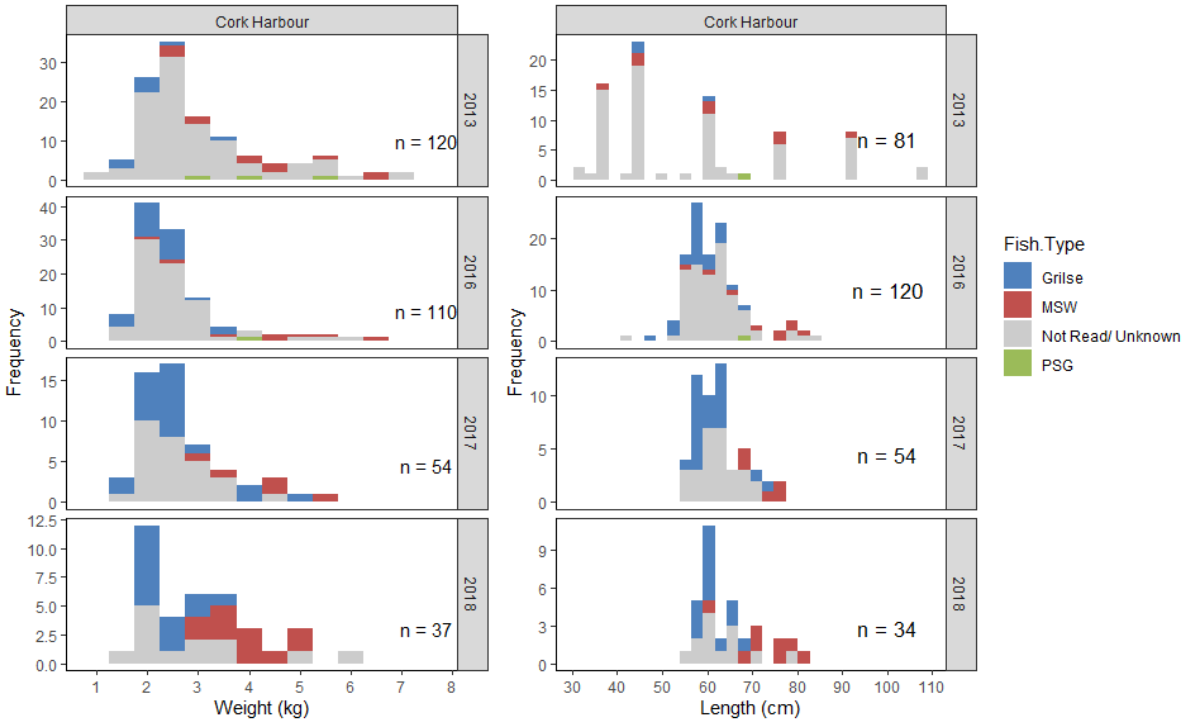


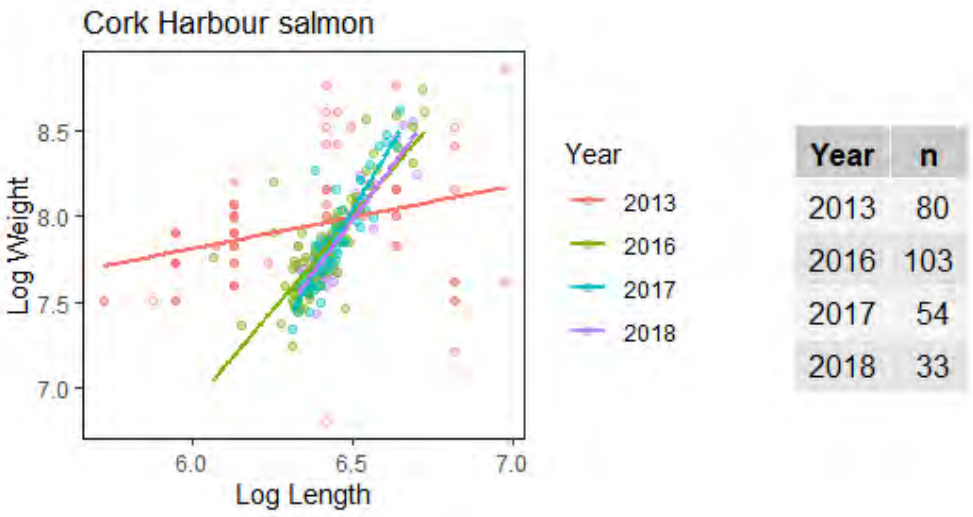
Year
2010
2011
2012
2013

Year	n
2010	9
2011	448
2012	363
2013	296

Comparison of Size and Age profile of Cork Harbour Salmon over time.

Commercial fishers in the Cork harbour, returned scales from 38 fish, 8 of those fish were noted as being hatchery fish. Age was determined by scale reading for the 24 salmon, this found that 53% were grilse and 47% MSW. The mean weight of grilse was 2.44kg (standard deviation 0.49, n=17), MSW salmon had a mean length of 4.09kg (SD 0.9, n=15), there were no PSG.





Year	n
2013	80
2016	103
2017	54
2018	33

Appendices:

A. Catchment-wide Electrofishing Results.

Data are presented for rivers electro-fished in each River Basin District in 2018. Results of any previous catchment-wide electro-fishing surveys undertaken over the 2007-2018 period are also shown. 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

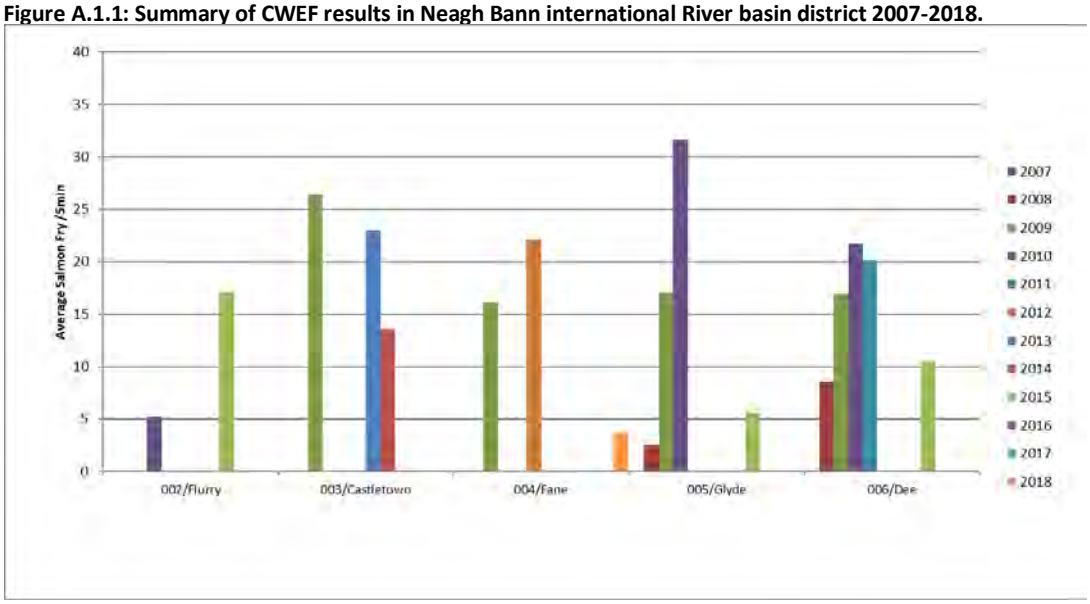
Since 2007, five salmon rivers have been surveyed in the Neagh Bann International River Basin District (NBIRBD) as part of the on-going catchment-wide electrofishing surveys. These are presented in (Table A.1.1). At present one river is meeting the threshold of 17 salmon fry per 5min. A survey of the Fane was undertaken in 2018.

Table A.1.1: 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.

	Survey Year												
Code/River	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Current Index**	**# Annual Surveys Considered**
002/Flurry			**5.24**					**17.15**				11.20	2
003/Castletown		**26.41**				**22.96**	**13.59**					20.99	3
004/Fane		**16.17**			**22.09**			8.94*		0.5*	**3.65**	13.97	3
005/Glyde	**2.49**	**17.08**	**31.61**					**5.56**				14.19	4
006/Dee	**8.55**	**16.92**	**21.72**	**20.13**				**10.51**				15.57	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.1.1: Summary of CWEF results in Neagh Bann international River basin district 2007-2018.



A.1.1. River Fane

IFI Salmon Catchment #: 8
2018 survey dates: 19/9/2018
Mean Salmon Fry/5 min (2018): 3.65 fry/5min.
CWEF Index: 13.97 fry/5min.

Sampling carried out by:
Ronan McCormick
Tony Holmes

Fish Species Present:
Brown Trout
European Eel
Gudgeon
Perch
Pike
Salmon
Stone Loach

Figure A.1.1.1: Length distribution of salmon captured in 2018 CWEF survey on the Fane Catchment.

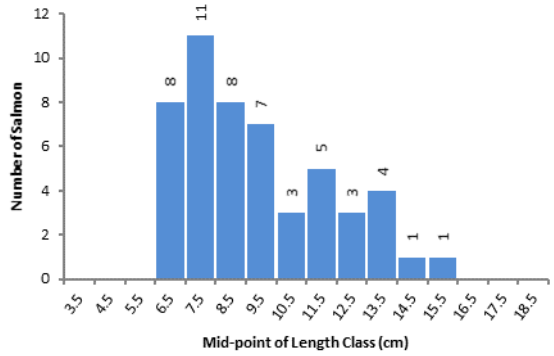


Figure A.1.1.2: Comparison of mean salmon fry/5min for all surveys on the Fane catchment to 2018.

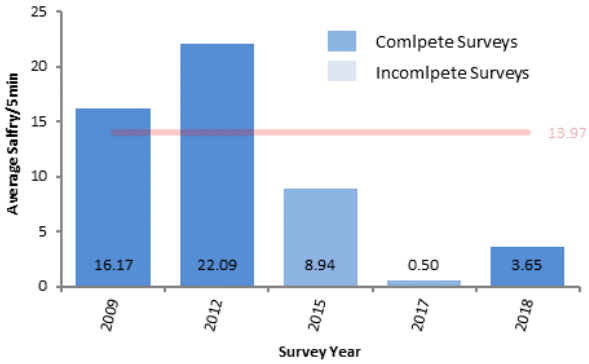


Table A.1.1.1: Conservation limits and provisional returns on the Fane catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	542	222	Open							
2008	2009	542	214	Open	5	2				15.80	16.17
2009	2010	542	273	Open							
2010	2011	542	387	Open							
2011	2012	542	603	Open	7			7		7.90	22.09
2012	2013	542	816	Open							
2013	2014	1172	264	Open							
2014	2015	1176	411	Open	2			9		10.06	8.94*
2015	2016	1176	58	Open							
2016	2017	1176	-241	C&R	4			1		22.13	0.50*
2017	2018	1176	-516	C&R	7			6		8.51	3.65

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit; * = Incomplete Surveys.

This, the seventh complete CWEF survey of this catchment in the 2007 to 2018 period, was carried out on the 19th of September, the survey comprised 13 sites, 7 of which were included in the analysis. Salmon were found at five sites, the highest numbers were at site 2 where six fry were observed. No salmon (fry or parr) were found at any sites above the site of the former Art Hamyl weir. Salmon numbers downstream of this point were low.

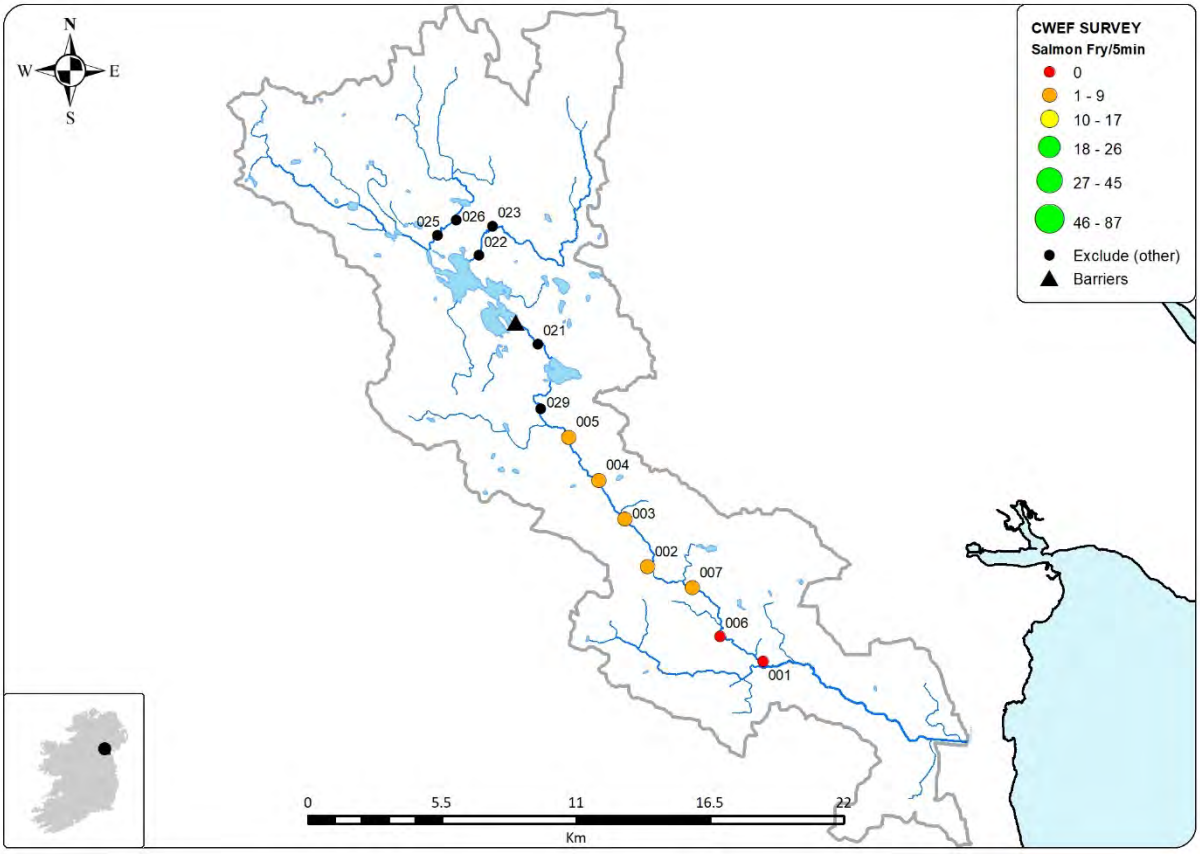
Table A.1.1.2: Site specific results of CWEF on the Fane catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	H 96614 03725	3	2	0	0	Include	0.00	0.00
002	H 91870 07622	2	1	2	6	Include	2.75	8.25
003	H 90947 09590	2	2	10	3	Include	13.08	3.92
004	H 89870 11167	2	1	8	2	Include	11.20	2.80
005	H 88635 12938	2	2	13	3	Include	17.06	3.94
006	H 94852 04767	3	1	0	0	Include	0.00	0.00
007	H 93718 06754	3	1	1	5	Include	1.33	6.67
021	H 87379 16774	3	3	0	0	Historically (CWEF) No Salmon		
022	H 84955 20417	3	1	0	0	Historically (CWEF) No Salmon		
023	H 85512 21618	3	1	0	0	Historically (CWEF) No Salmon		
025	H 83275 21245	3	2	0	0	Historically (CWEF) No Salmon		
026	H 84041 21860	3	2	0	0	Historically (CWEF) No Salmon		
029	H 87509 14111	3	2	0	0	Historically (CWEF) No Salmon		

Conclusion

The Fane had a salmon abundance of 3.65 salfry/5min in 2018. Taking the three most recent complete surveys into account this results in a cumulative average of 13.97 salmon fry/5min which is below the 17 salmon fry threshold. The result is the lowest of any complete CWEF survey, and considerably lower than the best year 2011 when an abundance of 22.09 salfry per 5 min was observed.

Map A.1.1.1: Showing locations of 2018 survey sites on Fane River.



A.2.Eastern River Basin District.

Summary

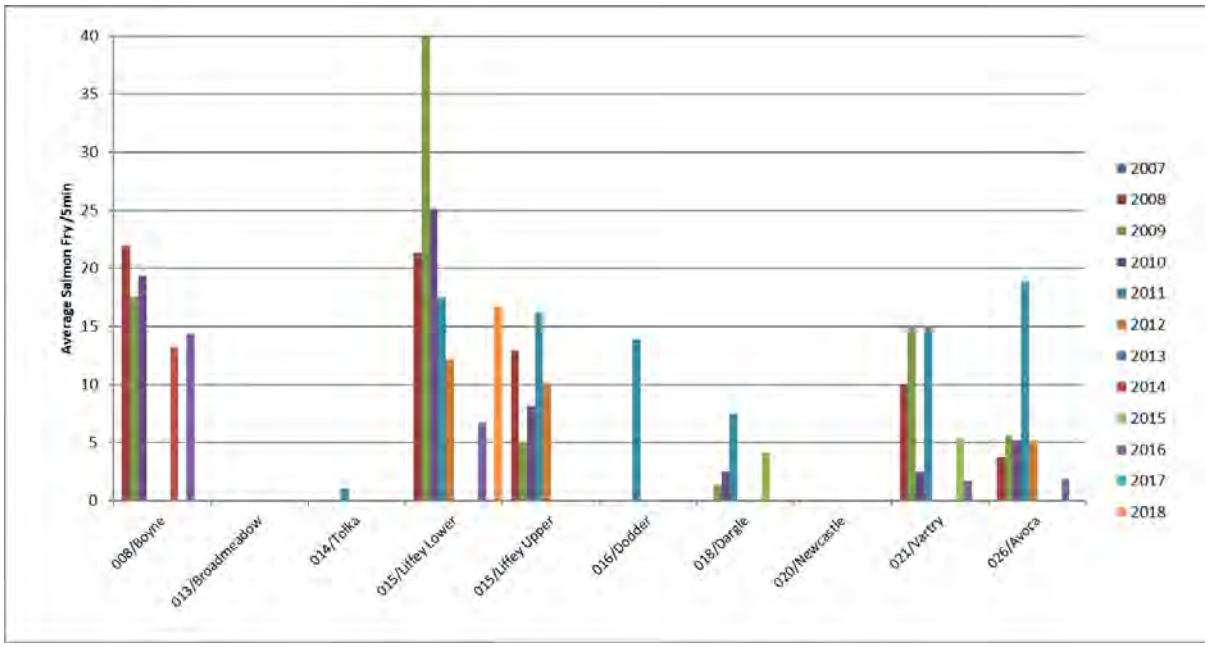
Since 2007, ten salmon rivers have been surveyed in the Eastern River Basin District (ERBD) as part of the on-going catchment-wide electrofishing surveys. The most recent ten years' data are presented (Table A.2.1). At present only the Boyne is meeting the threshold of 17 salmon fry per 5min. CWEF surveys were undertaken in the Tolka, Liffey, Newcastle and Avoca catchments in this region in 2018.

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.

	Survey Year												
Code/River	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Current Index	# Annual Surveys Considered
008/Boyne	**23.19**	**18.87**	**20.68**				**14.20**		**15.44**			18.48	5
013/Broadmeadow			0.00									0.00	1
014/Tolka				**1.08**	**0.00**						**0**	0.36	3
015/Liffey Lower	21.33	40.12	**25.16**	**17.47**	**12.12**				**6.75**		**16.69**	15.64	5
015/Liffey Upper	**12.93**	**5.11**	**8.15**	**16.20**	**10.13**				2.63†		5.33†	10.50	5
016/Dodder				**13.93**								13.93	1
018/Dargle		**1.40**	**2.53**	**7.52**				**4.19**				3.91	4
20/Newcastle											0		
021/Vartry	10.00	**15.11**	**2.54**	**15.07**				**5.34**	**1.75**			7.96	5
026/Avoca	3.79	5.56	**5.20**	**18.88**	**5.15**				**1.89**		8.37†	7.34	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 2007-2018.



A.2.1. River Tolka

IFI Salmon Catchment #: 14
2018 survey dates: 20/9/18- 24/09/18
Mean Salmon Fry/5 min (2018): 0 fry/5min.
CWEF Index: 0.36 fry/5min.
Sampling carried out by:
Alan Carter

Fish Species Present:
Brown TroutLamprey sp.
Minnow
Stone Loach
Three Spined Sitcleback

Figure A.2.1.1: Length distribution of Brown Trout captured in 2018 CWEF survey on the Tolka Catchment.

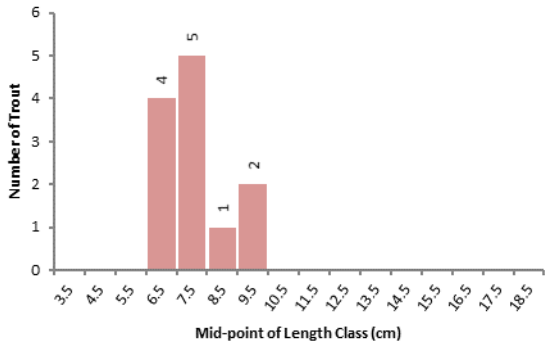
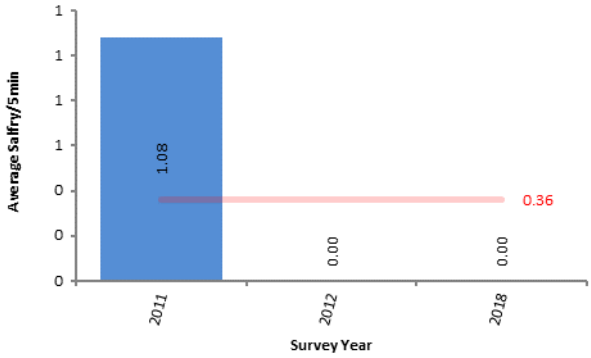


Figure A.2.1.2: Comparison of mean salmon fry/5min for all surveys on the Tolka.



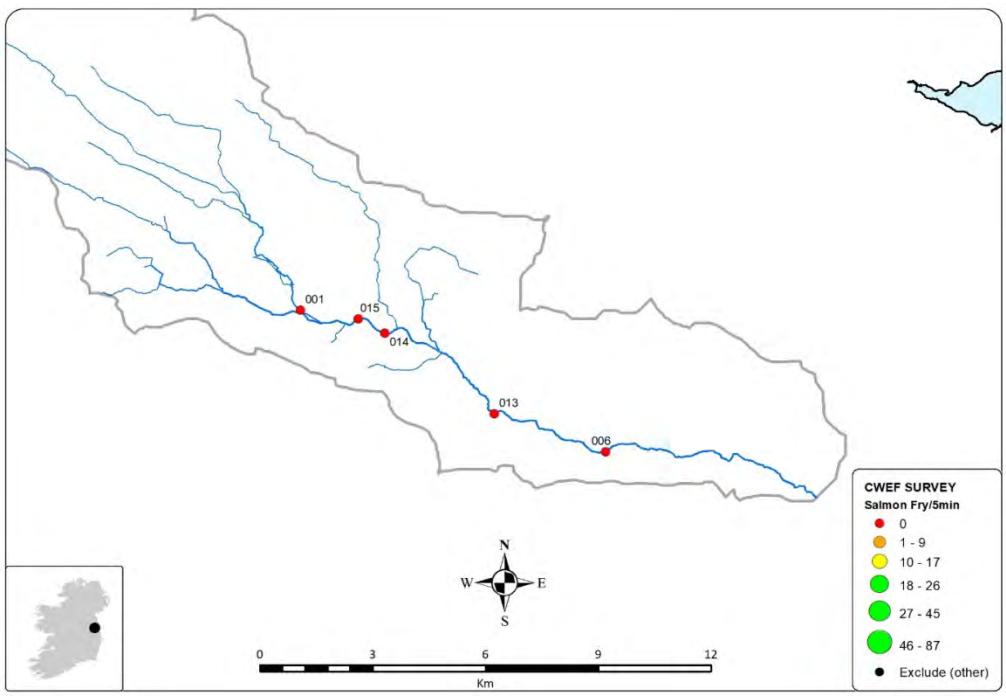
This, the third CWEF survey of this catchment in the 2007 to 2018 period, was carried out in Sept 2018. The survey comprised 5 sites, all of which of which were included in the analysis. Salmon fry were absent from all sites, trout were present at two.

Conclusion The Tolka had a mean catch of zero salmon fry/5min in 2018. Salmon fry had been observed in 2011, but have been absent from all subsequent surveys. The current salmon index is 0.36 salmon fry.

Table A.2.1.1: Site specific results of CWEF on the Tolka catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	O 02903 41568	3	2	0	0	Include	0.00	0.00
006	O 11031 37675	4	0	7	0	Include	7.00	0.00
013	O 08060 38723	2	1	3	0	Include	3.00	0.00
014	O 05149 40936	4	3	0	0	Include	0.00	0.00
015	O 04443 41328	4	3	0	0	Include	0.00	0.00

Map A.2.1.1: Showing locations of 2018 survey sites on the Tolka.



A.2.2. River Liffey Lower

IFI Salmon Catchment #: 15.1
2018 survey dates: 17/8/18 to 27/8/18
Mean Salmon Fry/5 min (2018): 16.69fry/5min.
CWEF Index: 15.64 fry/5min.

Sampling carried out by:
Alan Carter
Aaron McManus
Carl Owens
Fergal Cafferry
Jarlaith Gallagher

Fish Species Present:

Brown Trout	Perch
Dace	Pike
European Eel	Salmon Sea Trout
Lamprey	Stone Loach
Minnow	3 spined Stickleback

Figure A.2.2.1: Length distribution of salmon captured in 2018 CWEF survey on the Liffey Lower Catchment.

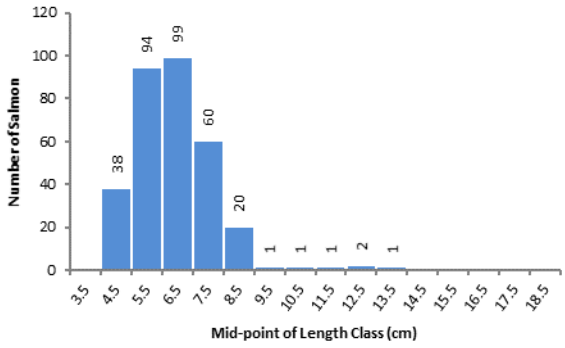


Figure A.2.2.2: Comparison of mean salmon fry/5min for all surveys on the Liffey Lower catchment to 2018.

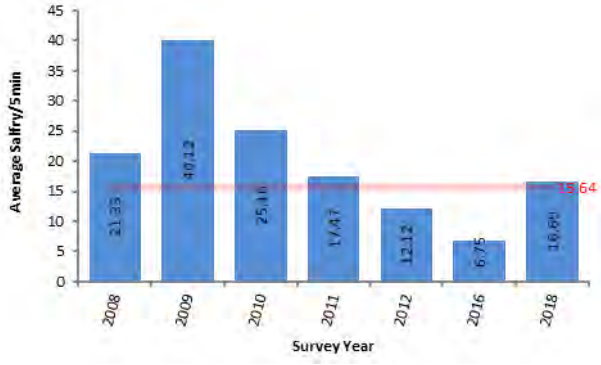


Table A.2.2.1: Conservation limits and provisional returns on the Liffey lower catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	4391	-2720	Closed	4	2				20.29	21.33
2008	2009	4391	-2953	Closed	6					20.29	40.12
2009	2010	4391	-3563	Closed	10		1			11.07	25.16
2010	2011	4391	-3049	Closed	12			3	2	7.16	17.47
2011	2012	4391	-3026	Closed	5	1		1		17.39	12.12
2012	2013	4391	-3549	Closed							
2013	2014	1711	-1291	C&R							
2014	2015	1703	-1112	C&R							
2015	2016	1703	-1064	C&R	16	1				7.16	6.75
2016	2017	1702	-1125	C&R							
2017	2018	1702	-1018	C&R	21					5.80	16.69

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit; * = Incomplete Surveys.

This, the seventh complete CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August 2018. The survey comprised 21 sites, all of which were included in the analysis. Salmon fry were present at all but three sites. The modal length category of Salmon fry was 6.5cm. The maximum fry catch was 45 salmon at site 110. The mean catch of included sites was 16.69 salmon fry/5min.

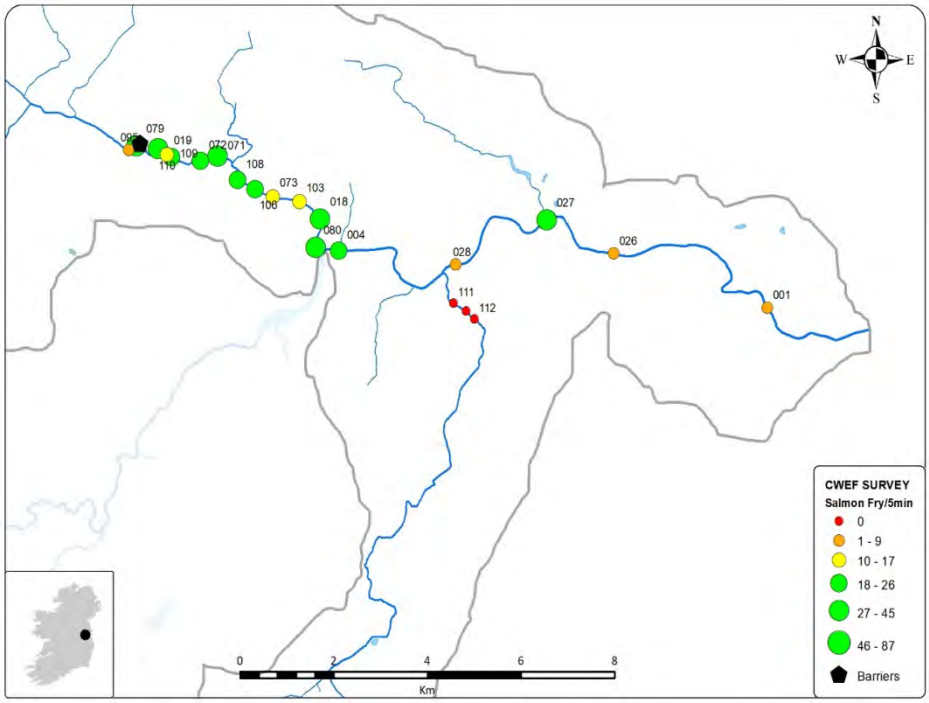
Table A.2.2.2: Site specific results of CWEF on the Liffey Lower catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	O 10070 34644	6	3	10	6	Include	10.00	6.00
004	O 00919 35793	6	1	0	16	Include	0.00	19.00
018	O 00517 36425	4	3	10	23	Include	12.12	27.88
019	N 97246 37722	4	1	8	11	Include	8.84	12.16
026	O 06791 35732	6	3	1	1	Include	1.00	1.00
027	O 05363 36405	6	1	1	31	Include	1.16	35.84
028	O 03413 35512	6	1	0	4	Include	0.00	4.00
071	N 98338 37688	4	2	6	26	Include	6.94	30.06
072	N 97969 37595	4	2	4	17	Include	4.38	18.62
073	N 99513 36871	4	1	3	13	Include	3.19	13.81
079	N 96592 37891	4	2	4	24	Include	4.57	27.43
080	O 00430 35860	4	2	0	29	Include	0.00	34.00
095	N 96439 37810	4	2	0	1	Include	0.00	1.00
103	O 00085 36773	4	2	6	10	Include	8.25	13.75
106	N 99135 37028	4	3	6	16	Include	6.82	18.18
107	O 03642 34583	4	2	1	0	Include	5.00	0.00
108	N 98759 37214	4	1	8	15	Include	9.74	18.26
109	N 97352 37672	4	2	10	23	Include	10.61	24.39
110	N 97061 37844	4	2	13	45	Include	13.00	45.00
111	O 03368 34736	4	1	2	0	Include	6.00	0.00
112	O 03822 34421	4	2	1	0	Include	4.00	0.00

Conclusion

The Lower Liffey had a mean catch of 16.69 salmon fry/5min in 2018. Taking the five most recent surveys into account this results in a cumulative average of 15.64 salmon fry/5min. This is below the 17 salmon fry threshold.

Map A.2.2.1: Showing the locations and results of 2018 CWEF surveys on the lower Liffey River.



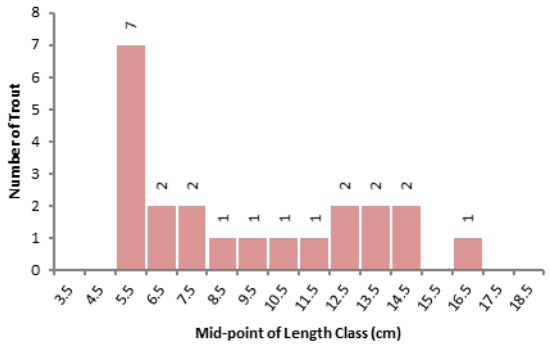
A.2.3. River Newcastle

IFI Salmon Catchment #: 20
2018 survey dates: 22/8/18 to 27/8/18
Mean Salmon Fry/5 min (2018): 0.00 fry/5min.
CWEF Index: ---- fry/5min.

Sampling carried out by:
Aaron McManus
Carl Owens
Jarlaith Gallagher
Joe Delaney

Fish Species Present:
Eel
Brown Trout
Flounder

Figure A.2.3.1: Length distribution of brown trout captured in 2018 CWEF survey on the Newcastle Catchment.



This, the first CWEF survey of this small catchment was carried out during August 2018. The survey comprised just three sites, all of which were included in the analysis. Salmon fry were absent from all, trout fry were present in small numbers at all three.

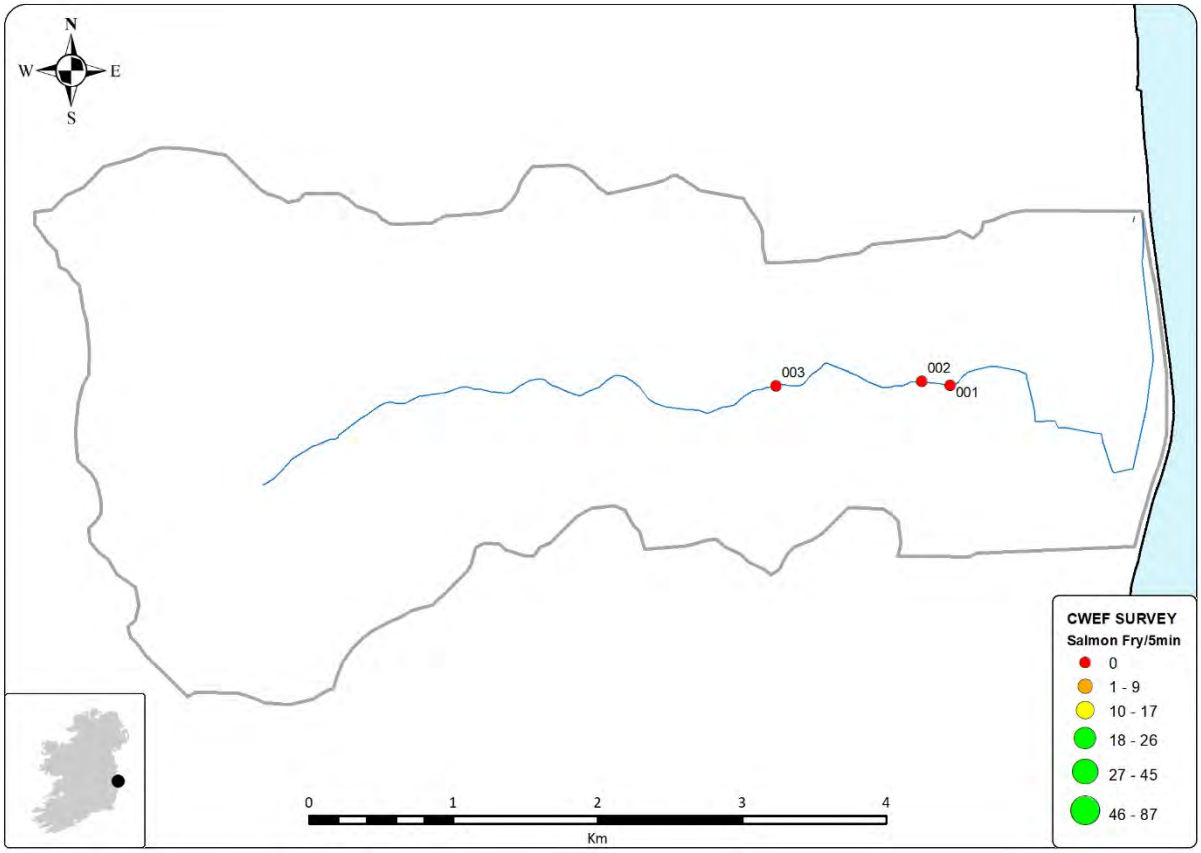
Table A.2.3.2: Site specific results of CWEF on the Newcastle catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	O 30250 04020	2	2	6	0	Include	6.00	0.00
002	O 30052 04047	2	1	2	0	Include	2.00	0.00
003	O 29045 04016	2	2	4	0	Include	4.00	0.00

Conclusion

Low abundance of trout fry and no salmon fry were observed in the Newcastle river in 2018.

Map A.2.3.1: Showing locations of 2018 survey sites on the Newcastle River.



A.2.4. River Avoca

IFI Salmon Catchment #: 26
2018 survey dates: 30/8/2018 – 6/9/18
Mean Salmon Fry/5 min (2018): 8.37 fry/5min.
CWEF Index: 7.34 fry/5min.

Sampling carried out by:
Alan Carter
Avril Hanbridge
Carl Owens
Fergal Caffery
Jarlaith Gallagher

Fish Species Present:
Brown Trout
Eel
Minnow
Salmon
3-Spined Stickleback

Figure A.2.4.1: Length distribution of salmon captured in 2018 CWEF survey on the Avoca catchment.

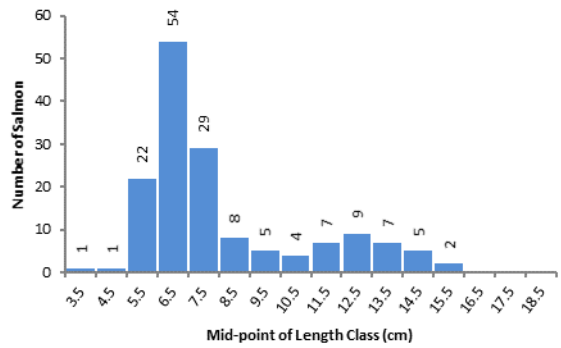


Figure A.2.4.2: Comparison of mean salmon fry/5min for all surveys on the Avoca catchment to 2018.

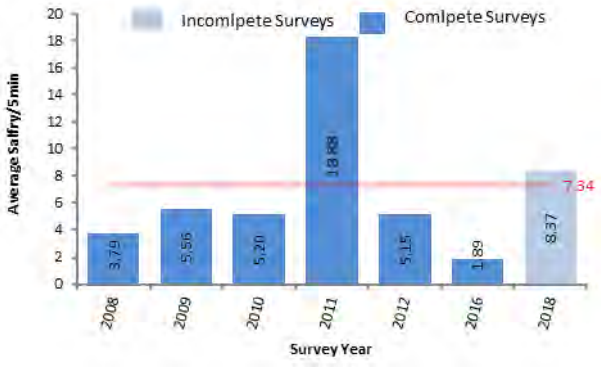


Table A.2.4.1: Conservation limits and provisional returns on the Avoca catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	2958	-1103	Closed	16	5				16.41	3.79
2008	2009	2958	-1501	Closed	29	2				11.12	5.56
2009	2010	2958	-1501	Closed	24	2				13.25	5.20
2010	2011	2958	-1501	Closed	65				16	4.25	18.88
2011	2012	2958	-1501	Closed	23	6		1		11.49	5.15
2012	2013	2958	-1501	Closed							
2013	2014	3945	-3055	Closed							
2014	2015	3945	-3050	Closed							
2015	2016	3945	-3050	Closed	45					7.66	1.89
2016	2017	3945	-3050	Closed							
2017	2018	0	0	Closed	15					22.98	8.37*

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This partial survey was the seventh CWEF survey of this catchment in the 2007 to 2018 period, it was carried out during August and September 2018. The survey comprised only 15 sites, all of which were included in the analysis. Salmon fry were present at 11 sites. The maximum fry catch was 30 salmon at site 10. The mean catch of included sites was 8.37 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm. High abundances of salmon were observed at several sites

along the main the Avoca and Avonmore, lower abundances were seen on the Glendasan suggesting salmon have access to much of those rivers. Comparisons with previous surveys suggest higher abundances at the sites surveyed in 2018 than in 2012 and 2016. Due to the limited number of sites surveyed this years' survey was not considered complete.

Conclusion

Overall in 2018, the Avoca had a mean catch of 8.37 salmon fry/5min, the survey was incomplete and not included in the calculation of the CWEF index. Taking the previous five most recent surveys into account this results in a cumulative average of 7.34 salmon fry/5min which is below the 17 salmon fry threshold.

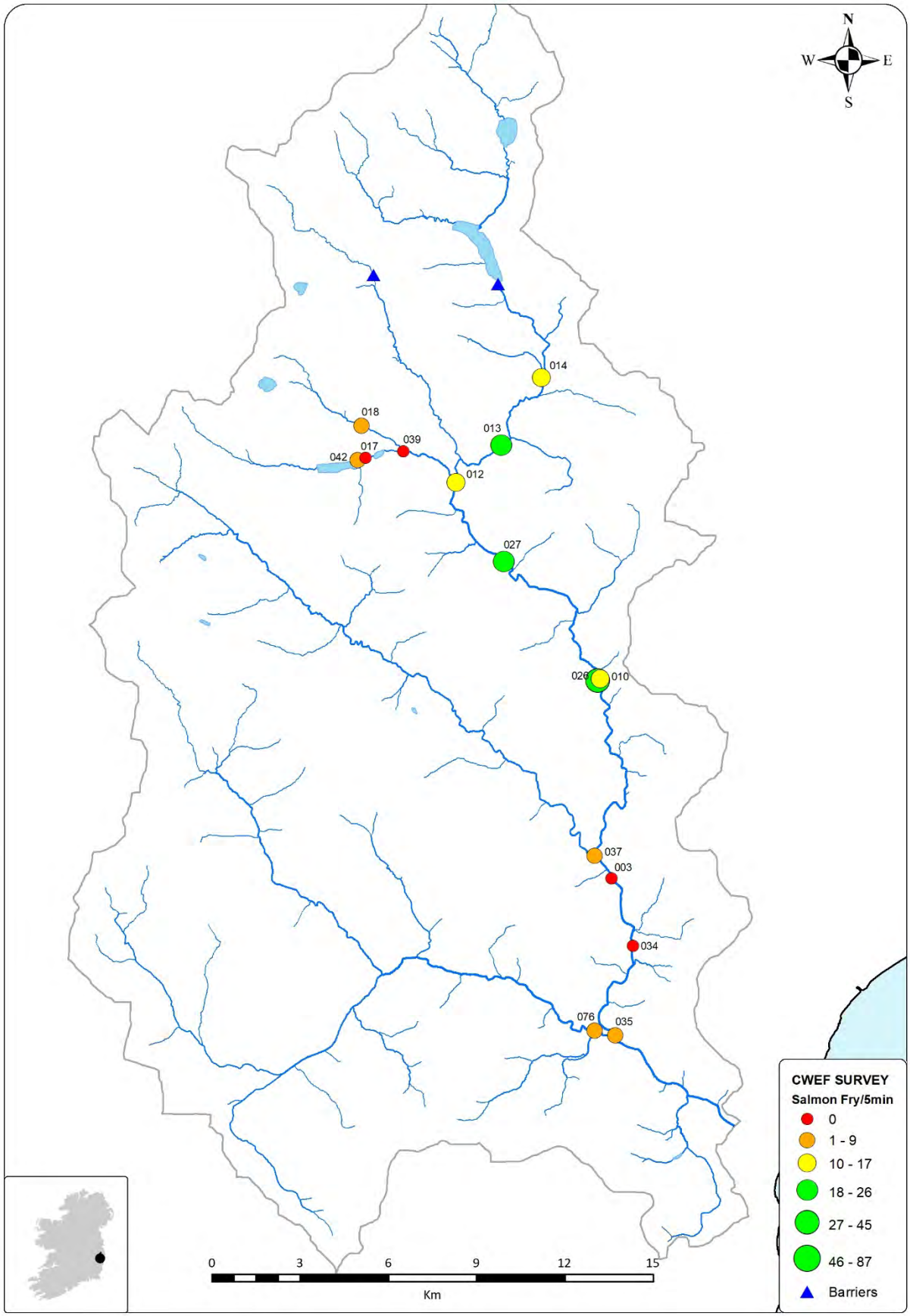
Table A.2.4.2: Site specific results of CWEF on the Avoca catchment in 2018.

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	0	0	Include	0.00	0.00
010	T 19174 88916	5	1	2	30	Include	2.19	32.81
012	T 14361 95637	4	2	0	12	Include	0.00	12.00
013	T 15892 96911	4	2	6	21	Include	6.00	21.00
014	T 17275 99199	4	2	2	8	Include	2.40	9.60
017	T 11292 96464	3	2	2	0	Include	2.00	0.00
018	T 11159 97554	3	1	2	4	Include	2.00	4.00
026	T 19266 88973	5	1	0	7	Include	0.00	10.00
027	T 15983 92960	5	1	0	18	Include	0.00	21.00
034	T 20367 79914	5	1	0	0	Include	0.00	0.00
035	T 19780 76874	5	1	1	2	Include	1.00	2.00
037	T 19080 82962	5	1	3	5	Include	3.00	5.00
039	T 12571 96693	4	2	7	0	Include	7.00	0.00
042	T 11023 96400	3	2	10	1	Include	11.82	1.18
076	T 19078 77033	5	2	1	7	Include	1.00	7.00

Table A.2.4.3: Current and previous salmon abundances (fry/5min) at sties surveyed on the Avoca catchment.

Site #	Trib.	2008	2009	2010	2011	2012	2016	2018
76	Aughrim				36		0	7
3	Avoca	8.56	8	1	34		0	0
34	Avoca		0			0	0	0
35	Avoca		1					2
37	Avoca		11.82	0	36		0	5
10	Avonbeg	9			105	5		32.81
12	Avonbeg	9.23	0		5.33	0	3	12
13	Avonbeg	12	6.6		47.8	9	15	21
14	Avonbeg	13.85	2	9	16	12.73	11	9.6
26	Avonbeg		3				9	10
27	Avonbeg		6.67	5		2	5	21
17	Glendasan	0						0
18	Glendasan	0						4
39	Glendasan			2	9.75	4		0
42	Glendasan			0	0		0	1.18

Map A.2.4.1: Showing the locations and results of 2018 CWEF surveys on the Avoca River.



A.3.South Eastern River Basin District.

Summary

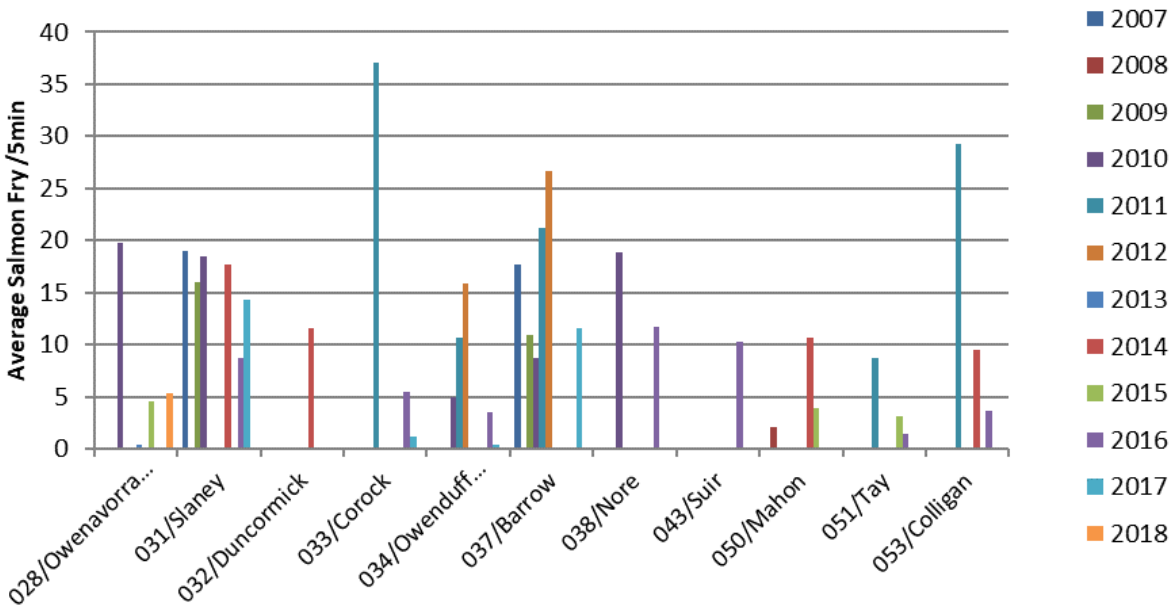
Since 2007, ten salmon rivers have been surveyed in the South Eastern River Basin District (SERBD) as part of the on-going catchment-wide electrofishing surveys. The most recent ten years' data are presented (Table A.3). At present no rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2018 a CWEF survey was undertaken in the Owenavorragh.

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.

	Survey Year											Current Index	# Annual Surveys Considered
Code/River	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
028/Owenavorragh			**19.76**			**0.33**		**4.61**			**5.37**	7.52	4
031/Slaney		**15.94**	**18.42**				**17.68**		**8.70**	**14.3**		15.01	5
032/Duncormick							**11.54**					11.54	1
033/Corock				**37.11**					**5.47**	**1.23**		14.60	3
034/Owenduff(Wx.)			**4.97**	**10.65**	**15.91**				**3.47**	**0.4**		7.08	5
037/Barrow		**10.93**	**8.71**	**21.23**	**26.72**				8.9*	**11.54**		15.83	5
038/Nore			**18.83**						**11.77**			15.30	2
043/Suir									**10.27**			10.27	1
050/Mahon	**2.11**						**10.72**	**3.92**				5.58	3
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 2007-2018.



A.3.1. River Owenavorragh

IFI Salmon Catchment #: 28
2018 survey dates: 22/8/18 to 25/8/18
Mean Salmon Fry/5 min (2018): 5.37 fry/5min.
CWEF Index: 7.52 fry/5min.

Sampling carried out by:
Glen McCrave
Morgan Rowsome
Tom Manning

Fish Species Present:

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

Figure A.3.1.1: Length distribution of salmon captured in 2018 CWEF survey on the Owenavorragh Catchment.

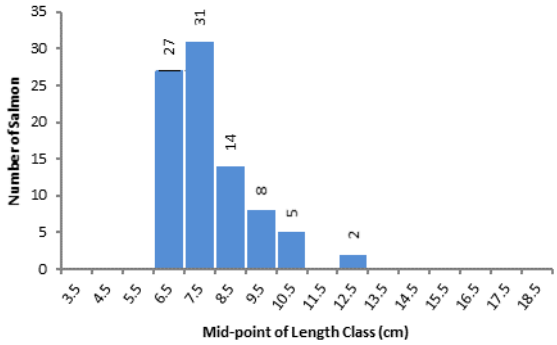


Figure A.3.1.2: Comparison of mean salmon fry/5min for all surveys on the Owenavorragh catchment to 2018.

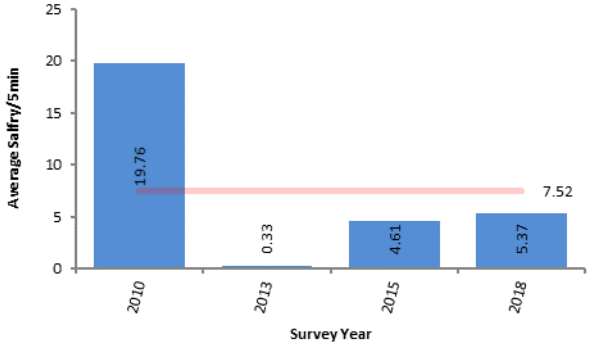


Table A.3.1.1: Conservation limits and provisional returns on the Owenavorragh catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	810	-302	Closed							
2008	2009	810	-411	Closed							
2009	2010	810	-411	Closed	7					13.52	19.76
2010	2011	810	-411	Closed							
2011	2012	810	-411	Closed							
2012	2013	810	-411	Closed	6					15.78	0.33
2013	2014	944	-715	Closed							
2014	2015	945	-713	Closed	18					5.26	4.61
2015	2016	945	-742	Closed							
2016	2017	945	-737	Closed							
2017	2018	945	-739	Closed	15	1				5.92	5.37

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the fourth CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August 2018. The survey comprised 16 sites, 15 of which were included in the analysis. Salmon fry were present at 9 sites. The maximum fry catch was 23 salmon at site 7. The mean catch of included sites was 5.37 salmon fry/5min. The modal length category of 0+ fry caught was 7.5cm.

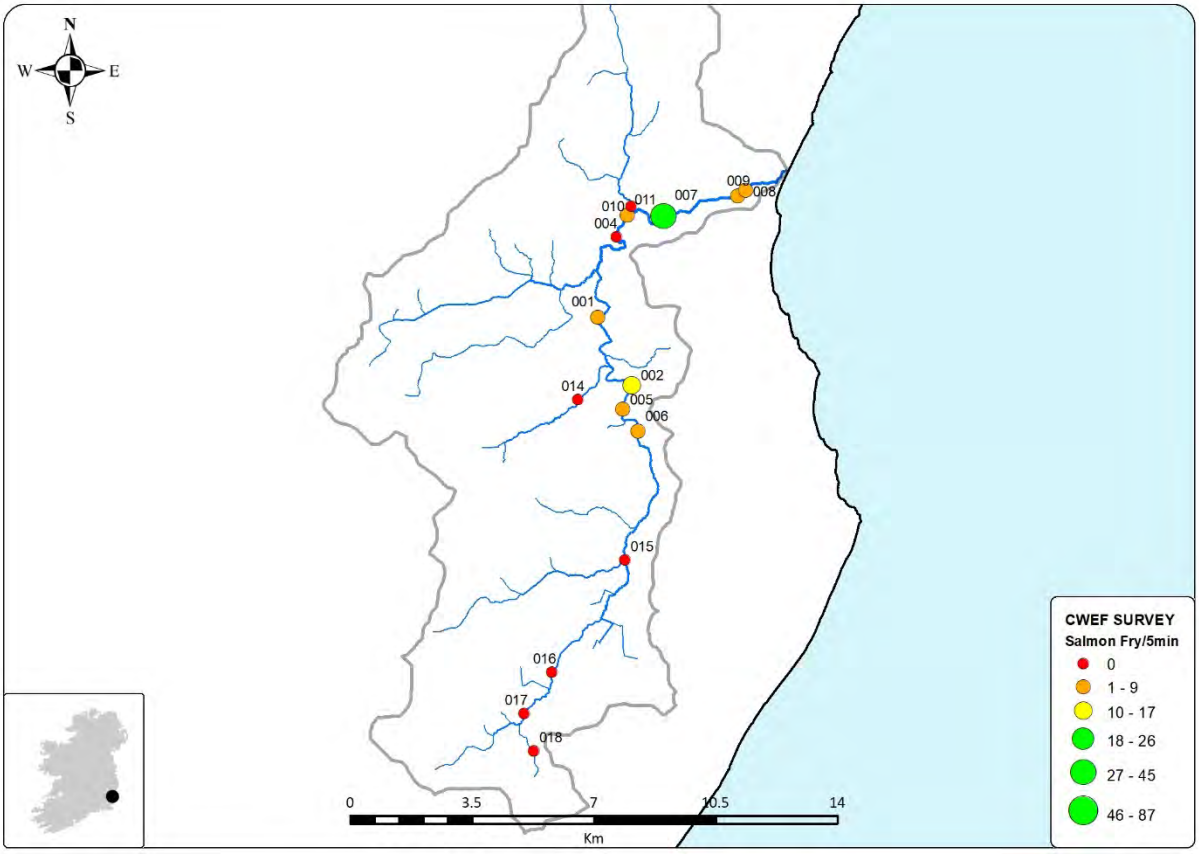
Conclusion

The Owenavorragh had a mean catch of 5.37 salmon fry/5min in 2018. Taking the four most recent surveys into account this results in a cumulative average of 7.52 salmon fry/5min which is blow the 17 salmon fry threshold.

Table A.3.1.2: Site specific results of CWEF on the Owenavorragh catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	T 14998 53140	4	1	2	6	Include	3.00	9.00
002	T 15971 51178	4	2	1	7	Include	1.38	9.63
003	T 15211 52032	4	1	0	8	Eff <60%		
004	T 15538 55451	5	1	0	0	Include	0.00	0.00
005	T 15709 50498	4	2	1	5	Include	1.17	5.83
006	T 16164 49854	4	3	1	2	Include	1.67	3.33
007	T 16887 56062	5	1	0	23	Include	0.00	33.00
008	T 19253 56784	5	1	3	3	Include	4.50	4.50
009	T 19026 56622	5	1	2	5	Include	2.86	7.14
010	T 15956 56339	3	2	0	0	Include	0.00	0.00
011	T 15853 56076	5	2	3	5	Include	4.88	8.13
014	T 14433 50766	3	2	5	0	Include	5.00	0.00
015	T 15787 46159	4	3	4	0	Include	5.00	0.00
016	T 13686 42928	3	2	6	0	Include	6.00	0.00
017	T 12884 41733	3	2	6	0	Include	7.00	0.00

Map A.3.1.1: Showing the locations and results of 2087 CWEF surveys on the Owenavorragh 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. The most recent ten years' data are presented (Table A.4.1). At present twelve rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2018 five complete CWEF surveys were undertaken; a Sub catchment surveys were also undertaken on the Maine.

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.

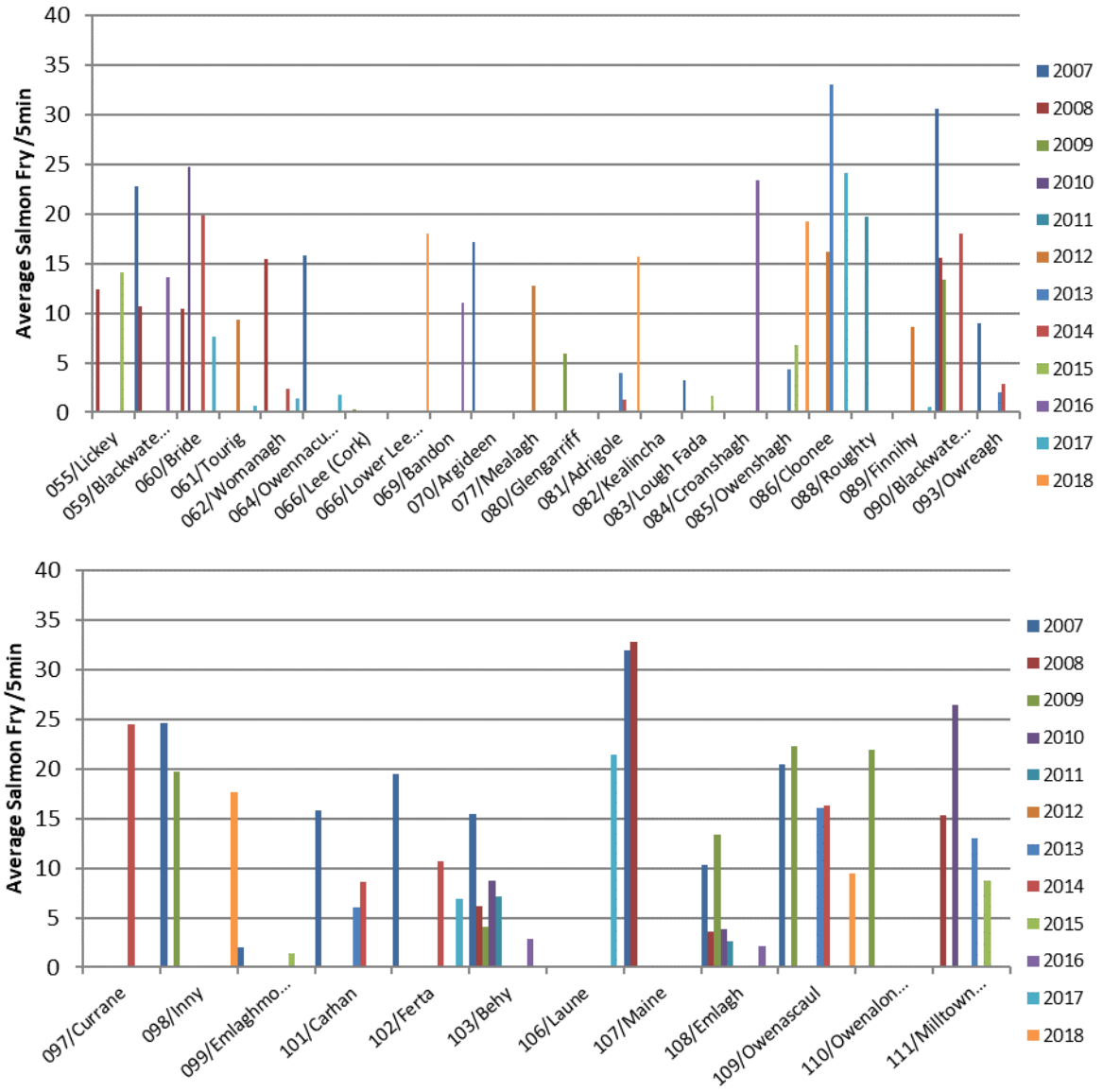
	Survey Year												
Code/River	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Current Index**	**# Annual Surveys Considered**
055/Lickey	**12.37**							**14.14**				13.26	2
059/Blackw. (Muns)	**10.67**								**13.56**			15.65	3
060/Bride	**10.40**		**24.70**				**19.85**			**7.65**		15.65	4
061/Tourig					**9.40**					**0.73**		5.07	2
062/Womanagh	**15.45**						**2.39**			**1.43**		6.42	3
064/Owennacurra										**1.77**		8.77	2
066/ Lee (Cork)		0.26*											
066/Lee (Cork)-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**				2.46	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**		24.44	3
088/Roughty				**19.78**								19.78	1
089/Finnihy					**8.61**	**0.00**				**0.58**		3.06	3
090/Blackwater (Kerry)	**15.52**	**13.35**					**18.01**					19.36	4
093/Owreagh						**2.07**	**2.81**					4.61	3
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**					10.14	3
102/Ferta							**10.74**			**6.88**		12.35	3
103/Behy	**6.14**	**4.03**	**8.71**	**7.17**					**2.89**			5.79	5
106/Laune	17.4†									**21.41**		21.41	1
107/Maine	**32.81**	**34.23**								22.0†	19.6†	32.97	3
108/Emlagh	**3.66**	**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 (Kerry)	**15.33**		**26.44**			**13.02**		**8.76**				15.89	4
112/Feohanagh		**16.61**				**3.20**	**11.93**					10.58	3
114/Owenmore (Kerry)												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. (cont.)

Code/River	Survey Year											Current Index	# Annual Surveys Considered
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
116/Owenamallagh									**0.00**			0.00	1
116/Meennascarty									**0.00**			0.00	1
117/Lee (Kerry)	**0.67**						**0.68**					0.68	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.
† Sub-catchment surveys not included in calculation of current index

Figure A.3: Summary of CWEF results in South Western River basin district 2007-2018.



A.4.1. River Lower Lee - Shournagh/ Martin/ Sheep rivers.

IFI Salmon Catchment #:	66
2018 survey dates:	3-5/9/18
Mean Salmon Fry/5 min (2018):	17.97 fry/5min.
CWEF Index:	17.97 fry/5min.

Sampling carried out by:
Dermot Long
Gareth Dunphy
Niamh McGerany
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 2018 CWEF survey on the Shournagh/Martin sub Catchment.

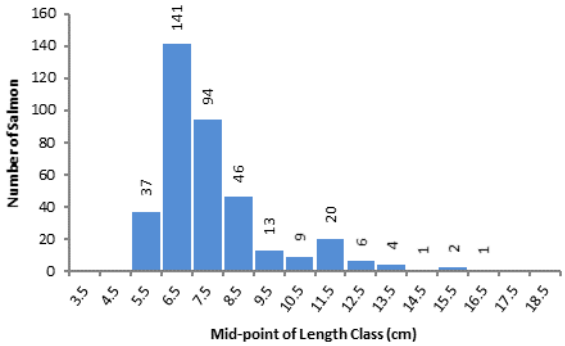
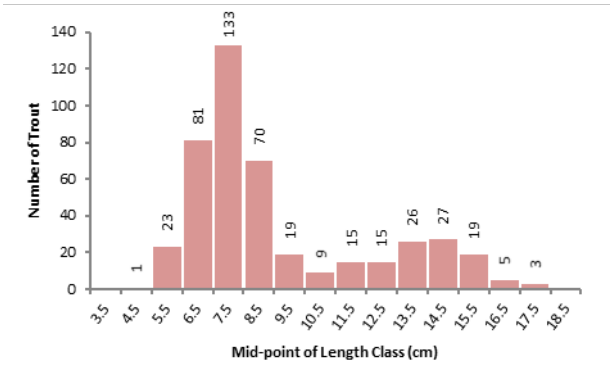


Figure A.4.1.2: Length distribution of brown trout captured in 2018 CWEF survey on the Shournagh/Martin sub Catchment.



The Shournagh and Martin rivers are part of the Lee system, they are located to the north of the main channel about 9km below the dam at Inishcara. This, the first CWEF survey of these sub-catchments in the 2007 to 2018 period, was carried out during September 2018. The survey comprised 21 sites, 18 of which were included in the analysis. Salmon fry were present at 13 sites. The maximum fry catch was 47 salmon at site 126 on the mid to upper stretches of the Martin river. The mean catch of included sites was 17.97 salmon fry/5min. The modal length category of 0+ Salmon fry caught was 6.5cm.

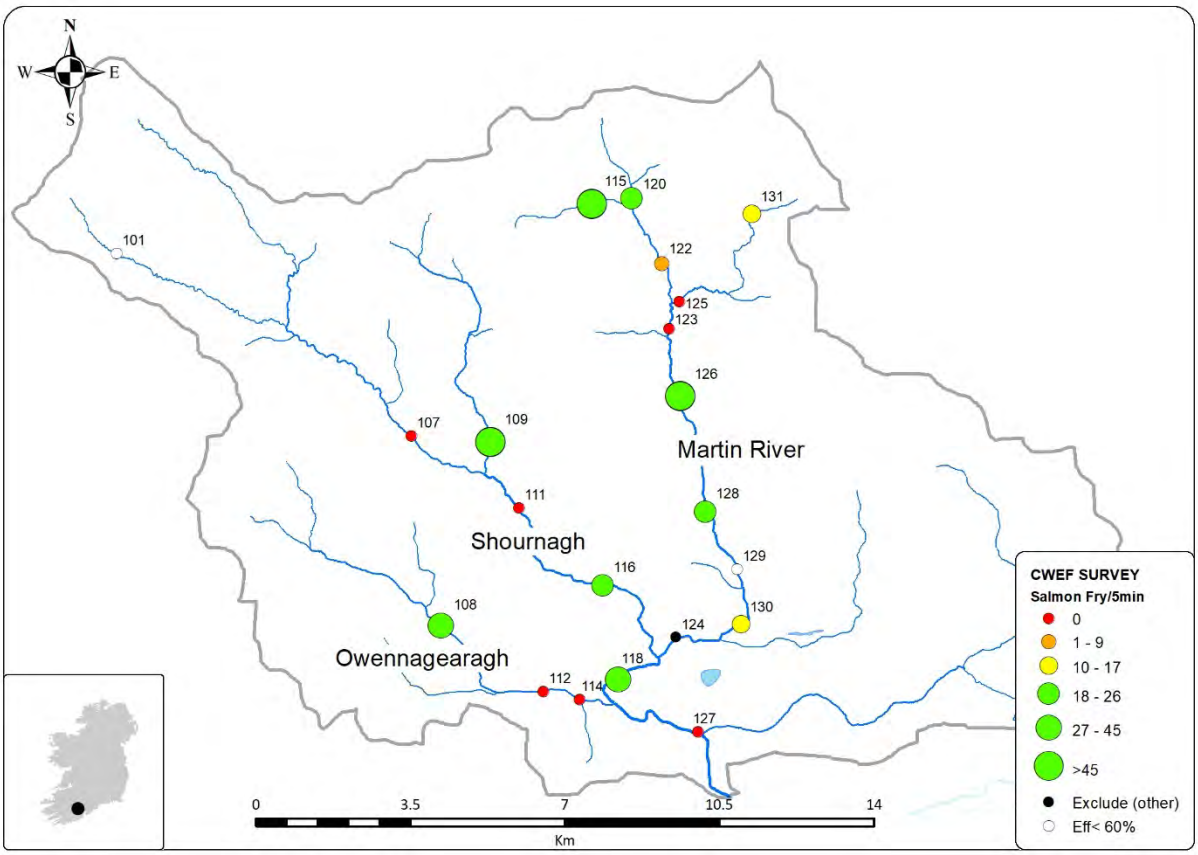
Conclusion

The Shournagh and Martin rivers together had a mean catch of 17.97 salmon fry/5min in 2018. High abundances of salmon fry were observed at a sites along all the main rivers in this sub-catchment.

Table A.4.1.1: Site specific results of CWEF on the Shournagh and Martin rivers in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
101	W 47105 84110	2	2	4	8	Eff <60%		
107	W 53779 79977	3	2	14	0	Include	17.00	0.00
108	W 54446 75687	3	1	14	30	Include	17.18	36.82
109	W 55563 79833	3	1	11	38	Include	13.24	45.76
111	W 56211 78348	4	2	26	0	Include	29.00	0.00
112	W 56763 74186	3	2	49	0	Include	50.00	0.00
114	W 57587 74013	3	2	9	0	Include	11.00	0.00
115	W 57856 85224	2	1	1	46	Include	1.34	61.66
116	W 58114 76586	4	2	6	20	Include	7.15	23.85
118	W 58457 74468	5	1	8	28	Include	9.11	31.89
120	W 58773 85347	3	1	47	17	Include	54.34	19.66
122	W 59448 83876	3	2	28	3	Include	33.42	3.58
123	W 59613 82396	4	2	8	0	Include	10.00	0.00
124	W 59773 75414	4	2	51	0	Exclude (too much instream veg.)		
125	W 59842 83016	3	0	0	0	Include	0.00	0.00
126	W 59857 80868	4	2	0	47	Include	0.00	55.00
127	W 60274 73273	5	3	6	0	Include	6.00	0.00
128	W 60432 78249	4	3	1	15	Include	1.56	23.44
129	W 61160 76962	4	3	0	2	Eff <60%		
130	W 61251 75715	4	2	13	10	Include	16.39	12.61
131	W 61491 85005	2	2	12	8	Include	13.80	9.20

Map A.4.1.1: Showing the locations and results of 2018 CWEF surveys on the Shournagh and Martin rivers.



A.4.2. River Adrigole

IFI Salmon Catchment #: 81
2018 survey dates: 10/9/2018 to 14/9/2018
Mean Salmon Fry/5 min (2018): 15.64 fry/5min.
CWEF Index: 6.99 fry/5min.

Sampling carried out by:
Danny Breen
Tony Holmes

Fish Species Present:
Brown Trout
European Eel
Salmon

Figure A.4.2.1: Length distribution of salmon captured in 2018 CWEF survey on the Adrigole Catchment.

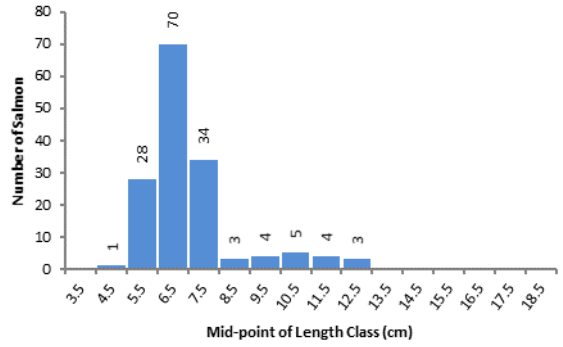


Figure A.4.2.2: Comparison of mean salmon fry/5min for all surveys on the Adrigole catchment to 2018.

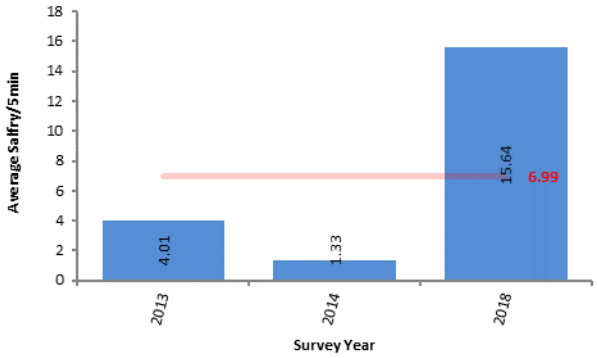


Table A.4.2.1: Conservation limits and provisional returns on the Adrigole catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2008	2009	168	23	C&R							
2009	2010	168	24	C&R							
2010	2011	168	28	C&R							
2011	2012	168	28	C&R							
2012	2013	168	28	C&R	7			2		3.89	4.01
2013	2014	166	7	C&R	11					3.19	1.33
2014	2015	166	9	C&R							
2015	2016	166	-45	C&R							
2016	2017	166	-46	C&R							
2017	2018	166	-47	C&R	11					3.19	15.64

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the third CWEF survey of this catchment in the 2007 to 2018 period, was carried out during Sept 2018. The survey comprised 11 sites, all of which were included in the analysis. Salmon fry were present at nine sites. The maximum fry catch was 37 salmon at site 4. The mean catch of included sites was 15.64 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

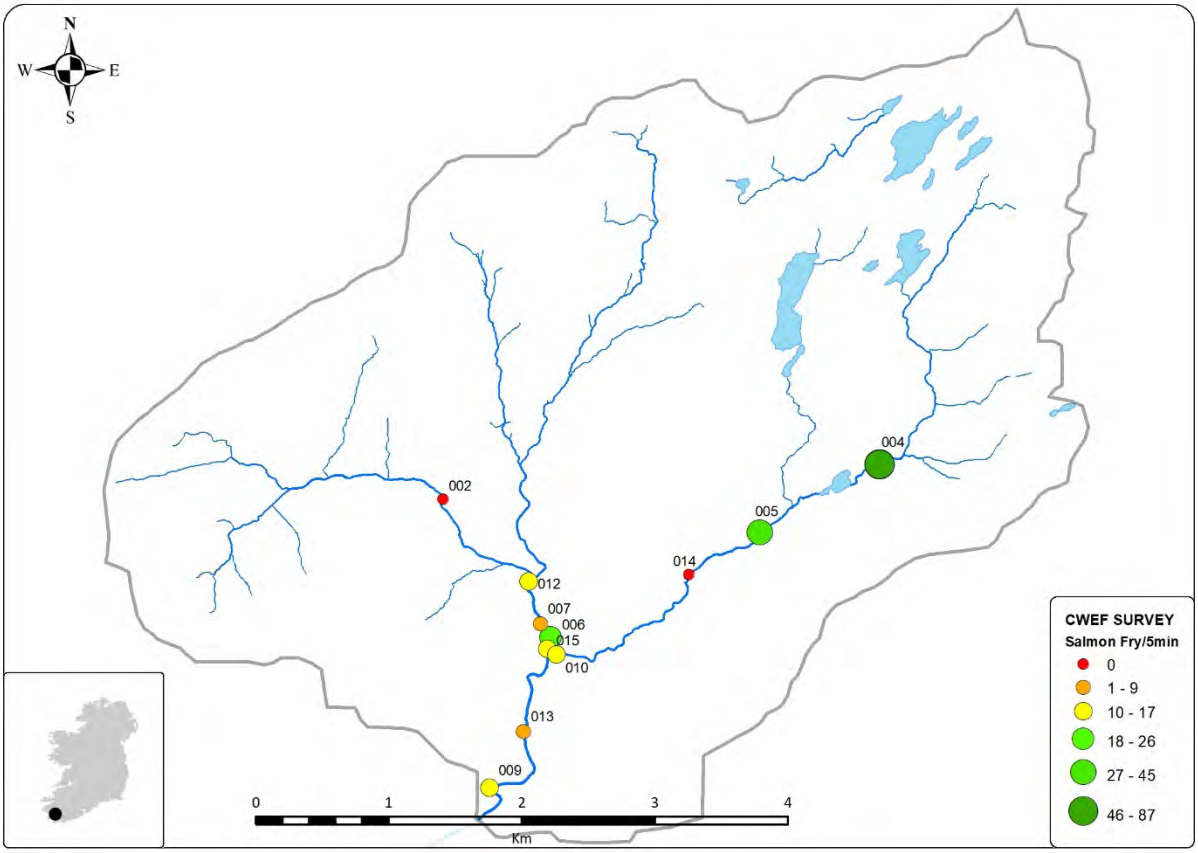
Conclusion

The Adrigole had a mean catch of 15.64 salmon fry/5min in 2018. This results in a cumulative average of 6.99 salmon fry/5min which is below the 17 salmon fry threshold. The numbers this year are considerably higher than those caught in the previous surveys.

Table A.4.2.2: Site specific results of CWEF on the Adrigole catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
002	V 80812 52873	4	3	1	0	Include	1.00	0.00
004	V 84092 53131	4	1	13	37	Include	16.90	48.10
005	V 83192 52624	4	2	4	28	Include	4.50	31.50
006	V 81622 51832	4	1	9	19	Include	10.61	22.39
007	V 81545 51935	5	1	4	7	Include	4.36	7.64
009	V 81162 50706	5	0	0	9	Include	0.00	12.00
010	V 81664 51705	4	2	1	9	Include	1.40	12.60
012	V 81454 52254	5	2	4	12	Include	5.00	15.00
013	V 81417 51125	5	0	4	5	Include	4.89	6.11
014	V 82658 52306	0	1	1	0	Include	4.00	0.00
015	V 81596 51747	0	1	2	10	Include	3.33	16.67

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



A.4.3. River Owenshagh

IFI Salmon Catchment #: 85
2018 survey dates: 28/8/2018 to 29/9/2018
Mean Salmon Fry/5 min (2018): 19.27 fry/5min.
CWEF Index: 10.11 fry/5min.

Sampling carried out by:
Dan Breen
Tony Holmes

Fish Species Present:
Brown Trout
European Eel
Salmon
Sea Trout

Figure A.4.3.1: Length distribution of salmon captured in 2018 CWEF survey on the Owenshagh Catchment.

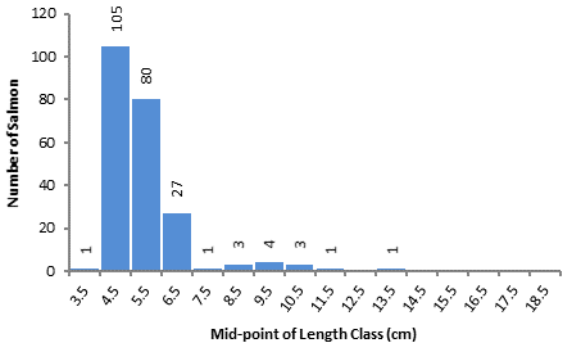


Figure A.4.3.2: Comparison of mean salmon fry/5min for all surveys on the Owenshagh catchment to 2018.

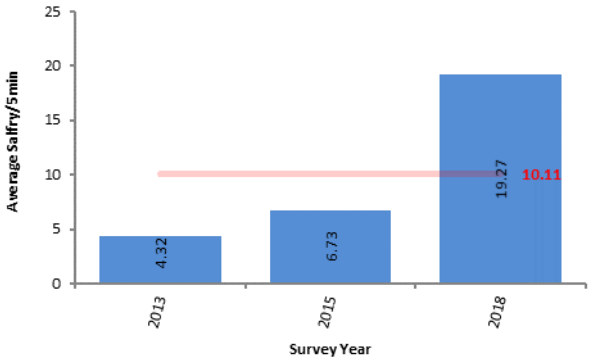


Table A.4.3.1: Conservation limits and provisional returns on the Owenshagh catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2008	2009	323	-178	Closed							
2009	2010	323	-185	Closed							
2010	2011	323	-185	Closed							
2011	2012	323	-185	Closed							
2012	2013	323	-185	Closed	11			5		3.31	4.32
2013	2014	302	-211	Closed							
2014	2015	304	-212	Closed	10					5.29	6.73
2015	2016	304	-212	Closed							
2016	2017	304	-212	Closed							
2017	2018			Closed	12			2		3.78	19.27

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the third CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August and September 2018. The survey comprised 14 sites, 12 of which were included in the analysis. Salmon fry were present at 9 sites. The maximum fry catch was 43 salmon at site 6. The mean catch of included sites was 19.27 salmon fry/5min. The modal length category of 0+ fry caught was 4.5cm.

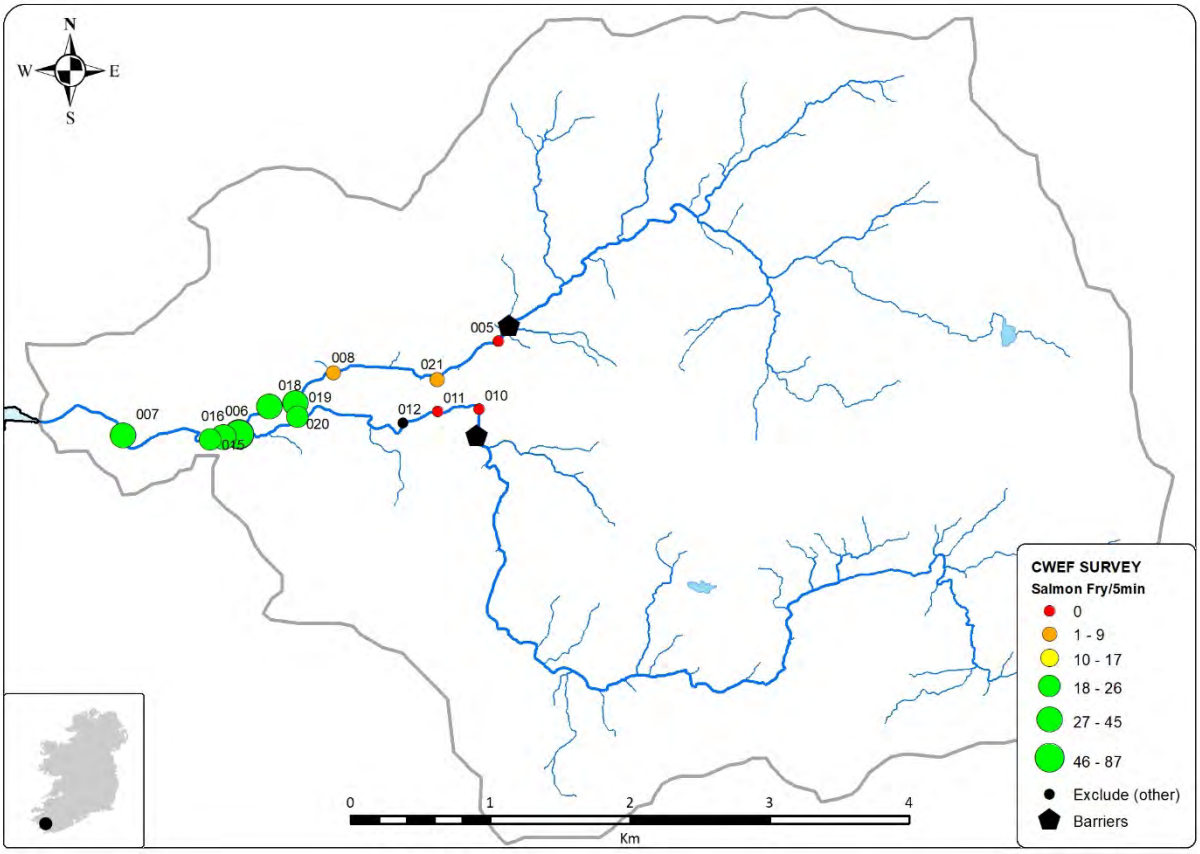
Conclusion

This system is now densely surveyed in the areas available to salmon. Some new sites were visited this year, some on excellent spawning material and producing good salmon numbers. At sites previously visited results were generally improved. The Owenshagh had a mean catch of 19.27 salmon fry/5min in 2018. Taking the three most recent surveys into account this results in a cumulative average of 10.11 salmon fry/5min which is below the 17 salmon fry threshold. There has been an increase in salmon fry abundance at each survey since 2013.

Table A.4.3.2: Site specific results of CWEF on the Owenshagh catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
005	V 80785 59017	5	3	4	0	Include	5.00	0.00
006	V 78924 58348	6	1	0	43	Include	0.00	48.00
007	V 78089 58341	6	1	0	26	Include	0.00	30.00
008	V 79601 58790	5	1	4	4	Include	4.00	4.00
010	V 80648 58529	5	3	2	0	Include	2.00	0.00
011	V 80348 58510	5	3	5	0	Include	7.00	0.00
015	V 78719 58313	6	3	0	14	Include	0.00	18.00
016	V 78811 58328	6	1	0	30	Include	0.00	37.00
017	V 79327 58571	5	1	0	39	Include	0.00	41.00
018	V 79140 58550	5	1	1	21	Include	1.27	26.73
019	V 79343 58475	5	2	1	20	Include	1.19	23.81
021	V 80345 58740	5	1	1	2	Include	1.33	2.67
012	V 80102 58432	5	3	0	0	Gear not working properly		
020	V 79367 58481	5	1	3	15	Test survey-v close to existing site		

Map A.4.3.1: Showing locations of 2018 survey sites on Owenshagh.



A.4.4. River Inny

IFI Salmon Catchment #: 98
2018 survey dates: 31/8/18 – 16/9/18
Mean Salmon Fry/5 min (2018): 17.67 fry/5min.
CWEF Index: 20.69 fry/5min.

Sampling carried out by:
Andrew Quigley
Sean Moran
Stephen Gill
Tony Holmes

Fish Species Present:
Brown Trout
European Eel
Salmon

Figure A.4.4.1: Length distribution of salmon captured in 2018 CWEF survey on the Inny Catchment.

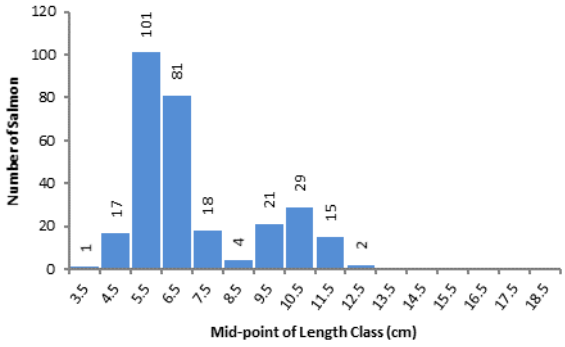


Figure A.4.4.2: Comparison of mean salmon fry/5min for all surveys on the Inny catchment to 2018.

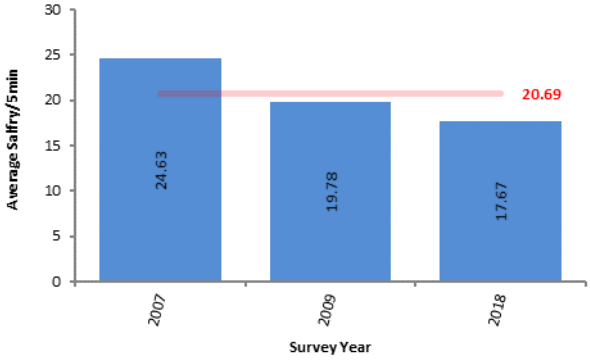


Table A.4.4.1: Conservation limits and provisional returns on the Inny catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	100	1	Open	19	3				3.87	24.63
2007	2008	648	-76	Open							
2008	2009	648	-5	Open	11	9				4.25	19.78
2009	2010	648	76	Open							
2010	2011	648	70	Open							
2011	2012	648	645	Open							
2012	2013	648	724	Open							
2013	2014	630	689	Open							
2014	2015	629	395	Open							
2015	2016	629	309	Open							
2016	2017	629	289	Open							
2017	2018	629	53	C&R	16	2		2		4.25	17.67

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit; * = Incomplete Surveys.

This, the third CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August and September 2018. Water levels at the time were slightly above average and an increase in levels interrupted the survey. The survey comprised 20 sites, 16 of which were included in the analysis. Salmon fry were present at 18 sites. The maximum fry catch was 36 salmon at site 17. The mean catch of included sites was 17.67 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

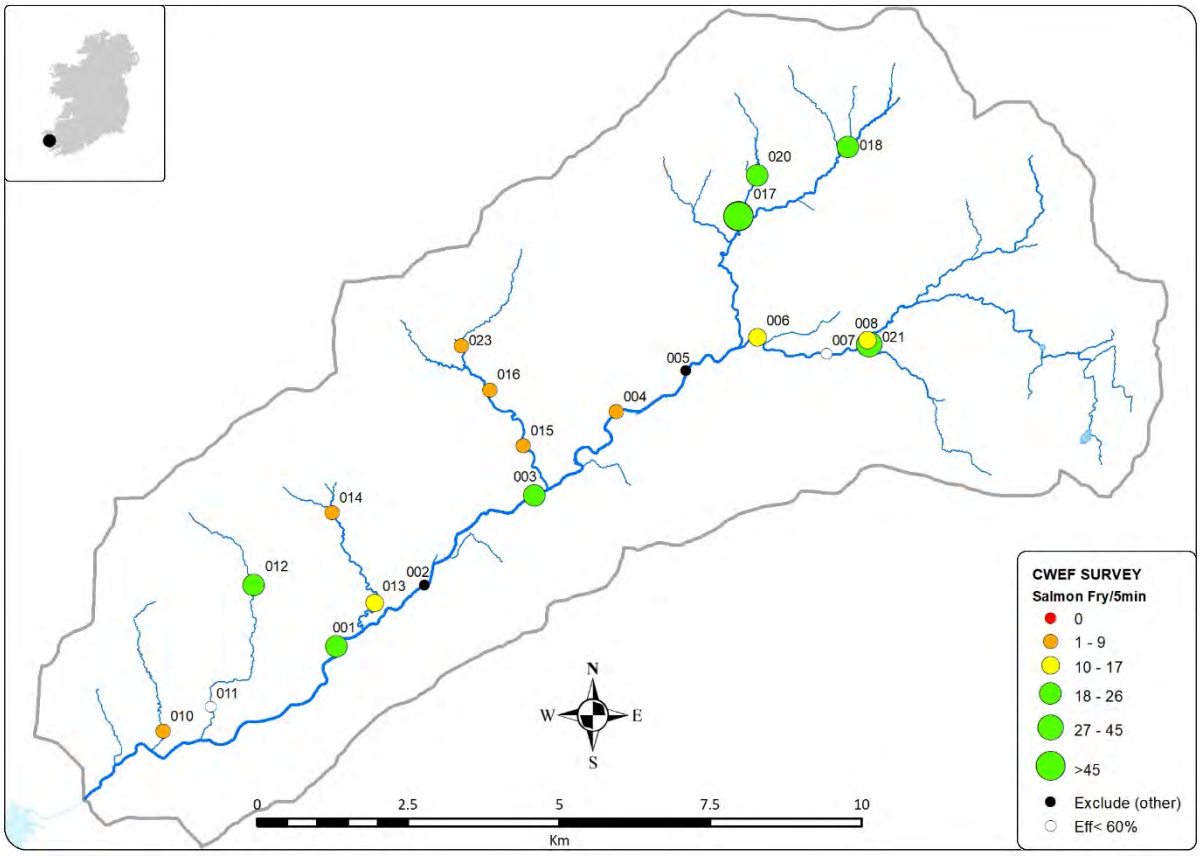
Conclusion

The Inny had a mean catch of 17.67 salmon fry/5min in 2018. This results in a cumulative average of 20.69 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.4.4.2: Site specific results of CWEF on the Inny catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	V 54549 72040	5	1	0	19	Include	0.00	24.00
002	V 56003 73052	5		0	0	Water too fast		
003	V 57817 74533	5	1	1	18	Include	1.42	25.58
004	V 59175 75922	5		0	7	Include	0.00	9.00
005	V 60330 76595	5		0	0	Water too fast		
006	V 61510 77152	4		0	8	Include	0.00	13.00
007	V 62661 76885	4		2	5	Eff <60%		
008	V 63330 77106	4	1	1	12	Include	1.38	16.62
010	V 51671 70636	2	2	3	6	Include	3.67	7.33
011	V 52458 71044	2	1	1	1	Eff <60%		
012	V 53178 73047	2	1	5	16	Include	6.67	21.33
013	V 55178 72755	3		2	14	Include	2.25	15.75
014	V 54468 74250	3	2	5	7	Include	6.25	8.75
015	V 57633 75358	4	2	2	3	Include	2.80	4.20
016	V 57079 76281	4	3	1	6	Include	1.29	7.71
017	V 61193 79155	3	1	2	36	Include	2.63	47.37
018	V 63014 80293	4	1	1	16	Include	1.47	23.53
020	V 61508 79830	3	1	5	16	Include	6.19	19.81
021	V 63357 77044	3	1	1	22	Include	1.43	31.57
023	V 56611 77009	2	1	4	6	Include	4.80	7.20

Map A.4.4.1: Showing locations of 2018 survey sites on the Inny River.



A.4.5. River Maine

IFI Salmon Catchment #: 107
2018 survey dates: 30/8/18 – 17/9/18
Mean Salmon Fry/5 min (2018): 19.61 fry/5min.
CWEF Index: 32.35 fry/5min.

Sampling carried out by:
Mick Millane
Stephen Gill
Tony Holmes

Fish Species Present:

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

Figure A.4.5.1: Length distribution of salmon captured in 2018 CWEF survey on the Maine Catchment.

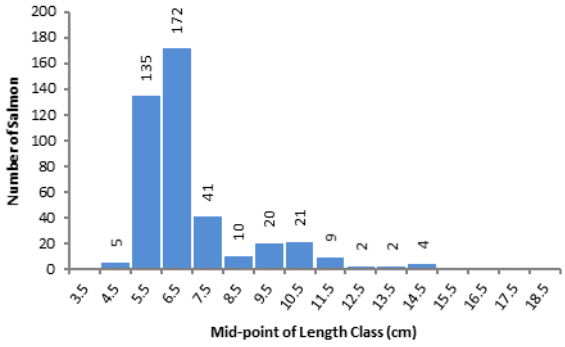


Figure A.4.5.2: Comparison of mean salmon fry/5min for all surveys on the Maine catchment to 2018.

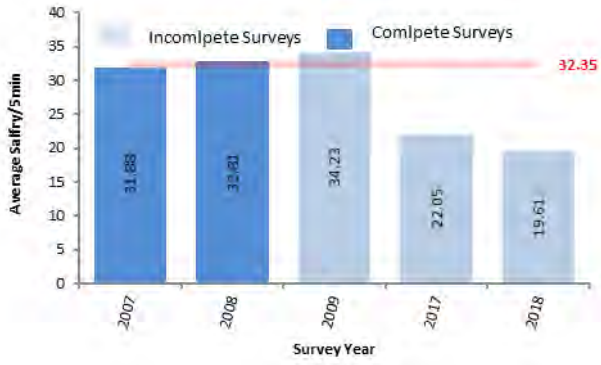


Table A.4.5.1: Conservation limits and provisional returns on the Maine catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	100	1	Open	55			1		3.35	31.88
2007	2008	1487	652	Open	48		1	2	1	3.60	32.81
2008	2009	1487	-743	Open	16	1				11.02	34.23*
2009	2010	1487	-871	Open							
2010	2011	1487	-792	Open							
2011	2012	1487	-475	Open							
2012	2013	1487	1509	Open							
2013	2014	1177	1709	Open							
2014	2015	1181	1637	Open							
2015	2016	1181	1156	Open							
2016	2017	1181	923	Open	22	2		1		7.49	22.05*
2017	2018	1181	272	Open	23	2		1		7.21	19.61*

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit; * = Incomplete Surveys.

This partial CWEF survey of the Maine catchment was carried out during August and September 2018. The survey comprised 26 sites, 23 of which were included in the analysis. Salmon fry were present at all 24 sites. The survey was concentrated primarily on the Maine plus a small number of sites on the Brown Flesk. Historically the Brown Flesk, rather than the Maine is the prime producer of salmon in the system. The maximum fry catch was 47 salmon at site 33. The mean catch of included sites was 19.61 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm.

When this years survey is compared with the last complete survey of the catchment which was completed in 2008 (Map A.4.5.1) It can be seen that individual site results a broadly similar.

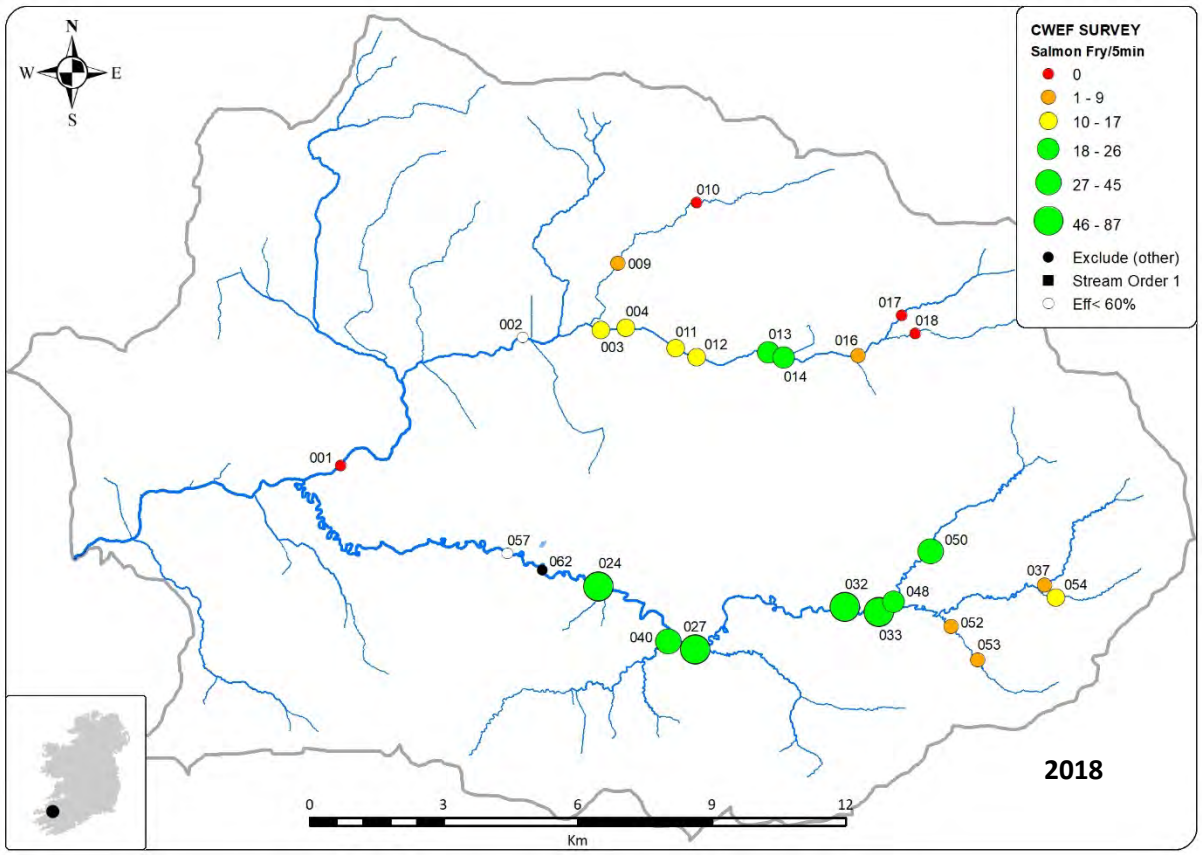
Conclusion

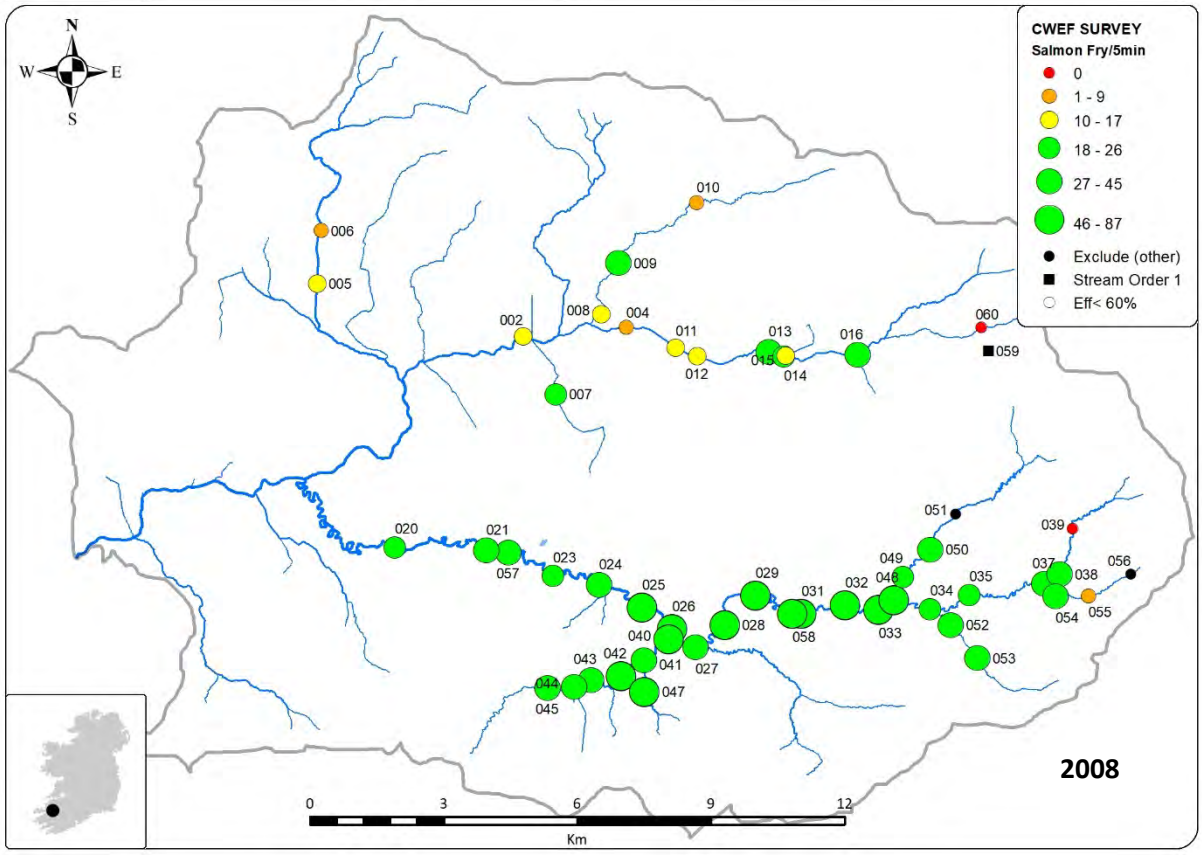
The Maine had a mean catch of 19.61 salmon fry/5min in 2018. However since this was not considered a complete survey, this does not contribute to the CWEF index which remains as 32.35.

Table A.4.5.2: Site specific results of CWEF major tributaries on the Maine catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
Maine								
001	Q 93806 06461	5	2	0	0	Include	0.00	0.00
002	Q 97876 09336	4	1	1	3	Eff <60%		
003	Q 99626 09497	3	1	2	12	Include	2.57	15.43
004	R 00189 09547	3	1	3	10	Include	3.00	10.00
009	R 00015 10989	2	2	7	2	Include	9.33	2.67
010	R 01772 12346	2	1	9	0	Include	11.00	0.00
011	R 01304 09090	3	2	2	11	Include	2.62	14.38
012	R 01776 08887	3	1	1	10	Include	1.55	15.45
013	R 03388 08998	3	1	8	19	Include	10.07	23.93
014	R 03733 08893	3	1	4	14	Include	4.89	17.11
016	R 05384 08928	3	1	11	6	Include	13.59	7.41
017	R 06367 09824	3	1	12	0	Include	14.00	0.00
018	R 06672 09424	2	1	31	0	Include	35.00	0.00
Brown Flesk								
024	Q 99575 03770	5	1	1	36	Include	1.41	50.59
027	R 01748 02360	4	2	8	40	Include	13.00	65.00
032	R 05103 03307	4	1	6	35	Include	9.66	56.34
033	R 05856 03201	4	1	1	47	Include	1.31	61.69
037	R 09562 03788	3	1	16	5	Include	19.81	6.19
040	R 01145 02539	4	2	6	27	Include	7.45	33.55
048	R 06191 03425	3	1	7	14	Include	10.33	20.67
050	R 07012 04557	3	1	1	24	Include	1.24	29.76
052	R 07464 02865	2	1	16	4	Include	20.80	5.20
053	R 08062 02122	2	2	35	4	Include	42.18	4.82
054	R 09819 03509	2	1	11	9	Include	13.20	10.80
057	Q 97539 04497	5	2	2	15	Eff <60%		
062	Q 98324 04139	5	2	3	6	Too Fast		

Map A.4.5.1 Showing the locations and results of CWEF surveys on the Maine River, 2018 (top) and 2008





A.4.6. River Owenascaul

IFI Salmon Catchment #: 109
2018 survey dates: 28/8/18
Mean Salmon Fry/5 min (2018): 9.51 fry/5min.
CWEF Index: 16.91 fry/5min.

Sampling carried out by:
Darragh King
Mick Millane

Fish Species Present:
Brown Trout
European Eel
Salmon
3-spined Stickleback

Figure A.4.6.1: Length distribution of salmon captured in 2018 CWEF survey on the Owenascaul Catchment.

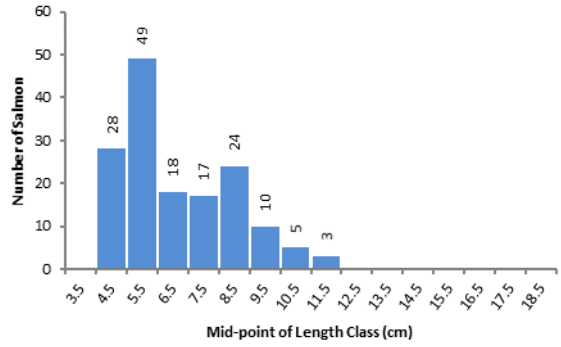


Figure A.4.6.2: Comparison of mean salmon fry/5min for all surveys on the Owenascaul catchment to 2018.

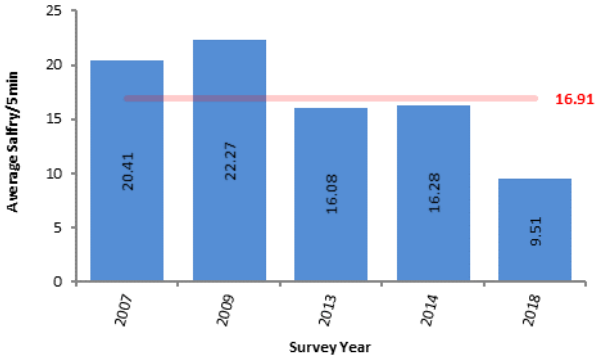


Table A.4.6.1: Conservation limits and provisional returns on the Owenascaul catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007			C&R	5	1				5.69	20.41
2007	2008	192	-73	C&R							
2008	2009	192	-72	C&R	10					3.42	22.27
2009	2010	192	-83	C&R							
2010	2011	192	-83	C&R							
2011	2012	192	-83	C&R							
2012	2013	192	-82	C&R	10					3.42	16.08
2013	2014	180	-99	C&R	13					2.63	16.28
2014	72015	181	-99	C&R							
2015	2016	181	-101	C&R							
2016	2017	181	-111	C&R							
2017	2018	181	-111	C&R	13					2.63	9.51

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the fifth CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August 2018. The survey comprised 13 sites, all of which were included in the analysis. Salmon fry were present at nine sites. The maximum fry catch was 30 salmon at site 13. The mean catch of included sites was 9.51 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

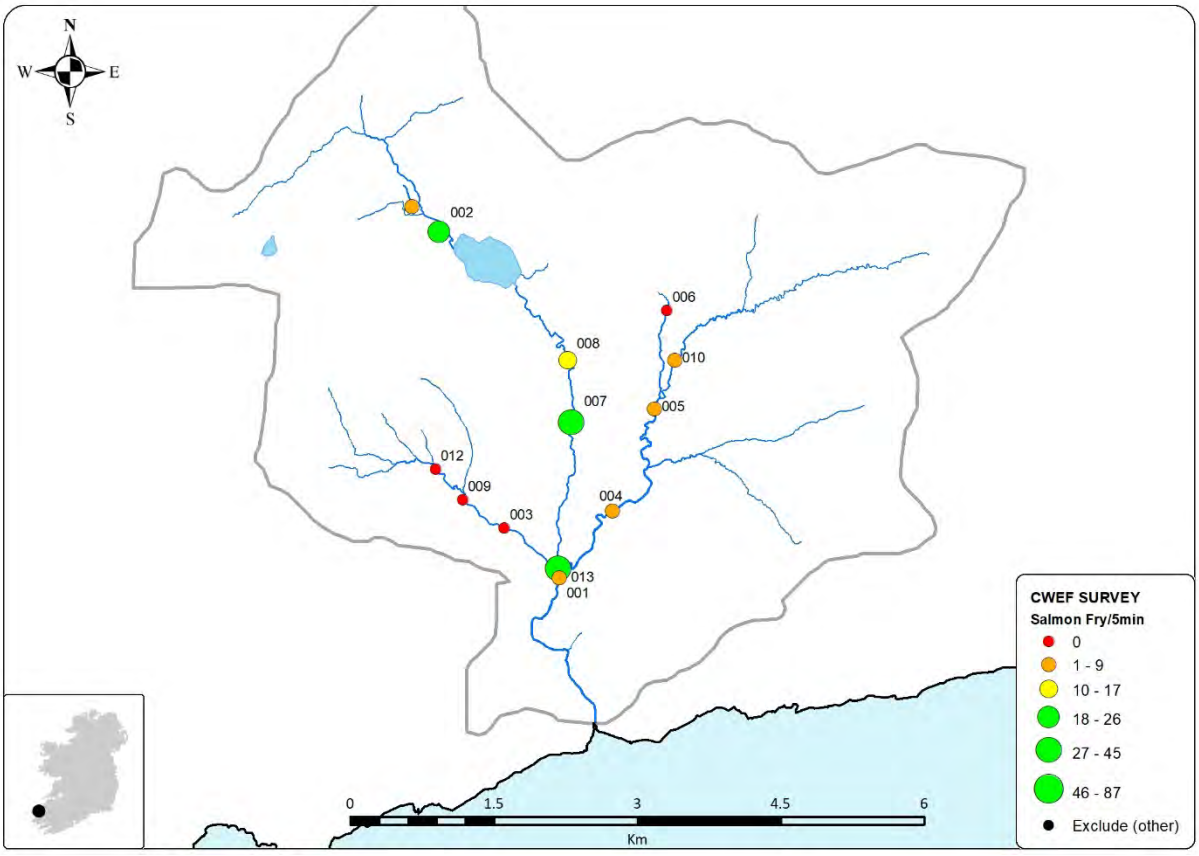
Conclusion

The Owenascaul had a mean catch of 9.51 salmon fry/5min in 2018. The salmon fry abundance observed in 2018 was the lowest observed in any of the annual surveys and much lower than the highest abundance of 22.27 observed in the 2009. Taking the four previous surveys into account the CWEF average is 16.91 salmon fry/5min, just below the 17 salmon fry threshold.

Table A.4.6.2: Site specific results of CWEF on the Owenascaul catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	Q 59257 01820	4	1	1	4	Include	1.00	4.00
002	Q 57998 05444	3	1	13	18	Include	15.94	22.06
003	Q 58680 02338	3	1	8	0	Include	8.00	0.00
004	Q 59815 02518	4	1	0	3	Include	0.00	4.00
005	Q 60251 03585	4	2	4	3	Include	5.71	4.29
006	Q 60385 04616	3	2	9	0	Include	9.00	0.00
007	Q 59381 03450	3	1	0	23	Include	0.00	28.00
008	Q 59344 04094	3	1	6	16	Include	6.00	16.00
009	Q 58245 02636	3	1	19	0	Include	21.00	0.00
010	Q 60466 04097	3	1	3	2	Include	3.00	2.00
011	Q 57711 05702	3	2	3	5	Include	4.13	6.88
012	Q 57961 02955	3	1	19	0	Include	23.00	0.00
013	Q 59245 01919	3	1	3	30	Include	3.64	36.36

Map A.4.6.1 Showing the locations and results of 2018 CWEF surveys on the Owenascaul River.



A.5.Shannon River Basin District.

Summary

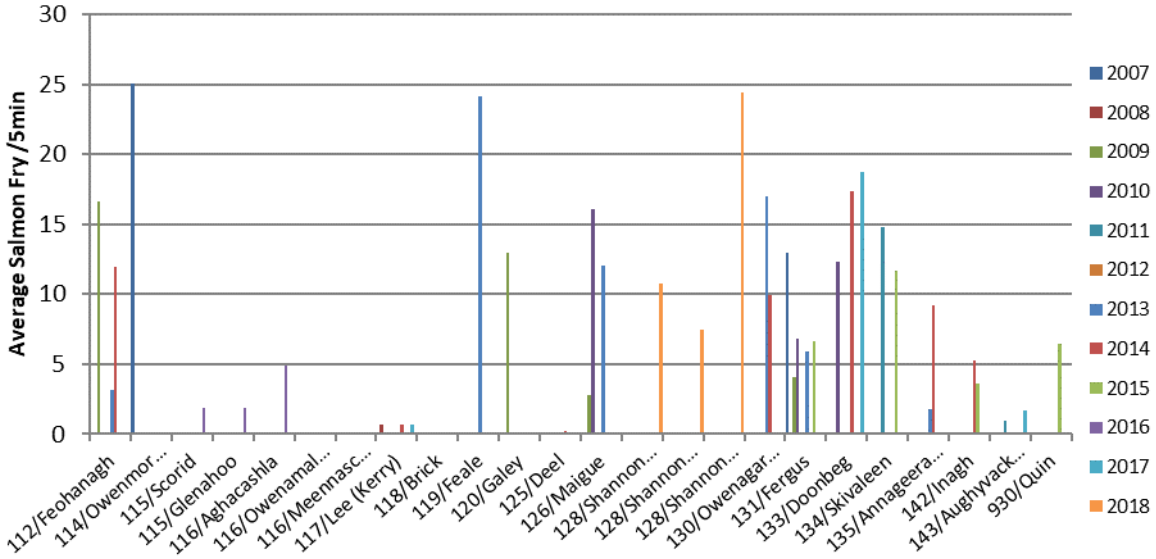
Since 2007, twenty catchments or sub catchments have been surveyed in the Shannon River Basin District (ShRBD) as part of the on-going catchment-wide electrofishing surveys. The most recent ten years' data are presented (Table A.5.1). At present just one designated salmon river is meeting the threshold of 17 salmon fry per 5min. In this region in 2018 CWEF surveys were undertaken. These were conducted on the Blackwater, Groody and Kilmastula sub-catchments of the lower Shannon along with the old River Shannon channel.

Table A.5.1: Catchment-wide Electrofishing data for the Shannon River Basin District 2009-2018 showing the average salmon fry captured /5min for each year surveyed. Also shown is the Surveys Mean capture rate.

	Survey Year										Current Index	# Annual Surveys Considered
Code/River	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**		
118/Brick											**0.00**	**1**
119/Feale					**24.15**						**<u>24.15</u>**	**1**
120/Galey	**12.99**										**12.99**	**1**
125/Deel			**0.18**			**0.23**			**0.04**		**0.15**	**3**
126/Maigue	**2.82**	**16.05**			**12.05**						**10.31**	**3**
128/Shan. Blackwt.									10.74†	10.74†	**10.74**	**2**
128/Shan. Groody									0†	7.45†	**3.73**	**2**
128/Shan. Kilmast.									10.35†	24.45†	**<u>17.40</u>**	**2**
128/Shan. Old Ch.									5.5*†	18.25*†		
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**						**1.7**		**1.35**	**2**
930/Quin							**6.47**				**6.47**	**1**

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.
* Partial/incomplete surveys curtailed by high water levels. †- Sub-catchment surveys.

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



A.5.1. River Shannon- Blackwater, Groody, Kilmastula sub-catchments and old main channel.

IFI Salmon Catchment #: 128
2018 survey dates: 15 -24/8/18

Sampling carried out by:

Colum Walshe
David Germaine
Flan Ryan
Liam Horrigan
Michael Millane
Ray Byrne
Tony Holmes

Fish Species Present:

Brown Trout
Dace
European Eel
Gudgeon
Lamprey
Minnow
Pike
Salmon
Stone Loach
3-Spined Stickleback

Figure A.5.1.1: Length distribution of salmon captured in the Shannon Blackwater 2018 CWEF.

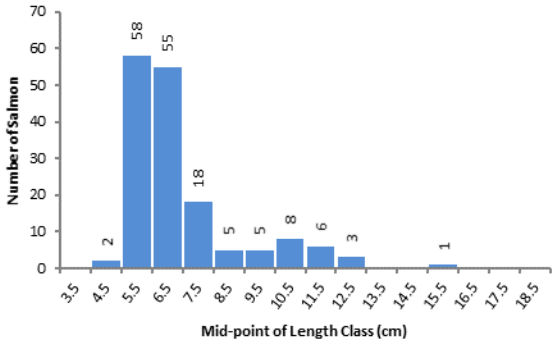


Figure A.5.1.2: Length distribution of salmon captured in the Shannon Kilmastula 2018 CWEF.

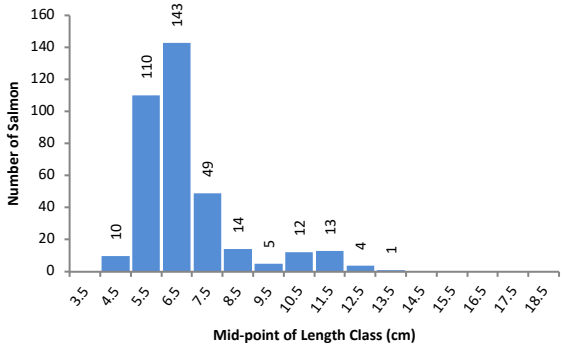


Figure A.5.1.3: Length distribution of salmon captured in the Shannon Old main channel 2018 CWEF.

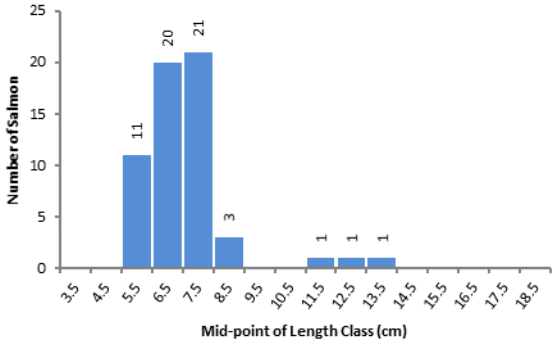


Figure A.5.1.4: Length distribution of salmon captured in the Shannon Groody 2018 CWEF.

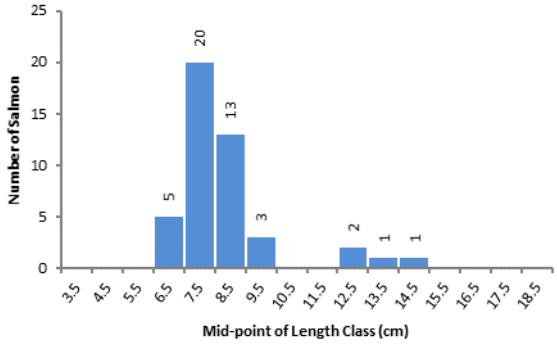


Table A.5.2.1: Summary of results of catchment-wide electrofishing in 2018 on sub-catchments within ShRFB.

Code	River	Salmon Fry/5min	Trout Fry/5min	# included sites	# sites not fished/ included
128	Shannon Blackwater	10.74	14.73	15	5
128	Shannon Groody	7.45	6.71	6	2
128	Shannon Kilmastula	24.45	2.35	15	8
128	Shannon Castleconnell / Old Main Ch.	18.25*	0.00	4	1

* Partial/incomplete survey curtailed by high water levels.

Surveys were undertaken in four discrete areas in the lower Shannon: the sub-catchments Blackwater, Groody and Kilmastula, plus the old main channel below the Parteen weir in the vicinity of Castleconnell. This is the second CWEF survey in each of these catchments. Results for each area are presented in table A.5.2.1.

Blackwater – The survey consisted of 20 sites, 15 of which were included in the analysis. Salmon were present at 7 of the 15 surveyed sites. The results suggest there was a partial barrier to salmon in the region where the original river flows beneath the headrace. Downstream of that point there were good numbers of salmon fry at most of the sites surveyed indicating good spawning in 2017, the maximum catch was 53 salmon fry at site 169; upstream of the headrace salmon were much less abundant. At two sites immediately upstream of the headrace, despite ideal habitat no fry were detected. Many of the sites visited in the course of the survey were deemed too narrow and overgrown for salmon and were not surveyed and will not be revisited. The Blackwater had a mean catch of 10.74 salmon fry/5min.

Groody – Seven sites were surveyed on the Groody visited six of which were included in the CWEF calculation. Salmon fry were present at four sites, the max catch was 20 fry at site 154, the mean of included sites was 7.45 salmon fry/5min.

Kilmastula – The survey consisted of 23 sites, 18 of which were included in the analysis. Salmon fry were present at 11 of the 16 surveyed sites. Excellent results were obtained at sites in the middle reaches of the catchment around Kilmastula Bridge, the maximum fry catch was 101 salmon at site 190. Fry were also present at the upper end of the catchment despite the channel in that area being canalised and having very little riffle, the river in this area had been habitat improved in the past. The Kilmastula had a mean catch of 24.45 salmon fry/5min.

Old Main channel – While not ideally suited to surveying larger rivers such as this the method can be used in main channels when substrate, depth and flow conditions allow. This year, water levels were too high for a thorough survey of this area. Sites surveyed here revealed good abundances of fry, indicating that there is likely to be spawning occurring in the main channel.

Table A.5.2.2: Numbers of individuals of various species encountered in 2018 CWEF surveys on Shannon sub-catchments.

IFI River	Salmon	Brown Trout	Dace	European eel	Gudgeon	Lamprey sp.	Minnow	Pike	Stone loach	Three-spined stickleback
Shannon Blackwater	161	219		2		2	165		70	54
Shannon Groody	45	40					5		75	60
Shannon Kilmastula	361	67	20	10	10	2	180	1	87	30
Shannon Old Main Channel	58			3					11	

Table A.5.2.3 Site specific results of CWEF on the Lower Shannon sub catchments catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
Blackwater Sub-Catchment								
165	R 61335 59530	4	1	12	20	Include	13.88	23.13
166	R 61567 59985	4	1	12	5	Include	14.12	5.88
167	R 61253 61509	4	1	10	39	Include	12.04	46.96
168	R 60412 61691	4	1	13	53	Include	15.36	62.64
169	R 59527 62690	4	1	17	0	Include	20.00	0.00
170	R 59586 62932	4	1	12	0	Include	15.00	0.00
171	R 60026 65846	3	2	8	0	Include	10.00	0.00
173	R 58982 65622	3	1	13	7	Include	13.00	7.00
174	R 58376 65598	3	1	4	12	Include	4.75	14.25
175	R 57705 65443	3	1	13	0	Include	17.00	0.00
176	R 56862 65932	3	2	19	0	Include	20.00	0.00
177	R 56348 65544	2	3	4	0	Include	4.00	0.00
183	R 56127 66599	2	2	13	0	Include	15.00	0.00
198	R 59883 64184	4	2	23	1	Include	28.75	1.25
199	R 57462 65519	2	1	14	0	Include	18.00	0.00
178	R 55141 65288	2	0	0	0	Not Sampled		
181	R 57564 66296	1	0	0	0	Not Sampled		
182	R 56706 66629	1	0	0	0	Not Sampled		
184	R 55870 66733	3	0	0	0	Not Sampled		
180	R 57942 66201	1	2	5	0	Stream Order<2		
Groody Sub-Catchment								
152	R 60558 57144	4	0	0	0	Include	0.00	0.00
153	R 61275 56050	4	2	5	9	Include	5.71	10.29
154	R 61604 55107	4	2	11	20	Include	11.71	21.29
155	R 62371 55140	4	2	11	11	Include	12.00	12.00
157	R 63495 53790	3	3	4	0	Include	4.00	0.00
158	R 67744 51661	2	3	6	1	Include	6.86	1.14
156	R 63587 54302	4	0	3	0	Site Too Short		
197	R 68053 49429	1	2	0	0	Stream Order<2		
Kilmastula Sub-Catchment								
136	R 70923 69499	5	2	1	37	Include	1.26	46.74
138	R 72953 70020	4	1	0	15	Include	0.00	17.00
139	R 73406 70371	3	1	6	27	Include	6.73	30.27
141	R 74146 70919	2	1	0	0	Include	0.00	0.00
142	R 74605 70638	4	1	5	23	Include	6.07	27.93
143	R 75491 71012	4	1	1	42	Include	1.23	51.77
147	R 81471 72653	4	3	9	10	Include	10.42	11.58
148	R 82818 73405	4	1	0	9	Include	0.00	11.00
149	R 83982 72464	3	2	4	0	Include	4.00	0.00
151	R 85901 71509	2	2	1	0	Include	1.00	0.00
190	R 72553 69744	4	1	0	101	Include	0.00	121.00
192	R 84259 71410	3	2	0	0	Include	0.00	0.00
194	R 78578 71928	4	2	2	31	Include	2.24	34.76
195	R 82780 71415	2	0	0	0	Include	0.00	0.00
196	R 80540 72593	4	3	2	13	Include	2.27	14.73
135	R 68031 67843	7	2	0	10	Eff <60%		
140	R 73939 71180	2	0	0	0	Not Sampled		
145	R 78440 71447	3	0	0	0	Not Sampled		
146	R 78738 72053	4	3	0	0	Not Sampled		
150	R 84963 72579	2	3	0	0	Not Sampled		
191	R 83944 72716	3	0	0	0	Not Sampled		
193	R 80676 71812	3	0	0	0	Not Sampled		
194	R 78578 71928	4	3	0	0	Not Sampled		
Old Main Channel								
200	R 66065 62919	7	1	0	16	Include	0.00	20.00
201	R 65495 62150	7	1	0	13	Include	0.00	19.00
202	R 65451 61845	7	1	0	10	Include	0.00	10.00
203	R 65408 61682	7	2	0	16	Include	0.00	24.00
204	R 65338 61631	7	0	0	0	Not Sampled		

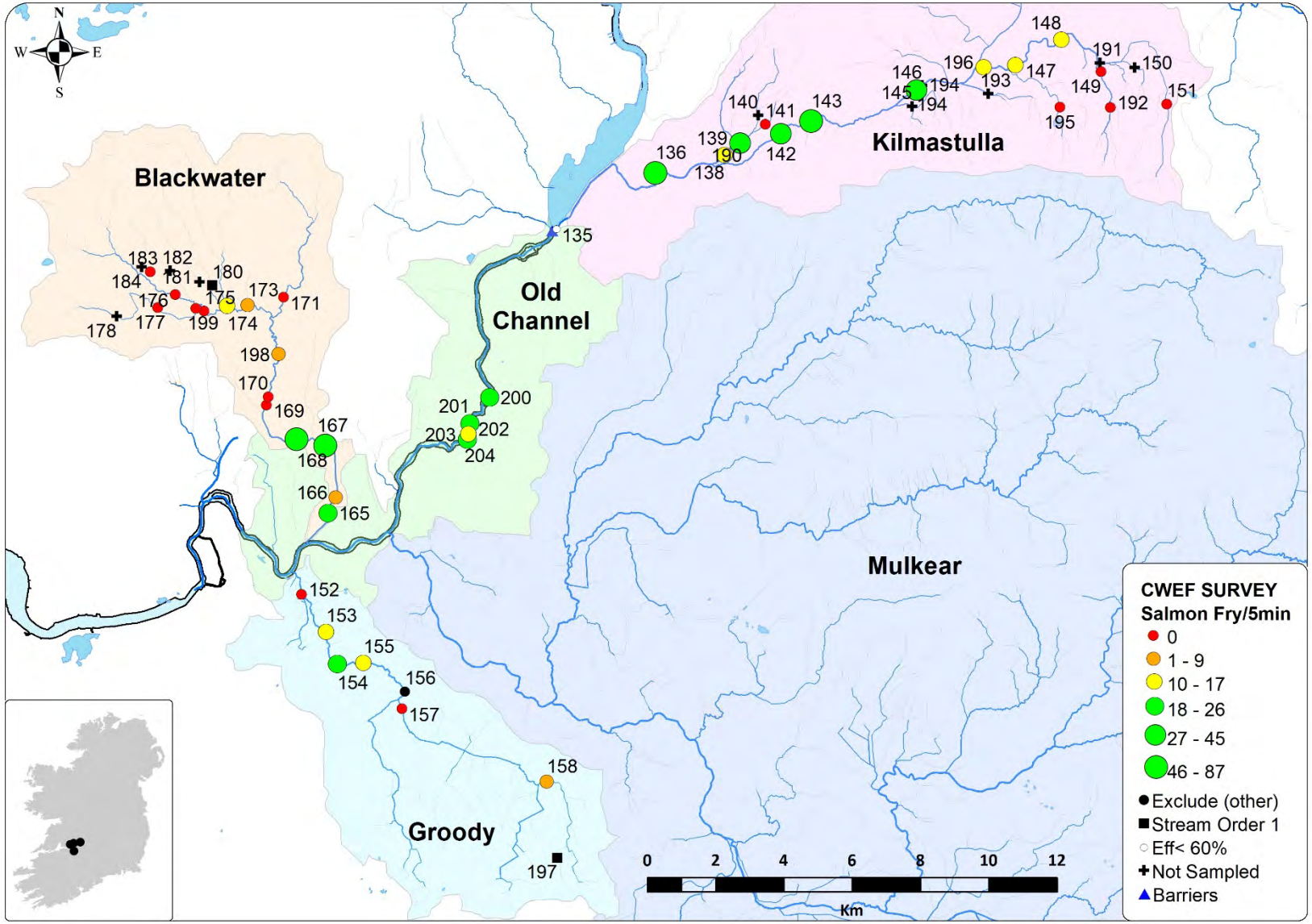
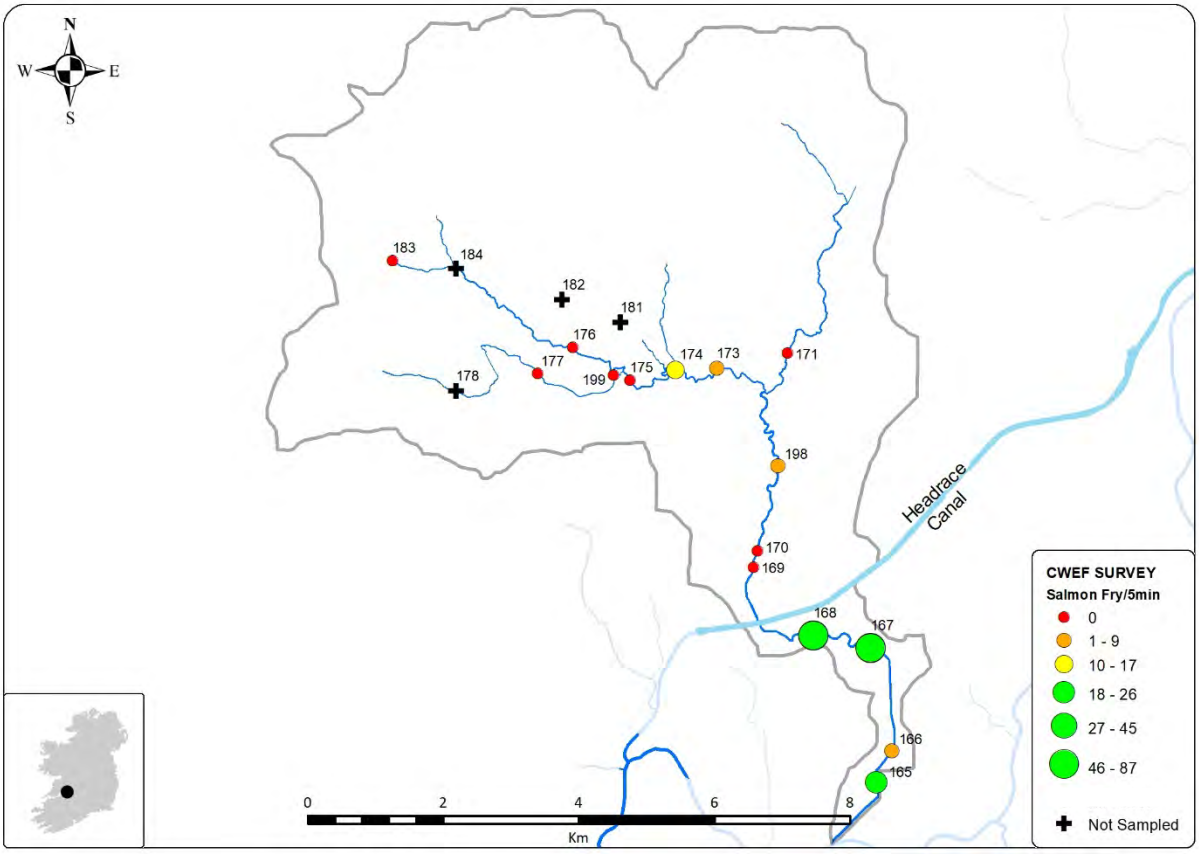
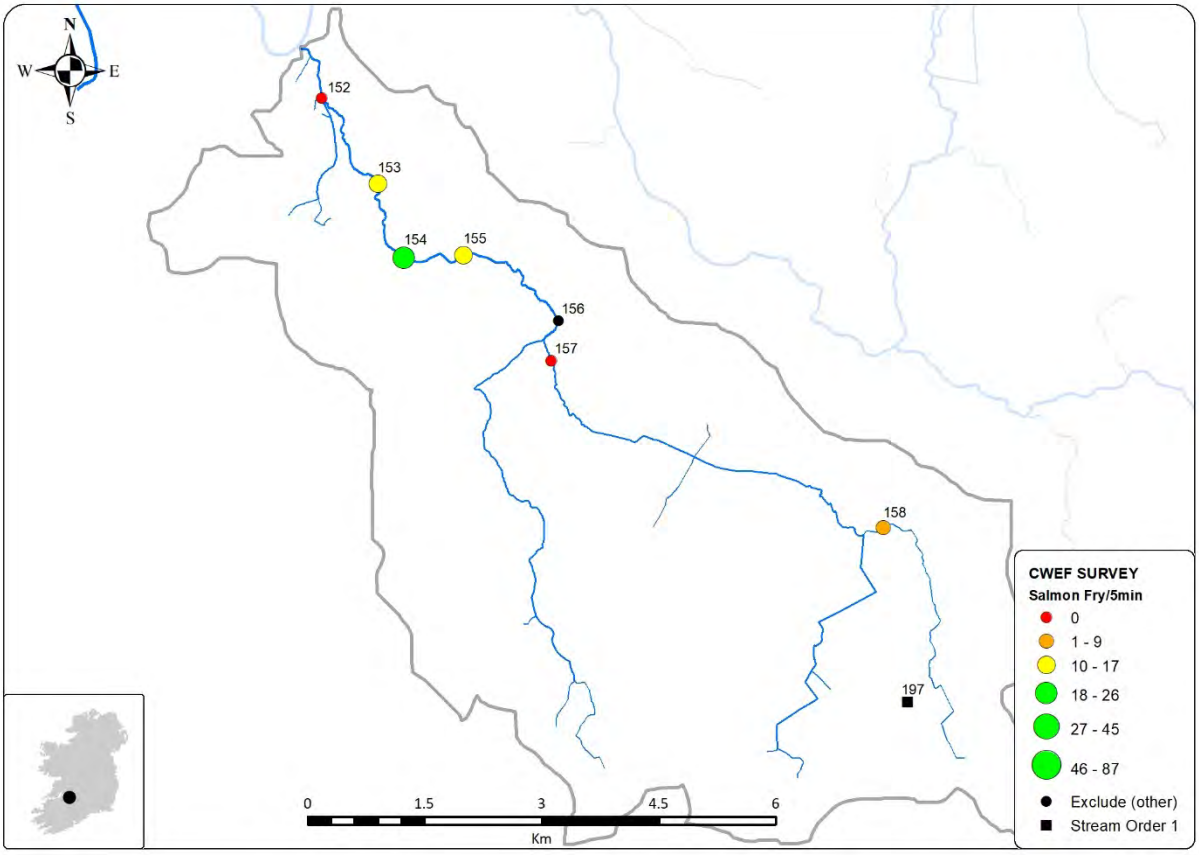


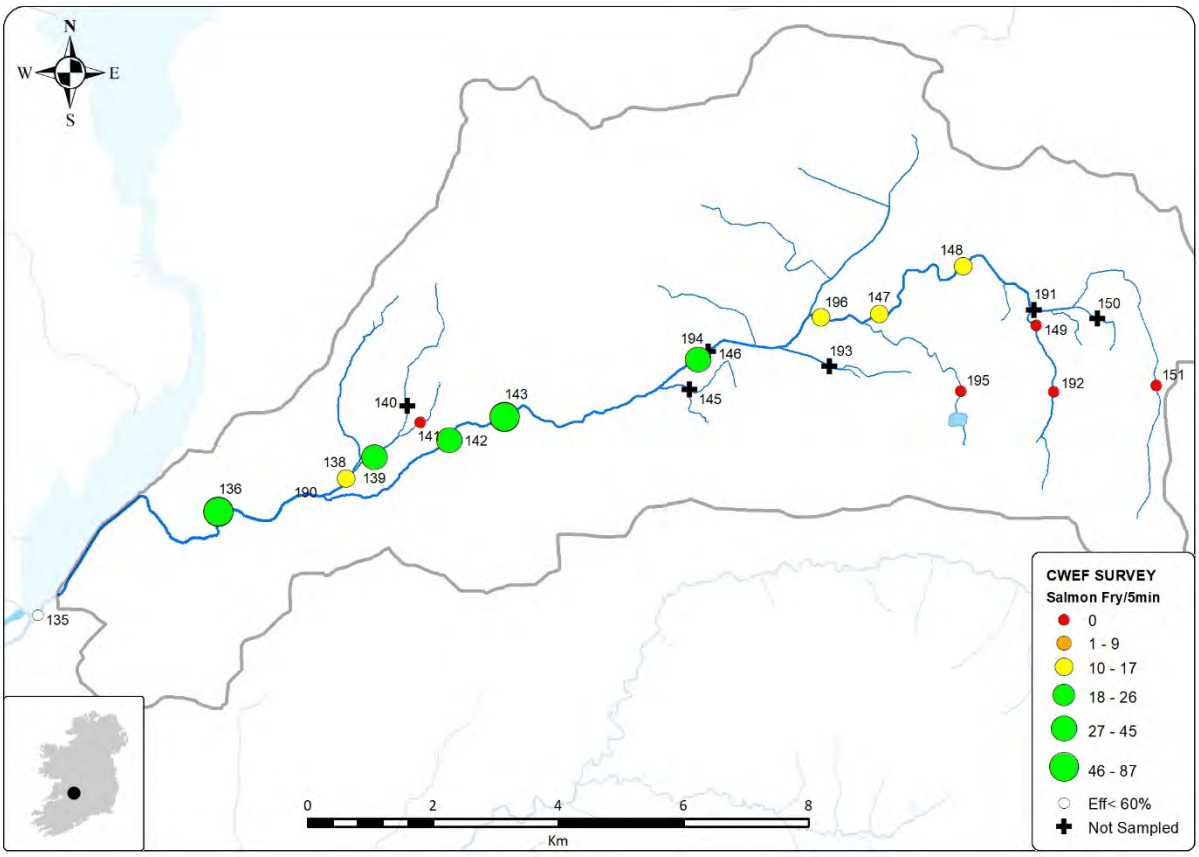
Figure A.5.2.1: Salmon fry abundance by site (no. fry/5min) for Kilmastula, Blackwater and Groody sub-catchments sampled on dates from 15-24 August 2018. Coloured circles indicate abundance; + indicates sites visited but not fished as unsuitable.

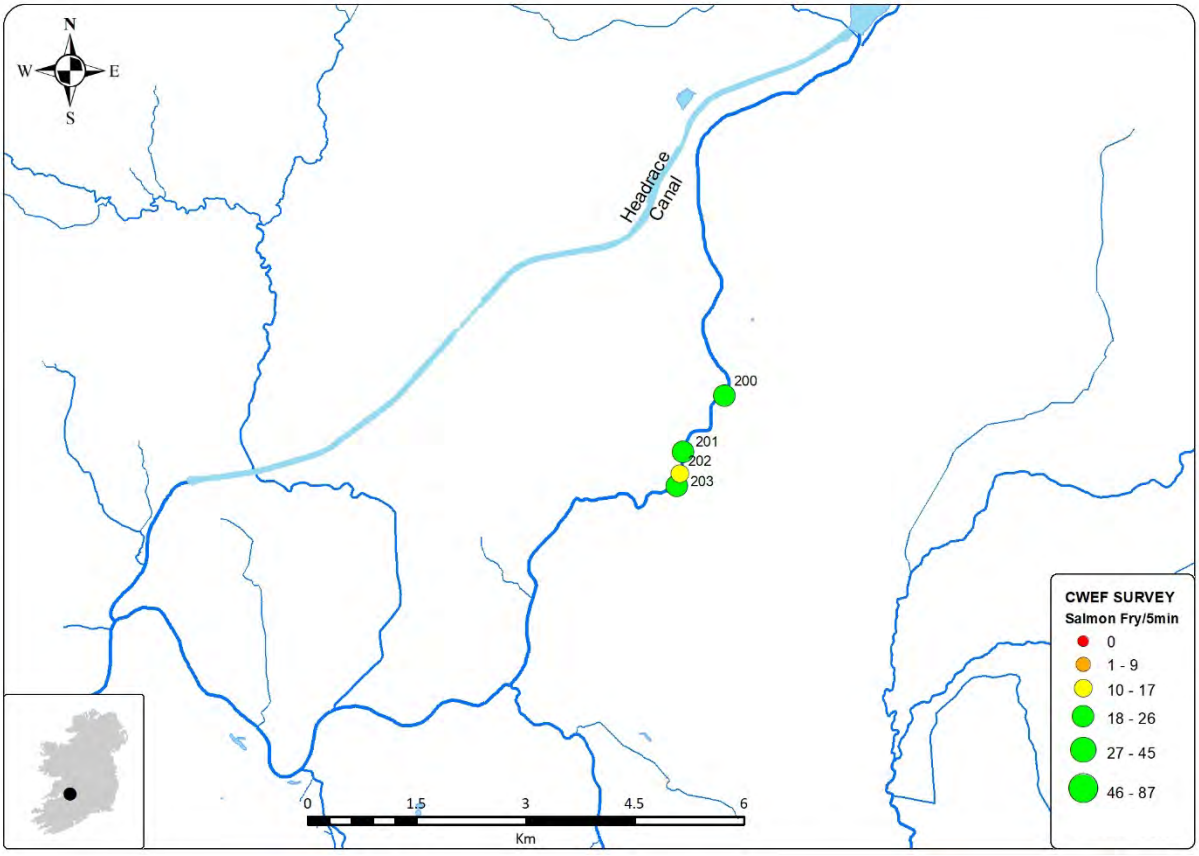
Figures A.5.2.2 & A.5.2.3: Salmon fry abundance by site (no. fry/5min) for the Blackwater (top) and Groody (bottom) sub-catchments sampled on dates in August 2018. Coloured circles indicate abundance; + indicates sites visited but not fished as unsuitable for either salmon or electrofishing.





Figures A.5.2.4 & A.5.2.5: Salmon fry abundance by site (no. fry/5min) in the Kilmastula sub-catchment sampled on dates in August 2018 (top), and the old main channel sampled in August 2018 (bottom). Coloured circles indicate abundance; + indicates sites visited but not fished as unsuitable for either salmon or electrofishing.





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. The most recent ten years' data are presented (Table A.6.1). At present six rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2018, seven CWEF surveys were undertaken. These were conducted on the Kilcolgan, Owenriff, Knock, Erriff, Cloonaghmore, and on the small catchment of the Oranmore stream.

Table A.6.1: Catchment-wide Electrofishing data for the 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.

	Survey Year												
Code/River	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Current Index	# Annual Surveys Considered
145/Kilcolgan		**2.51**									**0.79**	1.65	2
146/Clarinbridge				**7.26**								7.26	1
147/Owenriff(Corb.)											10.3*	15.75	1
148/Knock				**12.53**							1.5*	12.53	1
149/Owenboliska	**4.06**						**4.52**				**0.6**	3.06	3
152/Cashla						**10.83**						10.83	1
154/L. Na Furnace								**0.00**				0.00	1
155/Screeb										**10.7**		10.70	1
163/Owenglin		**11.57**										11.57	1
167/Culfin	30.83											30.83	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**	22.33	5
171/Carrownisky	**18.25**				**20.60**	**18.22**				4.2*		19.02	3
172/Bunowen		**13.62**										13.62	1
173/Owenwee			**8.47**	**7.25**	**15.27**							10.33	3
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	8.96		**9.71**	**22.27**	**17.32**	**15.02**				5.1*	**14.63**	15.79	5
196/Brusna		**4.70**				**14.16**	**14.74**					11.20	3
198/Leaffony		**7.95**						**1.87**				5.19	3
203/Garvogue	**13.26**	**16.83**	**11.31**	**7.08**	**18.54**							13.40	5
205/Drumcliff			**17.72**									17.72	1
207/Grange		**3.29**						**4.56**				4.53	3
1461/Oramnore											**0.63**	0.63	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.

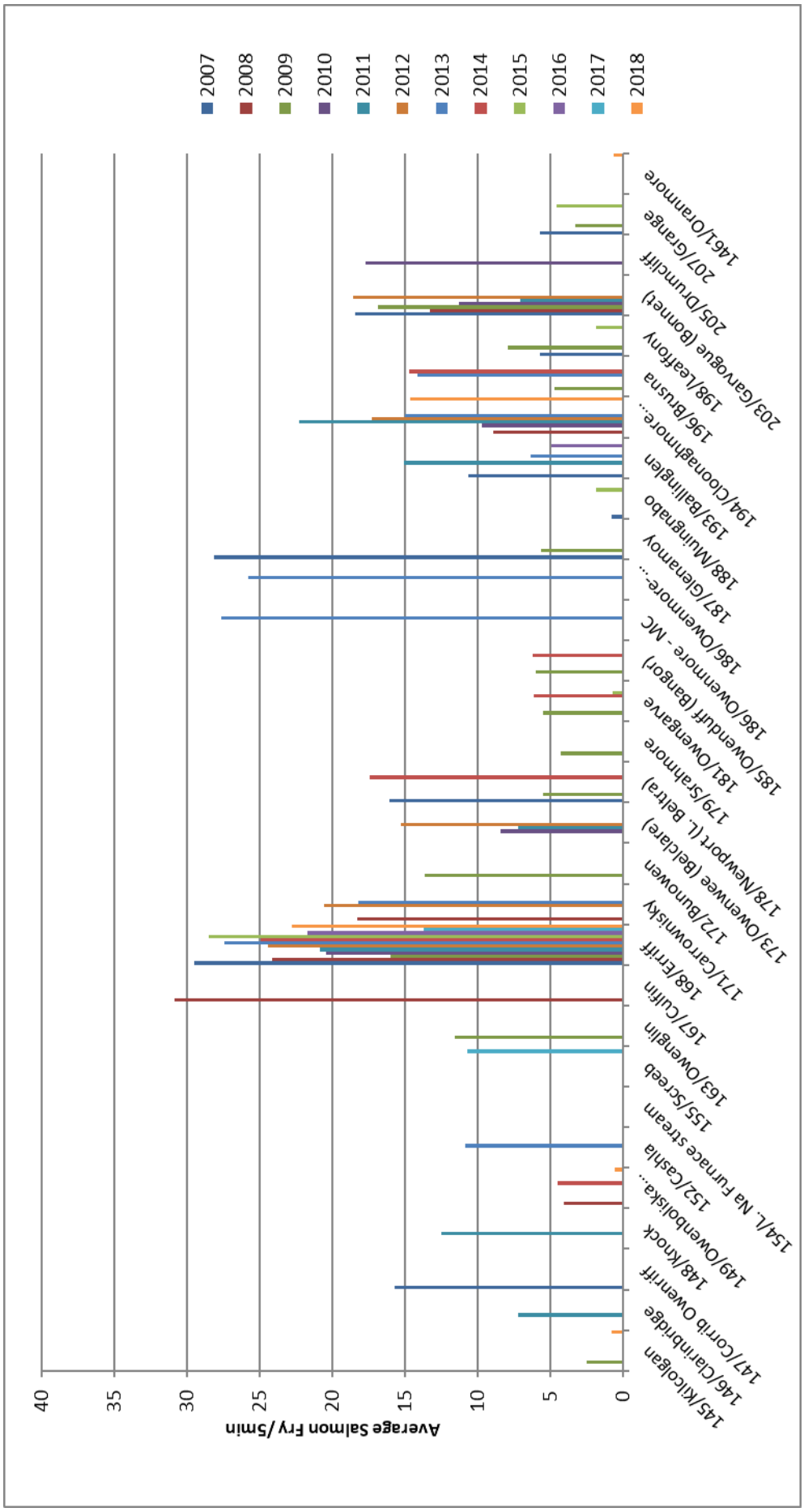


Figure A.6.1: Summary of CWEF results in Western River basin district 2007-2018.

A.6.1. River Kilcolgan

IFI Salmon Catchment #: 145
2018 survey dates: 4 – 13/9/17
Mean Salmon Fry/5 min (2018): 0.79 fry/5min.
CWEF Index: 1.65 fry/5min.

Sampling carried out by:
Bil Keane
Tim Hughes
Tony McQuinn

Fish Species Present:

Brown Trout	Pike
Crayfish	Salmon
European Eel	Stone Loach
Gudgeon	3-spined Stickleback
Minnow	

Figure A.6.1.1: Length distribution of salmon captured in 2018 CWEF survey on the Kilcolgan Catchment.

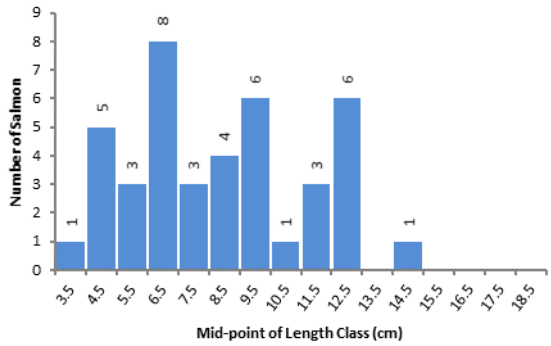


Figure A.6.1.2: Comparison of mean salmon fry/5min for all surveys on the Kilcolgan catchment to 2018.

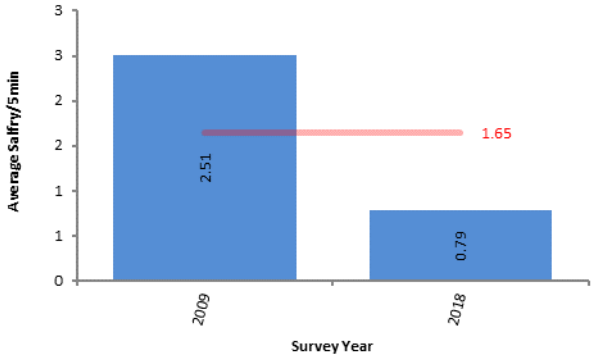


Table A.6.1.1: Conservation limits and provisional returns on the Kilcolgan catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2008	2009	1681	-670	Closed	35					4.64	2.51
2009	2010	1681	-774	Closed							
2010	2011	1681	-696	Closed							
2011	2012	1681	-696	Closed							
2012	2013	1681	-696	Closed							
2013	2014	2070	-1237	Closed							
2014	2015	2072	-1239	Closed							
2015	2016	2072	-1239	Closed							
2016	2017	2072	-1239	Closed	10						
2017	2018			Closed	30				4	4.78	0.79

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit; * = Incomplete Surveys.

This, the second CWEF survey of this catchment in the 2007 to 2018 period, was carried out during September 2018. The survey comprised 30 sites, all of which were included in the analysis. Salmon fry were observed at nine sites, he maximum fry catch was 5 salmon at site 8. The mean catch of included sites was 0.79 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm. Habitat enhancement works had been undertaken at a number of sites in the catchment in 2018,

this disturbance may have may have led to a temporary reduction in salmon fry numbers at those sites this year.

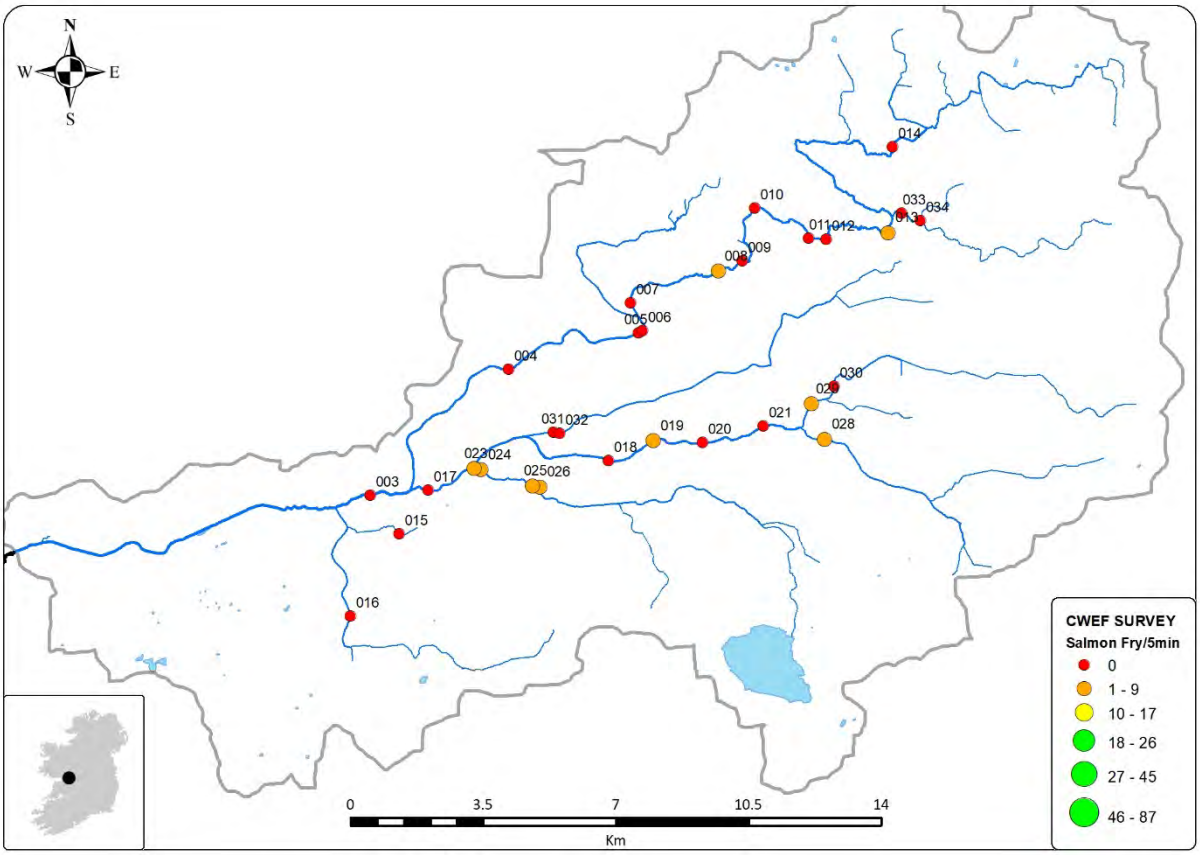
Conclusion

The Kilcolgan had a mean catch of 0.79 salmon fry/5min in 2018. Taking the only previous complete survey in to account this results in a cumulative average of 1.65 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.6.1.2 Site specific results of CWEF on the Kilcolgan catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
003	M 51065 19929	5	0	0	0	Include	0.00	**0.00**
004	M 54707 23253	4	3	0	0	Include	0.00	**0.00**
005	M 58135 24211	4	1	0	0	Include	0.00	**0.00**
006	M 58239 24259	4	2	0	0	Include	0.00	**0.00**
007	M 57930 25003	4	2	1	0	Include	2.00	**0.00**
008	M 60247 25834	4	2	4	5	Include	4.89	**6.11**
009	M 60885 26110	4	2	6	0	Include	6.00	**0.00**
010	M 61211 27496	4	2	1	0	Include	4.00	**0.00**
011	M 62627 26700	4	2	1	0	Include	1.00	**0.00**
012	M 63097 26669	4	2	0	0	Include	0.00	**0.00**
013	M 64729 26843	4	2	3	2	Include	3.60	**2.40**
014	M 64846 29110	4	3	0	0	Include	0.00	**0.00**
015	M 51822 18906	2	3	3	0	Include	3.00	**0.00**
016	M 50535 16739	3	2	2	0	Include	2.00	**0.00**
017	M 52585 20060	4	3	1	0	Include	1.00	**0.00**
018	M 57343 20837	4	2	7	0	Include	14.00	**0.00**
019	M 58531 21358	4	1	2	1	Include	2.00	**1.00**
020	M 59827 21314	4	2	6	0	Include	6.00	**0.00**
021	M 61435 21747	4	0	15	0	Include	15.00	**0.00**
023	M 53798 20624	3	1	5	2	Include	7.86	**3.14**
024	M 53976 20595	3	1	0	4	Include	0.00	**4.00**
025	M 55344 20166	3	1	0	1	Include	0.00	**1.00**
026	M 55541 20141	3	2	0	3	Include	0.00	**4.00**
028	M 63054 21393	3	2	7	1	Include	7.00	**1.00**
029	M 62698 22333	3	2	2	1	Include	2.00	**1.00**
030	M 63298 22801	3	3	1	0	Include	1.00	**0.00**
031	M 55896 21589	3	40	5	0	Include	8.00	**0.00**
032	M 56055 21560	3	2	3	0	Include	5.00	**0.00**
033	M 65081 27366	3	0	0	0	Include	0.00	**0.00**
034	M 65581 27165	2	2	2	0	Include	3.00	**0.00**
001	M 44182 18408	5	0	0	0	Not Sampled		
002	M 45493 18399	5	0	0	0	Not Sampled		
022	M 61706 21786	4	0	0	0	Not Sampled		
027	M 62233 18544	2	0	0	0	Not Sampled		

Map A.6.1.1: Showing locations of 2018 survey sites on Kilcolgan River.



A.6.2. River Oranmore

IFI Salmon Catchment #: --
2018 survey dates: 24/9/2018
Mean Salmon Fry/5 min (2018): 0.63 fry/5min.
CWEF Index: 0.63 fry/5min.

Sampling carried out by:
Bill Keane
Willie Roche

Fish Species Present:

Brown Trout	Lamprey sp.
European Eel	Salmon
Flounder	3-Spined Stickleback

Figure A.6.2.1: Length distribution of salmon captured in 2018 CWEF survey on the Oranmore Catchment.

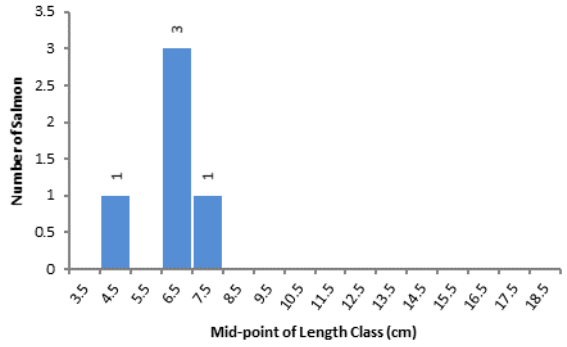
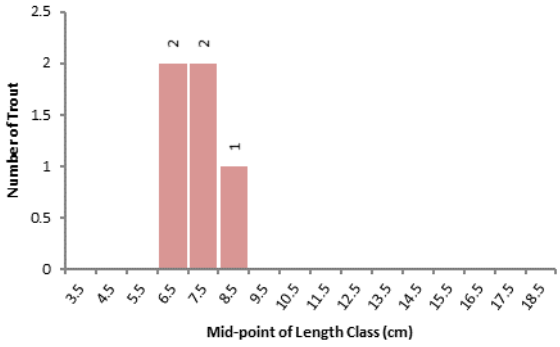


Figure A.6.2.2: Length distribution of brown trout captured in 2018 CWEF survey on the Oranmore Catchment.



This the first CWEF survey on this small stream carried out on the 24th of Sept 2018. This spring fed stream is not considered a significant producer of salmonids. The survey consisted of six sites, salmon fry were present at 3 sites, the maximum being 2 fry at site 4. The modal length category of 0+ fry caught was 6.5cm. Brown trout were present at two sites, the maximum being 3 fry at site 3.

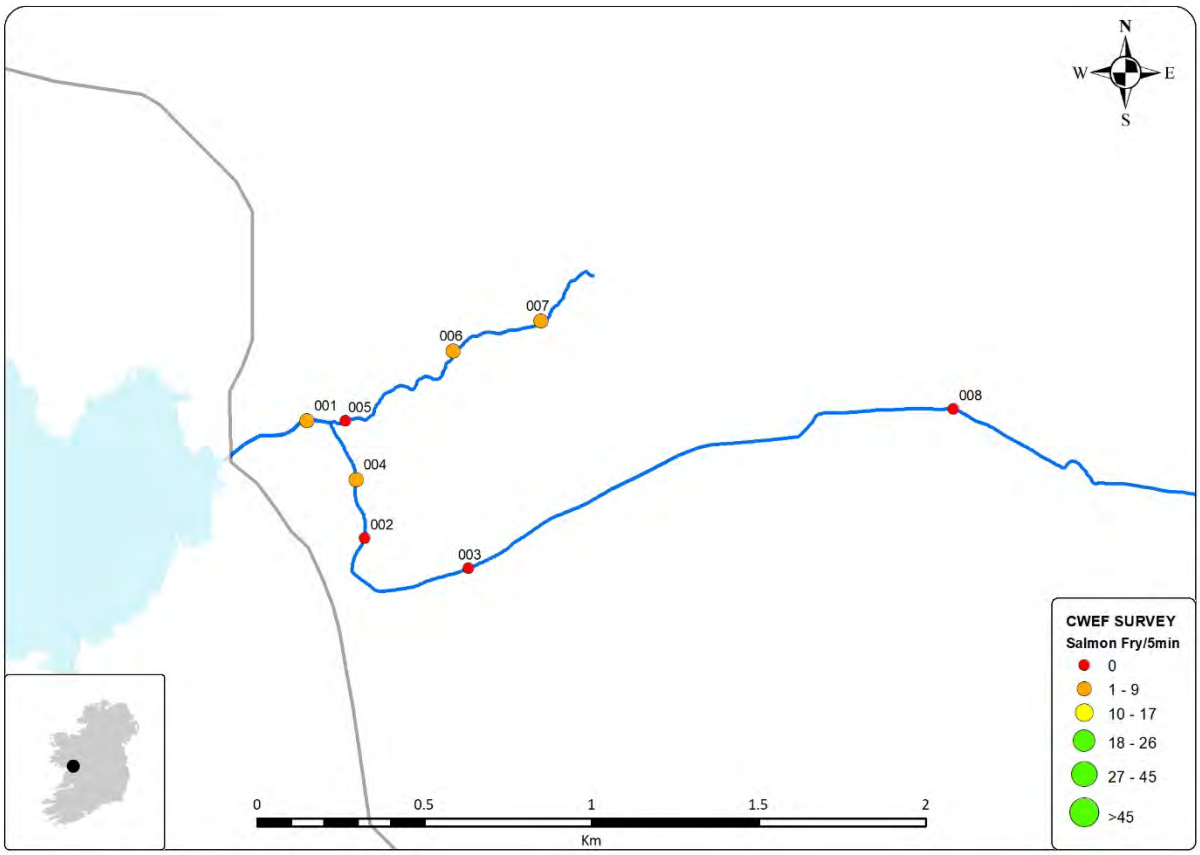
Conclusion

Very small numbers of salmon and trout were observed in the Oranmore stream.

Table A.6.2.1: CWEF results of CWEF on the Oranmore catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
1	M 38031 24973	2	2	0	1	Include	0.00	1.00
2	M 38204 24623	1	3	2	0	Include	2.00	0.00
3	M 38514 24533	1	3	3	0	Include	3.00	0.00
4	M 38179 24798	1	1	0	2	Include	0.00	2.00
5	M 38147 24973	1	3	0	0	Include	0.00	0.00
6	M 38468 25182	1	3	0	1	Include	0.00	1.00

Map A.6.2.1: Showing locations of 2018 survey sites on the Oranmore River



A.6.3. River Owenboliska (Spiddal)

IFI Salmon Catchment #: 179
2018 survey dates: 21 - 29/8/2018
Mean Salmon Fry/5 min (2018): 0.60 fry/5min.
CWEF Index: 3.06 fry/5min.

Sampling carried out by:
Barry Kelly
Bill Keane
Tony McQuinn

Fish Species Present:
Brown Trout
Salmon

Figure A.6.3.1: Length distribution of salmon captured in 2018 CWEF survey on the Owenboliska Catchment.

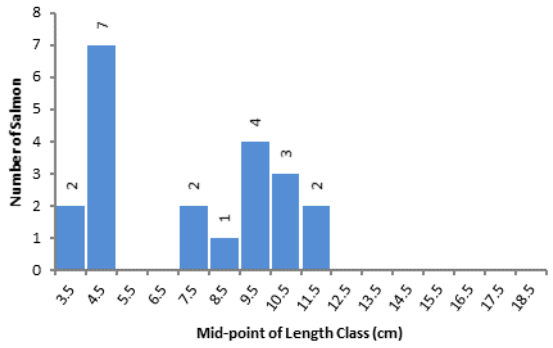


Figure A.6.3.2: Comparison of mean salmon fry/5min for all surveys on the Owenboliska catchment to 2018.

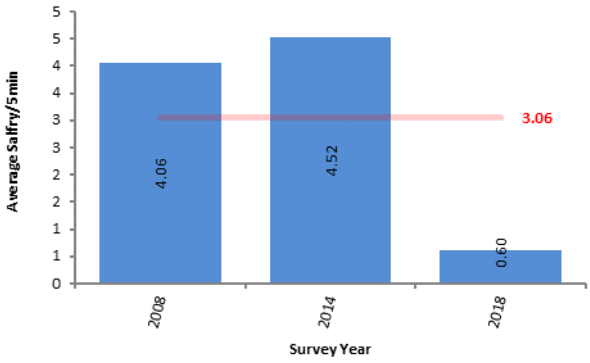


Table A.6.3.1: Conservation limits and provisional returns on the Owenboliska catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	550	-241	Closed	21		6			2.15	4.06
2008	2009	550	-241	Closed							
2009	2010	550	-267	Closed							
2010	2011	550	-241	Closed							
2011	2012	550	-241	Closed							
2012	2013	550	-241	Closed							
2013	2014	593	-352	Closed	21					2.77	4.52
2014	2015	598	-354	Closed							
2015	2016	598	-339	Closed							
2016	2017	598	-388	Closed							
2017	2018	598	-411	Closed	19			1		2.91	0.60

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the third CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August 2018. The Survey comprised 20 site 19 of which were used in the analysis. Salmon fry were present at just two sites. The maximum fry catch was 9 salmon at site 24. The mean catch of included sites was 0.6 salmon fry/5min The modal length of +0 salmon was 4.5cm.

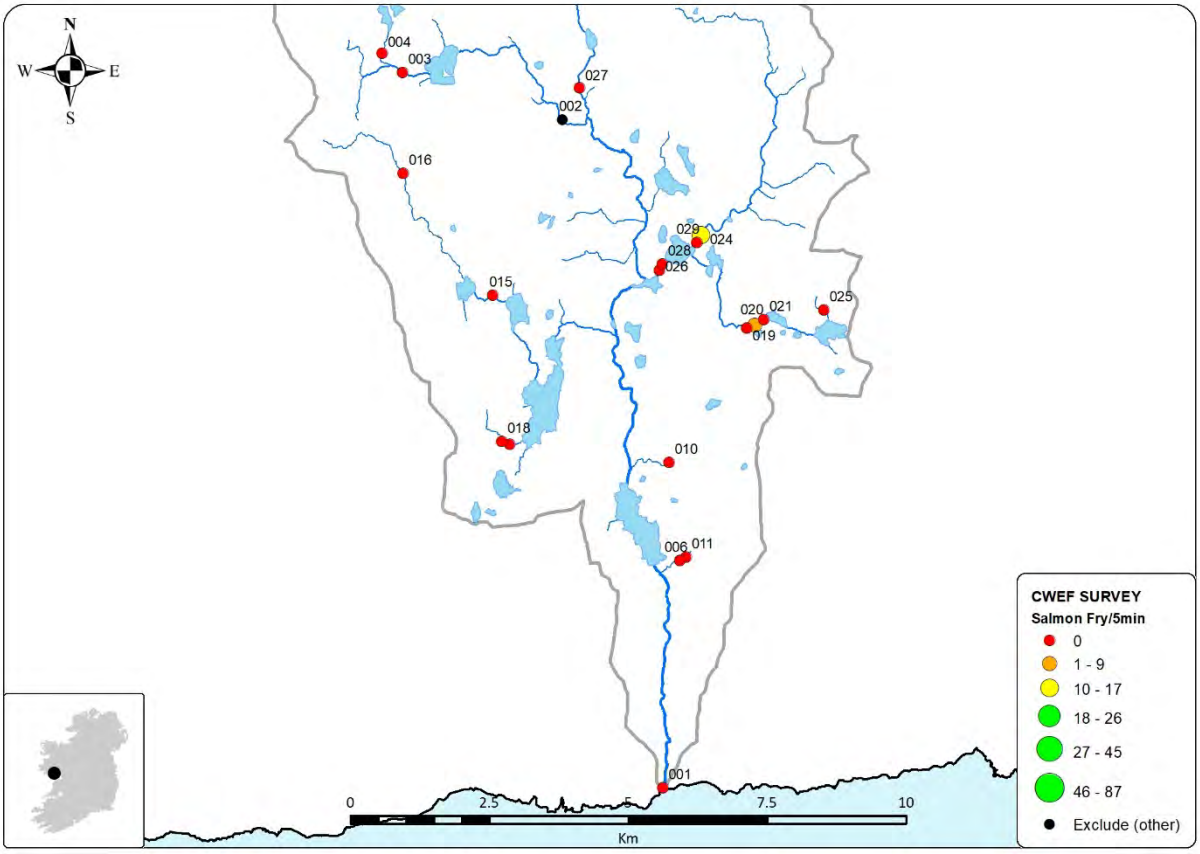
Table A.6.3.2: Site specific results of CWEF on the Owenboliska catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	M 12684 22167	5	3	0	0	Include	0.00	0.00
002	M 10872 34230	3	2	1	0		Water Too High	
003	M 07994 35078	3	1	8	0	Include	12.00	0.00
004	M 07630 35422	2	0	3	0	Include	6.00	0.00
006	M 12990 26273	2	2	9	0	Include	9.00	0.00
010	M 12796 28036	2	2	5	0	Include	9.00	0.00
011	M 13104 26329	2	2	6	0	Include	9.00	0.00
013	M 09926 28366	2	2	9	0	Include	9.00	0.00
015	M 09619 31058	3	2	1	0	Include	3.00	0.00
016	M 08007 33257	2	3	6	0	Include	10.00	0.00
018	M 09783 28416	2	2	8	0	Include	8.00	0.00
019	M 14195 30461	3	3	6	0	Include	8.00	0.00
020	M 14343 30517	3	2	8	1	Include	9.78	1.22
021	M 14508 30620	3	2	13	0	Include	16.00	0.00
024	M 13374 32138	3	2	13	9	Include	14.77	10.23
025	M 15595 30791	2	2	4	0	Include	5.00	0.00
026	M 12621 31501	4	1	8	0	Include	11.00	0.00
027	M 11181 34801	3	2	8	0	Include	10.00	0.00

Conclusion

The Owenboliska had a mean catch of just 0.60 salmon fry/5min in 2018. Taking the three surveys into account this results in a cumulative average of 3.06 salmon fry/5min which is below the 17 salmon fry threshold. There has been a reduction in observed fry abundance since 2014.

Map A.6.3.1: Showing locations of 2018 survey sites on the Owenboliska River.



A.6.4. River Erriff

IFI Salmon Catchment #: 168
2018 survey dates: 25/8/2018 to 28/9/2018
Mean Salmon Fry/5 min (2018): 22.81 fry/5min.
CWEF Index: 22.33 fry/5min.

Sampling carried out by:
Donovan Brinklow
Luara Walsh
Luke Cameron
Paddy Gargan

Fish Species Present:
Brown Trout
European Eel
Minnow
Salmon
3-Spined Stickleback

Figure A.6.4.1: Length distribution of salmon captured in 2018 CWEF survey on the Erriff Catchment.

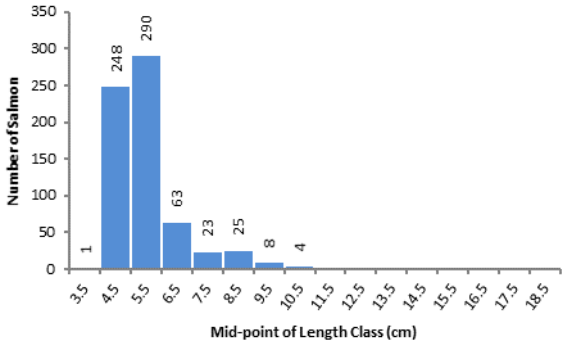


Figure A.6.4.2: Comparison of mean salmon fry/5min for all surveys on the Erriff catchment to 2018.

Table A.6.4.1: Conservation limits and provisional returns on the Erriff catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2008	2009	1299	2345	Open	33	16	2	2		2.68	16.03
2009	2010	1299	715	Open	46	2	2	1		2.78	20.43
2010	2011	1299	512	Open	32		1	1	1	4.05	20.86
2011	2012	1299	605	Open	33		1	1		4.05	24.45
2012	2013	1299	592	Open	33		1			4.17	27.45
2013	2014	1382	520	Open	34		1			4.05	24.90
2014	2015	1382	669	Open	35		1	1		3.83	28.52
2015	2016	1382	806	Open	33					4.30	21.72
2016	2017	1382	574	Open	33					4.30	13.69
2017	2018	1382	114	Open	33	1				4.17	22.81

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the twelfth CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August and September 2018. The survey comprised 34 sites, 33 of which were included in the analysis. Salmon fry were present at all sites. The maximum fry catch was 42 salmon at site 7. The mean catch of included sites was 22.81 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

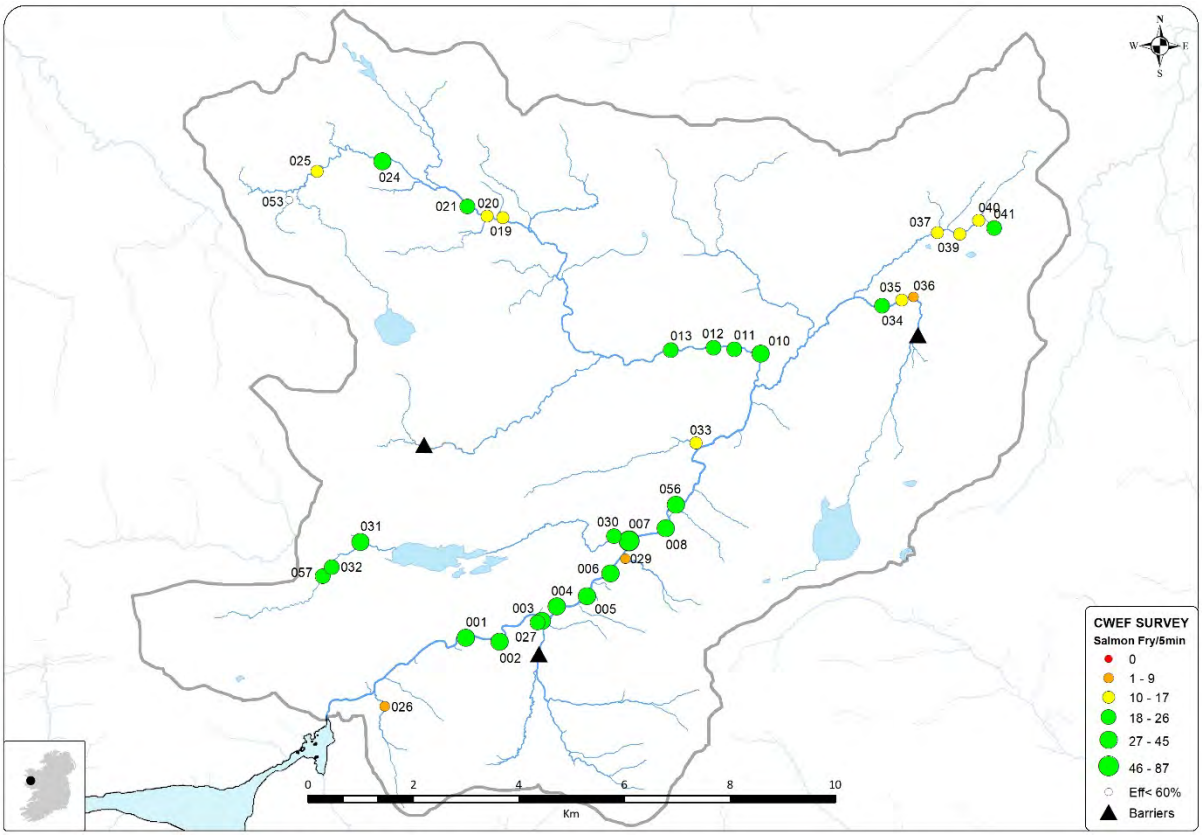
Conclusion

The Erriff had a mean catch of 22.81 salmon fry/5min in 2018. Taking the five most recent surveys into account this results in a cumulative average of 22.33 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.6.4.2: Site specific results of CWEF on the Erriff catchment in 2018.

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	0	0	30	Include	0.00	37.00
002	L 92702 65721	5	0	0	32	Include	0.00	38.00
003	L 93503 66122	5	0	0	23	Include	0.00	30.00
004	L 93784 66390	5	0	0	27	Include	0.00	35.00
005	L 94352 66589	5	0	0	31	Include	0.00	37.00
006	L 94798 67019	5	0	0	29	Include	0.00	42.00
007	L 95142 67641	5	0	0	42	Include	0.00	49.00
008	L 95846 67875	5	0	0	28	Include	0.00	33.00
010	L 97630 71190	4	0	0	22	Include	0.00	28.00
011	L 97125 71269	4	0	1	18	Include	1.26	22.74
012	L 96732 71295	4	0	0	15	Include	0.00	18.00
013	L 95919 71252	4	0	0	15	Include	0.00	18.00
019	L 92739 73748	4	0	0	10	Include	0.00	13.00
020	L 92438 73774	4	0	1	9	Include	1.30	11.70
021	L 92057 73962	4	0	0	16	Include	0.00	18.00
024	L 90454 74809	3	0	0	25	Include	0.00	29.00
025	L 89216 74612	3	0	0	13	Include	0.00	16.00
026	L 90525 64492	3	0	0	6	Include	0.00	7.00
027	L 93408 66092	4	0	0	17	Include	0.00	24.00
029	L 95076 67299	3	0	0	7	Include	0.00	9.00
030	L 94855 67725	3	0	0	14	Include	0.00	18.00
031	L 90058 67605	3	0	5	24	Include	6.03	28.97
032	L 89506 67128	2	0	3	14	Include	3.71	17.29
033	L 96407 69493	3	0	0	10	Include	0.00	13.00
034	L 99926 72098	4	0	0	17	Include	0.00	22.00
035	M 00301 72204	4	0	0	14	Include	0.00	17.00
036	M 00529 72263	4	0	3	3	Include	4.00	4.00
037	M 00973 73488	3	0	0	7	Include	0.00	10.00
039	M 01401 73456	3	0	1	10	Include	1.27	12.73
040	M 01753 73717	3	0	1	10	Include	1.27	12.73
041	M 02046 73578	2	0	0	16	Include	0.00	21.00
056	L 96034 68324	5	0	0	31	Include	0.00	40.00
057	L 89337 66953	2	0	2	16	Include	2.56	20.44
053	L 88685 74071	2	0	0	4	Eff <60%		

Map A.6.4.1: Showing locations of 2018 survey sites on the Erriff River.



A.6.5. River Cloonaghmore

IFI Salmon Catchment #: 194
2018 survey dates: September 2018
Mean Salmon Fry/5 min (2018): 14.63 fry/5min.
CWEF Index: 15.73 fry/5min.

Sampling carried out by:
Brian Flannery
Declan Doherty
Seamus Murphy

Fish Species Present:
Brown Trout
European Eel
Minnow
Salmon
3-Spined Stickleback

Figure A.6.5.1: Length distribution of salmon captured in 2018 CWEF survey on the Cloonaghmore Catchment.

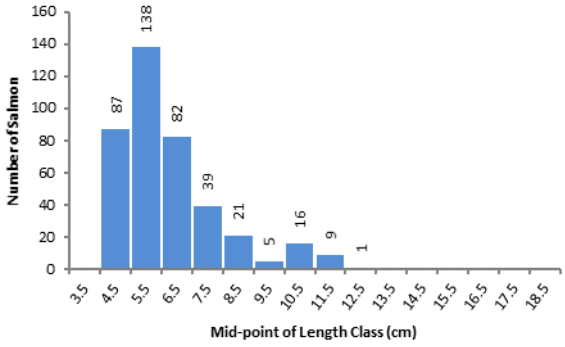


Figure A.6.5.2: Comparison of mean salmon fry/5min for all surveys on the Cloonaghmore catchment to 2018.

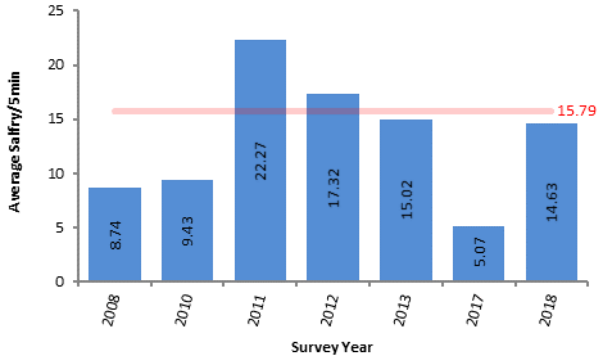


Table A.6.5.1: Conservation limits and provisional returns on the Cloonaghmore catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	1260	-752	Closed	41	1				2.87	8.74
2008	2009	1260	-753	Closed							
2009	2010	1260	-756	Closed	34					3.55	9.43
2010	2011	1260	-785	Closed	27	2			13	2.87	22.27
2011	2012	1260	-785	Closed	33					3.65	17.32
2012	2013	1260	-795	Closed	28	1				4.16	15.02
2013	2014	1324	-1099	Closed							
2014	2015	1323	-1098	Closed							
2015	2016	1323	-1098	Closed							
2016	2017	1323	-1098	C&R	28	1				4.16	5.07
2017	2018			Closed	27					4.46	14.63

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the seventh CWEF survey of this catchment in the 2007 to 2018 period, was carried out during Sept 2018. The survey comprised 27 sites, all of which were included in the analysis. Salmon fry were present at 25 sites. The maximum fry catch was 28 salmon at site 40. The mean catch of included sites was 14.63 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

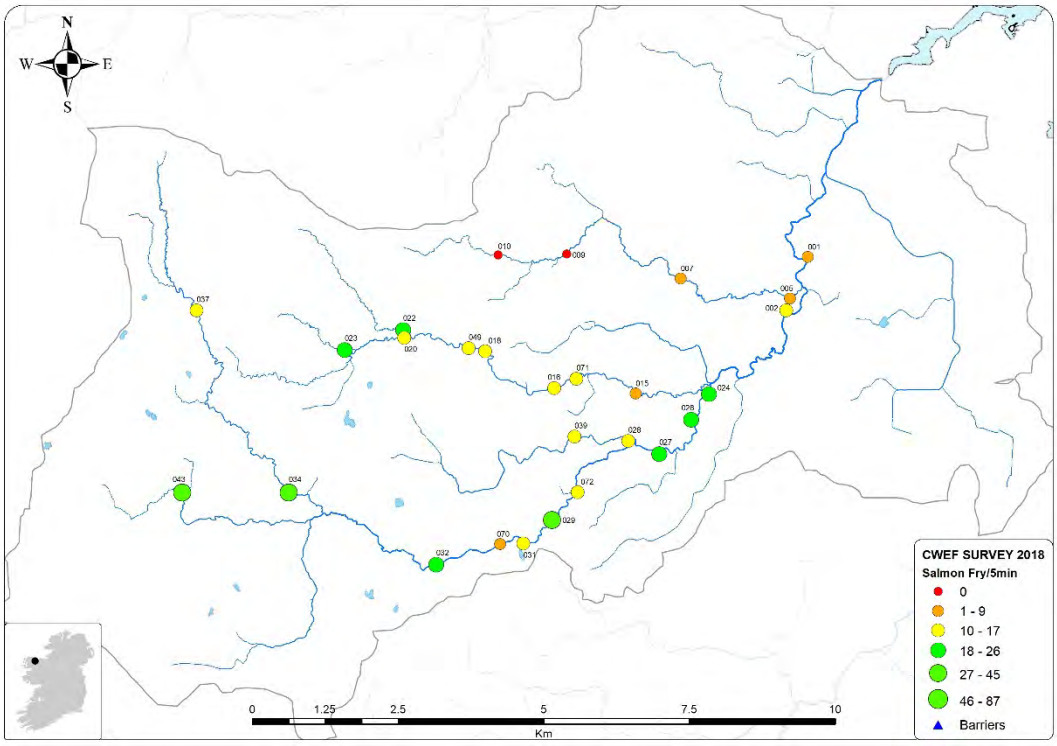
Conclusion

The Clooghnamore had a mean catch of 14.63 salmon fry/5min in 2018. Taking the five most recent surveys into account this results in a cumulative average of 17.53 salmon fry/5min which is above the 17 salmon fry threshold. There has been an improvement in salmon fry abundance since 2017.

Table A.6.5.2: Site specific results of CWEF on the Cloonaghmore catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	G 16050 28403	5	2	1	7	Include	1.25	8.75
002	G 15680 27490	5	1	1	12	Include	1.23	14.77
005	G 15747 27691	3	2	3	1	Include	3.75	1.25
007	G 13868 28036	3	1	5	1	Include	6.67	1.33
009	G 11910 28454	3	2	8	0	Include	9.00	0.00
010	G 10732 28438	2	1	0	0	Include	0.00	0.00
015	G 13098 26063	3	1	1	6	Include	1.29	7.71
016	G 11699 26154	3	2	0	9	Include	0.00	12.00
018	G 10509 26788	3	2	5	13	Include	5.83	15.17
020	G 09121 27018	3	2	6	14	Include	7.20	16.80
022	G 09100 27149	2	2	1	21	Include	1.09	22.91
023	G 08100 26808	2	0	3	21	Include	3.25	22.75
024	G 14353 26050	4	1	0	22	Include	0.00	24.00
026	G 14045 25612	4	1	1	16	Include	1.24	19.76
027	G 13497 25020	4	1	0	22	Include	0.00	25.00
028	G 12967 25245	3	2	2	8	Include	2.60	10.40
029	G 11659 23888	4	1	0	28	Include	0.00	32.00
031	G 11165 23485	4	1	1	10	Include	1.36	13.64
032	G 09669 23122	4	1	0	20	Include	0.00	24.00
034	G 07140 24360	3	1	3	26	Include	3.62	31.38
037	G 05556 27487	3	3	0	8	Include	0.00	10.00
039	G 12047 25320	3	2	3	13	Include	3.56	15.44
043	G 05310 24362	2	1	0	24	Include	0.00	27.00
049	G 10226 26840	3	1	3	10	Include	3.69	12.31
070	G 10768 23476	4	2	1	5	Include	1.33	6.67
071	G 12078 26314	3	1	0	9	Include	0.00	10.00
072	G 12098 24368	4	2	0	8	Include	0.00	10.00

Map A.6.5.1: Showing locations of 2018 survey sites on the Clooghnamore



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. The most recent ten years' data are presented (Table A.7.1). At present eleven rivers are meeting the threshold of 17 salmon fry per 5min. In this region in 2018 CWEF seven surveys were undertaken. These were in the Duff, Erne, Eske, Glen, Owenea, Leannan and Crana.

Table A.7.1: Catchment-wide Electrofishing data for the North 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.

	Survey Year												
Code/River	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Current Index**	**# Annual Surveys Considered**
208/Duff	**9.31**	**18.59**	**25.16**							**18.05**	**20.34**	18.29	5
210/Erne	7.37	0.17	0.08	0.00	0.00	0.00	1.60	1.16	1.25	0	0.24		
211/Abbey						**7.20**	**28.14**					17.67	2
212/Ballintra		**10.27**				**13.40**	**18.30**					13.99	3
213/Laghy		**8.58**				**14.97**	**11.02**					11.52	3
214/Eske	**13.10**	**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**		20.10	3
219/Glen (Ballyshannon)			**19.44**					**18.37**			**18.56**	18.79	3
220/Owenwee (Yellow R)	**5.00**	**14.81**			**20.31**	**19.65**						16.78	5
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
226/Owenamarve		**3.76**				**2.64**	**1.00**					2.47	3
228/Gweedore (Crolly R.)	**15.99**			**11.32**								13.66	2
229/Clady	**16.12**				**37.21**							26.67	2
234/Glenna		**16.80**		**3.77**		**7.77**			**4.00**			8.09	4
235/Tullaghobegly	**8.33**		**9.05**						0.0*			8.69	2
236/Ray	**6.43**			**14.89**			**17.31**		3.7*			12.88	3
240/Lackagh	**18.86**	**15.82**		**19.20**	**23.57**				17.5*	**22.5**		19.99	5
248/Leannan	7.41	8.73	16.71	12.36	21.51	**19.51**	**20.87**	**15.27**	15.1*	**18.66**	**20.11**	18.88	5
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**									5.34	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	**16.61**		**6.59**					**4.21**				9.14	3
257/Straid			**0.20**					**0.00**				0.10	2
258/Donagh			**4.25**					**0.68**				2.47	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.

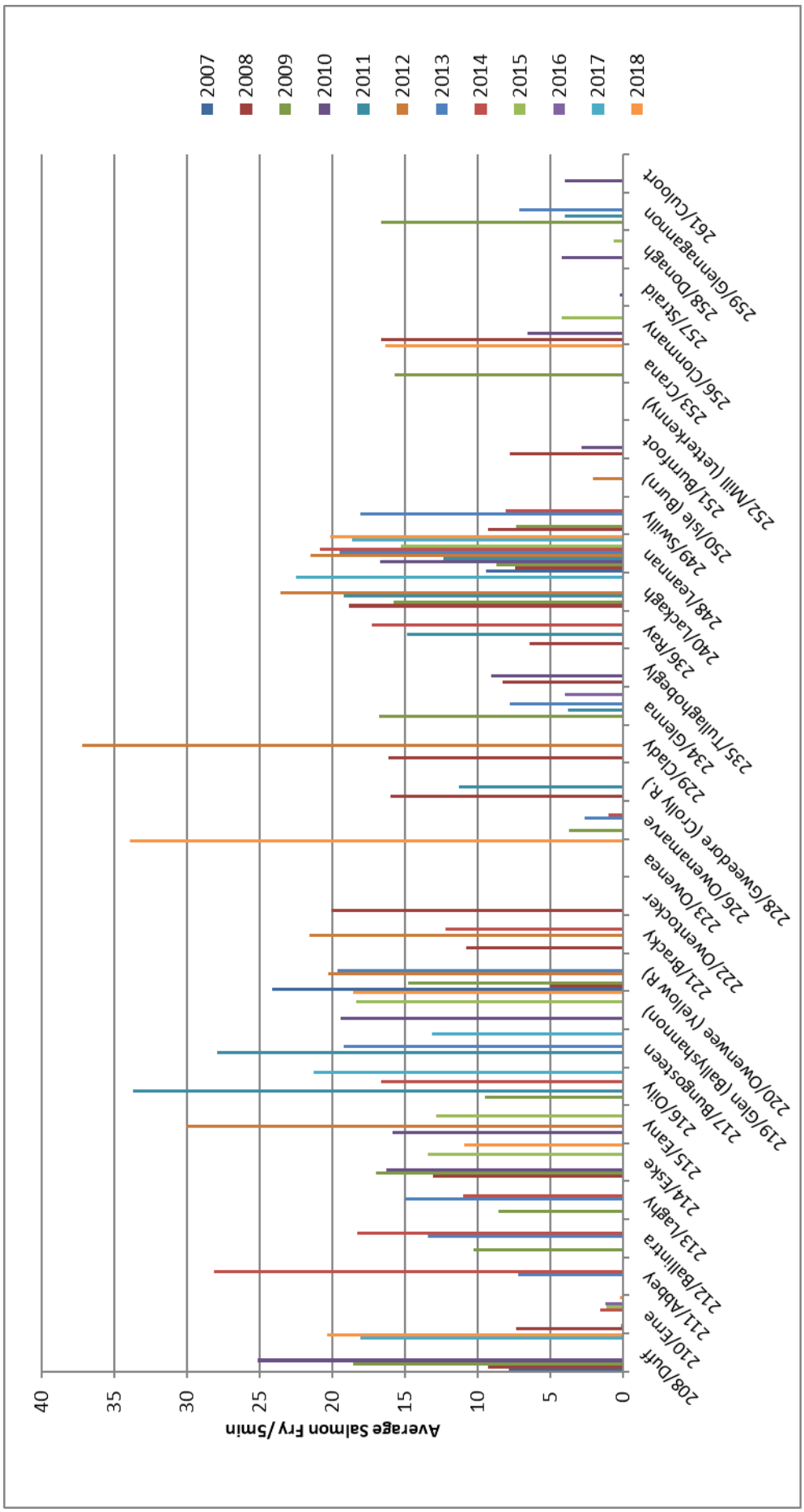


Figure A.7: Summary of CWEF results in North Western River basin district 2007-2018.

A.7.1. River Duff

IFI Salmon Catchment #: 208
2018 survey dates: 7 – 8/8/2018
Mean Salmon Fry/5 min (2018): 20.34 fry/5min.
CWEF Index: 18.29 fry/5min.

Sampling carried out by:
Cillian Murphy
Dara Timpson

Fish Species Present:
Brown Trout
Salmon

Figure A.7.1.1: Length distribution of salmon captured in 2018 CWEF survey on the Duff Catchment.

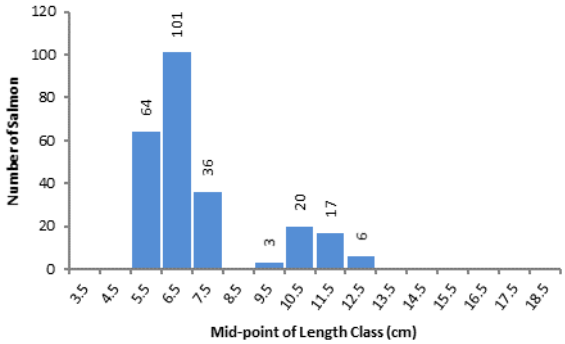


Figure A.7.1.2: Comparison of mean salmon fry/5min for all surveys on the Duff catchment to 2018.

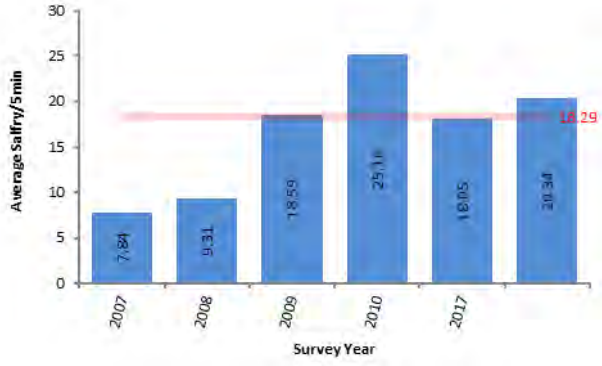


Table A.7.1.1: Conservation limits and provisional returns on the Duff catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	100	1	Open	11					8.77	7.84
2007	2008	1181	478	Open	10					9.65	9.31
2008	2009	1181	472	Open	9					10.72	18.59
2009	2010	1181	309	Open	11					8.77	25.16
2010	2011	1181	1140	Open							
2011	2012	1181	788	Open							
2012	2013	1181	-61	Open							
2013	2014	1068	286	Open							
2014	2015	1066	305	Open							
2015	2016	1066	217	Open							
2016	2017	1066	-31	C&R	11					8.77	18.05
2017	2018	1066	-30	C&R	11					8.77	20.34

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the sixth CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August 2018. The survey comprised 11 sites, all of which were included in the analysis. Salmon fry were present at all sites. The maximum fry catch was 33 salmon at site 3. The mean catch of included sites was 20.34 salmon fry/5min. The modal length category of 0+ fry caught was 6.5cm. A number of >0+were caught; the modal length of that cohort was 11.5cm.

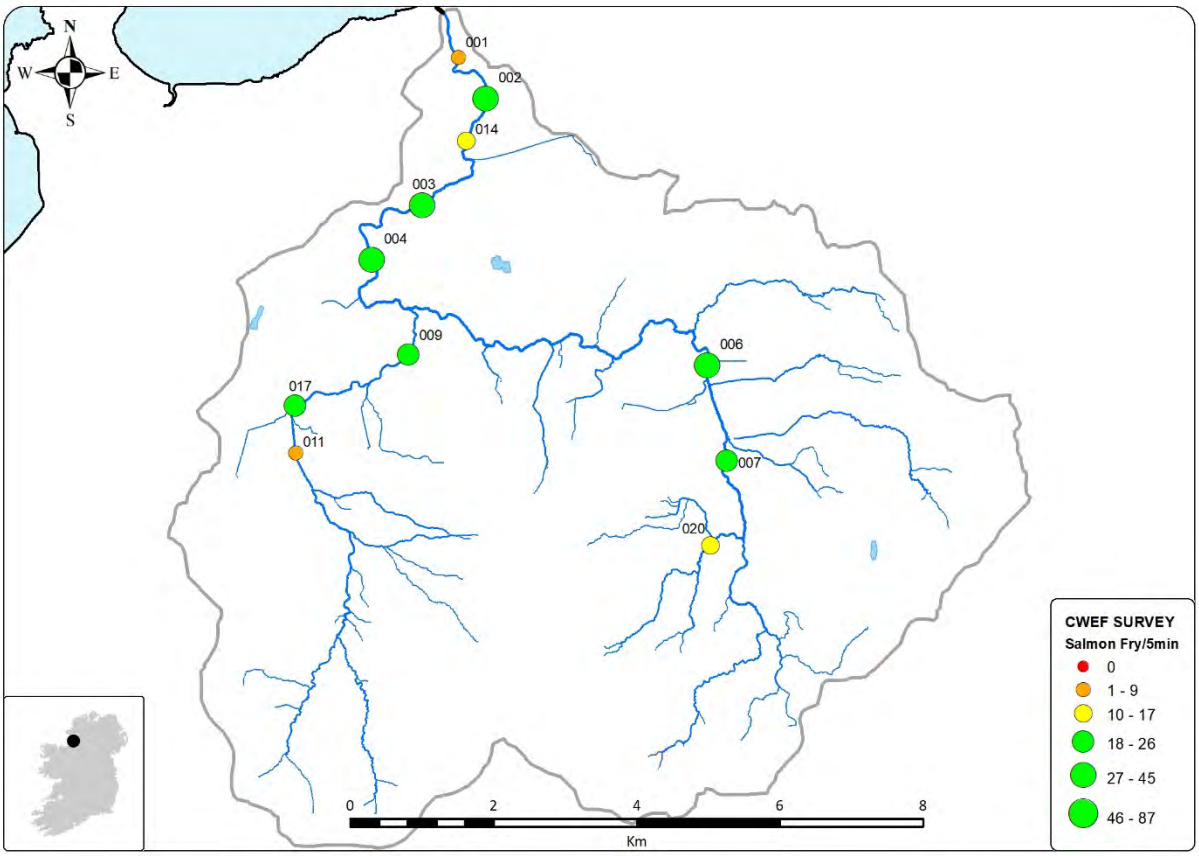
Conclusion

The Duff had a mean catch of 20.34 salmon fry/5min in 2018. Taking the five previous surveys into account this results in a cumulative average of 18.29 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.7.1.2: Conservation results of CWEF on the Duff catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
1	G 75530 56756	5	3	0	7	Include	0.00	7.00
2	G 75912 56188	5	2	0	26	Include	0.00	29.00
3	G 75020 54697	5	1	10	33	Include	10.93	36.07
4	G 74314 53929	5	2	3	27	Include	3.30	29.70
6	G 79014 52458	5	1	5	33	Include	5.53	36.47
7	G 79292 51128	5	1	2	15	Include	2.35	17.65
9	G 74831 52608	4	2	4	20	Include	4.50	22.50
11	G 73251 51229	4	2	1	3	Include	1.00	3.00
14	G 75642 55588	5	2	1	11	Include	1.08	11.92
17	G 73246 51894	4	1	7	18	Include	8.12	20.88
20	G 79057 49932	4	1	2	8	Include	2.40	9.60

Map A.7.1.1: Showing locations and results of 2018 surveys on the Duff River.



A.7.2. River Erne

IFI Salmon Catchment #: 210
2018 survey dates: 27/7/18 – 12/9/18
Mean Salmon Fry/5 min (2018): 0.24 fry/5min.

Sampling carried out by:
Dave Bancroft
Kevan Murphy
Tom Bannnon

Fish Species Present:
Brown Trout
Crayfish
Lamprey sp.
Minnow
Salmon
Stone Loach
Three Spined Stickleback

Figure A.7.2.1: Length distribution of salmon captured in 2018 CWEF survey on the Erne Catchment.

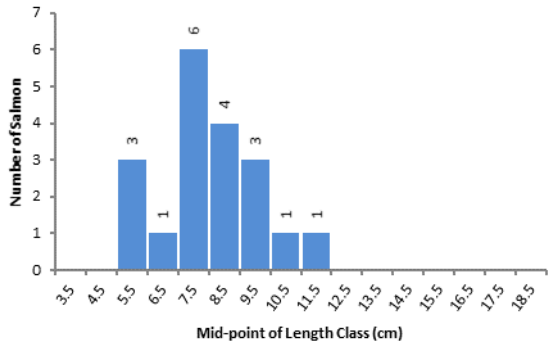
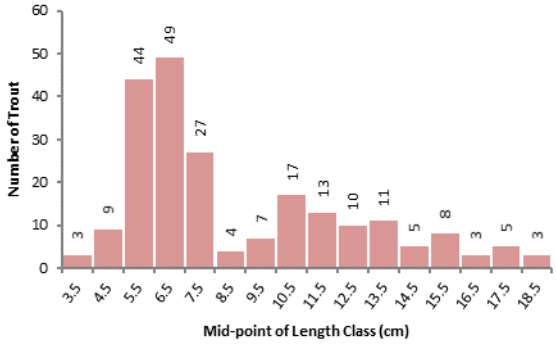


Figure A.7.2.2: Length distribution of brown trout captured in 2018 CWEF survey on the Erne Catchment.



This CWEF survey of this catchment was focused on sections of the Arney, Swanlinbar and Blackwater catchments. The survey was carried out from July to Sept 2018 and comprised 50 sites, 49 of which were included in the analysis. Salmon fry were located at three sites on the Swanlinbar. This area has not been stocked with fingerlings since 2016, and one site on the Glenfarne, a tributary of the Arney, fry were planted there in 2017. No salmon fry or parr were found on the Blackwater.

Conclusion

The very low abundance of salmon fry and parr observed in 2018 suggests very few or no salmon spawned in these areas in late 2017 or 2016.

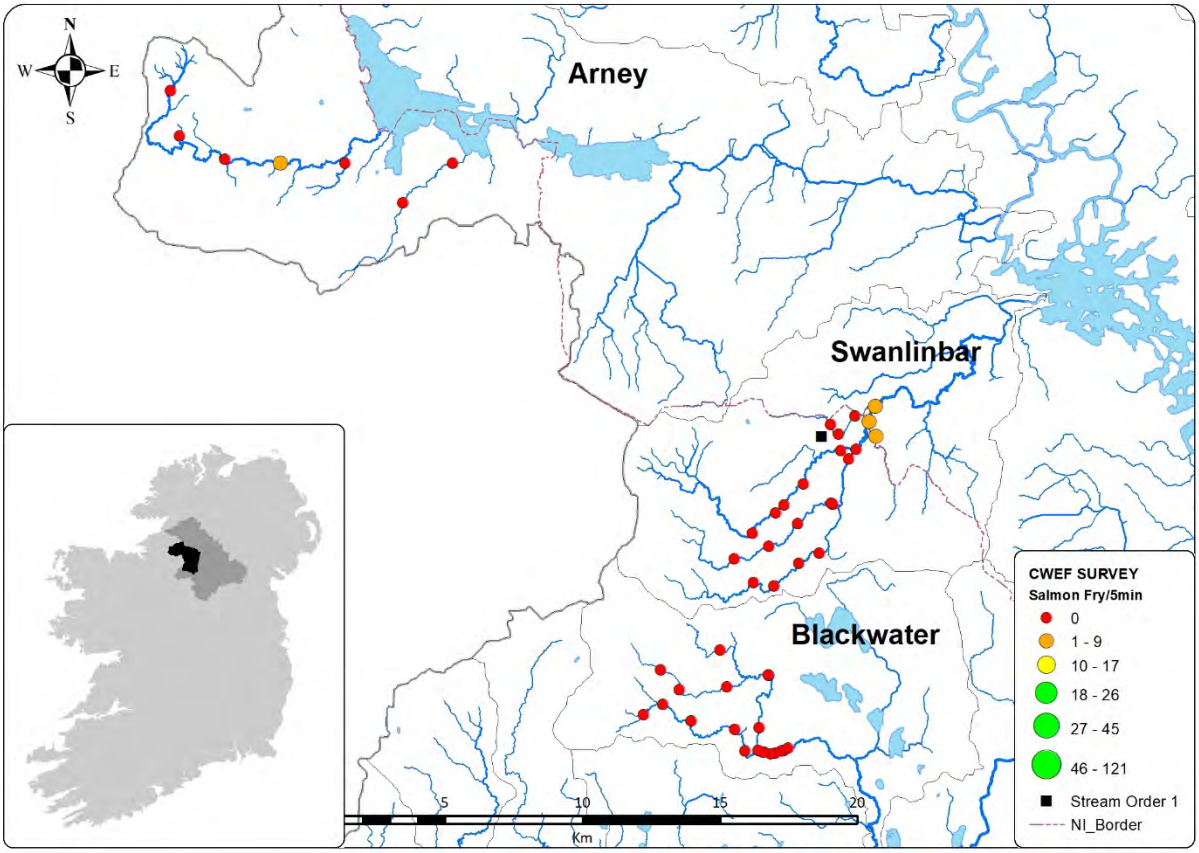
Table A.7.2.1: Site Specific results of CWEF survey on the Erne catchment in 2018.

Site #	Grid Ref.	Sub-Catchment	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
19	H 16376 17022	Blackwater	3	2	7	0	Include	7.00	0.00
34	H 15505 16971	Blackwater	3	2	5	0	Include	5.00	0.00
36	H 15206 18513	Blackwater	2	2	0	0	Include	0.00	0.00
37	H 13475 18407	Blackwater	2	2	4	0	Include	4.00	0.00
38	H 12878 17870	Blackwater	3	2	0	0	Include	0.00	0.00
56	H 17440 16289	Blackwater	4	2	0	0	Include	0.00	0.00
60	H 14970 19843	Blackwater	2	2	3	0	Include	3.00	0.00
61	H 12794 19121	Blackwater	2	2	2	0	Include	5.00	0.00
65	H 15860 16173	Blackwater	3	2	2	0	Include	4.00	0.00
70	H 13910 17271	Blackwater	3	3	1	0	Include	1.00	0.00

Table A.7.2.1: Site Specific results of CWEF survey on the Erne catchment in 2018.

Site #	Grid Ref.	Sub-Catchment	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
74	H 12185 17498	Blackwater	3	2	3	0	Include	3.00	0.00
106	H 16704 18939	Blackwater	3	2	0	0	Include	0.00	0.00
106b	H 16726 18917	Blackwater	3	2	1	0	Include	1.00	0.00
122	H 17292 16197	Blackwater	4	2	2	0	Include	2.00	0.00
123	H 17191 16177	Blackwater	4	1	2	0	Include	2.00	0.00
124	H 16967 16105	Blackwater	4	1	2	0	Include	2.00	0.00
125	H 16786 16083	Blackwater	4	1	4	0	Include	4.00	0.00
126	H 16558 16140	Blackwater	4	1	6	0	Include	6.00	0.00
127	H 16502 16143	Blackwater	3	2	3	0	Include	4.00	0.00
128	H 16348 16190	Blackwater	3	2	4	0	Include	6.00	0.00
1702	G 95300 38550	Glenfarne	0	2	0	0	Include	0.00	0.00
1704	G 96947 37701	Glenfarne	4	2	8	0	Include	8.00	0.00
1705	H 01307 37556	Glenfarne	3	2	1	0	Include	1.00	0.00
1706	H 05232 37557	Glenfarne	2	3	0	0	Include	0.00	0.00
1707	H 03411 36110	Glenfarne	2	3	3	0	Include	3.00	0.00
1708	G 98953 37549	Glenfarne	4	2	15	1	Include	15.00	1.00
1709	G 94956 40199	Glenfarne	4	2	1	0	Include	2.00	0.00
1	H 20617 28715	Swanlinbar	5	1	2	3	Include	3.20	4.80
3	H 18565 23374	Swanlinbar	3	1	2	0	Include	2.00	0.00
4	H 20627 27619	Swanlinbar	2	1	1	2	Include	1.00	2.00
8	H 17998 25888	Swanlinbar	4	2	4	0	Include	4.00	0.00
9	H 17283 25132	Swanlinbar	4	2	1	0	Include	1.00	0.00
10	H 19269 27712	Swanlinbar	2	2	3	0	Include	3.00	0.00
11	H 18983 28057	Swanlinbar	2	3	0	0	Include	0.00	0.00
13	H 20392 28156	Swanlinbar	5	1	1	4	Include	1.00	4.00
14	H 19906 27154	Swanlinbar	5	2	1	0	Include	1.00	0.00
15	H 19343 27105	Swanlinbar	4	2	2	0	Include	2.00	0.00
16	H 16988 24838	Swanlinbar	4	3	7	0	Include	7.00	0.00
17	H 16128 24087	Swanlinbar	4	3	0	0	Include	0.00	0.00
23	H 19648 26787	Swanlinbar	4	0	0	0	Include	0.00	0.00
24	H 19055 25146	Swanlinbar	3	2	7	0	Include	7.00	0.00
25	H 18992 25188	Swanlinbar	3	2	8	0	Include	8.00	0.00
26	H 17778 24445	Swanlinbar	3	2	2	0	Include	2.00	0.00
27	H 19877 28354	Swanlinbar	2	3	0	0	Include	0.00	0.00
28	H 18647 27624	Swanlinbar	1	1	1	0	Stream Order<2		
29	H 15466 23162	Swanlinbar	3	3	4	0	Include	4.00	0.00
66	H 17823 23002	Swanlinbar	3	3	4	0	Include	4.00	0.00
67	H 16911 22177	Swanlinbar	3	2	3	0	Include	3.00	0.00
68	H 16169 22295	Swanlinbar	3	2	0	0	Include	0.00	0.00
69	H 16739 23613	Swanlinbar	3	3	4	0	Include	5.00	0.00

Map A.7.2.1: Showing locations of 2018 survey sites on the Erne River.



A.7.3. River Eske

IFI Salmon Catchment #: 214
2018 survey dates: 28-31/8/2018
Mean Salmon Fry/5 min (2018): 10.94 fry/5min.
CWEF Index: 14.16 fry/5min.

Sampling carried out by:
J Barrow
Dara Timpson

Fish Species Present:
Brown Trout
European Eel
Flounder
Margaritifera
Salmon

Figure A.7.3.1: Length distribution of salmon captured in 2018 CWEF survey on the Eske Catchment.

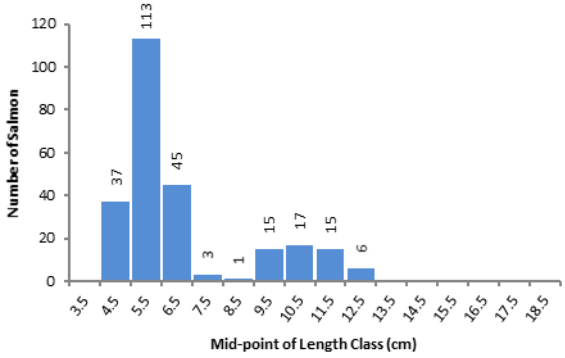


Figure A.7.3.2: Comparison of mean salmon fry/5min for all surveys on the Eske catchment to 2018.

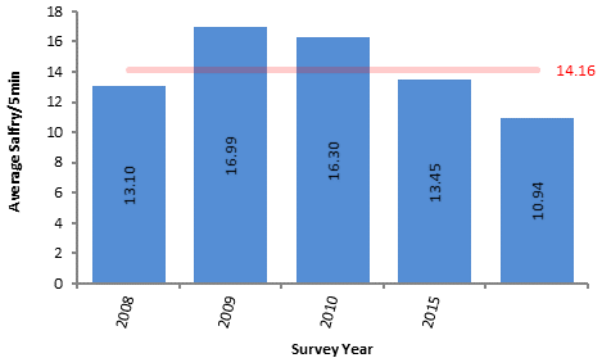


Table A.7.3.1: Conservation limits and provisional returns on the Eske catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	1135	-785	Open	14					8.27	13.10
2008	2009	823	-92	Open	14	2				7.24	16.99
2009	2010	823	38	Open	17					6.81	16.30
2010	2011	823	-124	Open							
2011	2012	823	118	Open							
2012	2013	823	260	Open							
2013	2014	601	99	Open							
2014	2015	731	45	Open	23					5.03	13.45
2015	2016	731	-55	C&R							
2016	2017	731	-241	C&R							
2017	2018	731	-284	C&R	20					5.79	10.94

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the fifth CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August 2018. The survey comprised 20 sites, all of which were included in the analysis. Salmon fry were present at 17 sites. The maximum fry catch was 25 salmon at site 25. The mean catch of included sites was 10.94 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

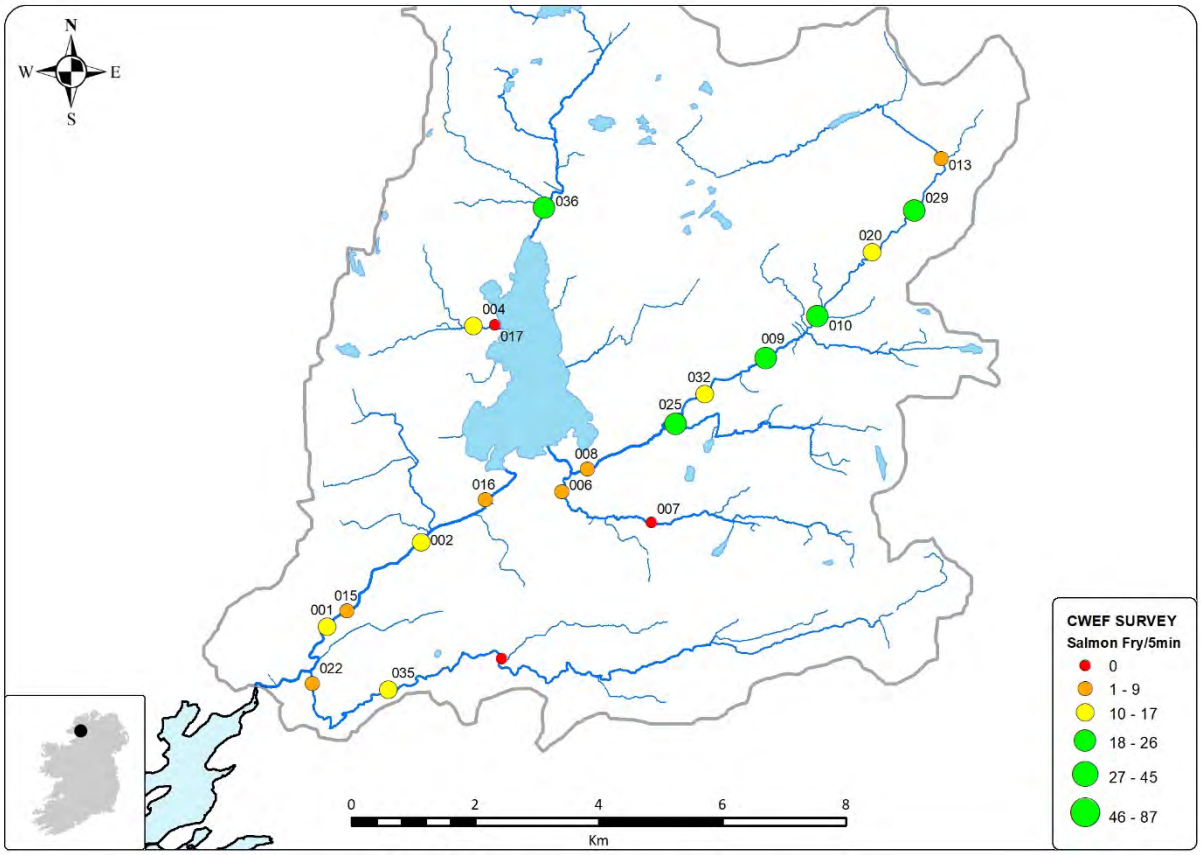
Conclusion

The Eske had a mean catch of 10.94 salmon fry/5min in 2018. Taking the four previous surveys into account this results in a cumulative average of 14.16 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.7.3.2: Conservation results of CWEF on the Eske catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
1	G 93997 79498	5	1	2	14	Include	2.25	15.75
2	G 95524 80871	5	2	3	13	Include	3.19	13.81
4	G 96369 84373	3	1	0	15	Include	0.00	17.00
6	G 97806 81686	4	1	2	4	Include	2.33	4.67
7	G 99260 81193	4	1	7	0	Include	8.00	0.00
8	G 98217 82058	5	2	1	5	Include	1.00	5.00
9	H 01118 83856	4	2	0	16	Include	0.00	18.00
10	H 01956 84534	3	1	0	17	Include	0.00	19.00
13	H 03957 87079	3	3	0	4	Include	0.00	4.00
15	G 94326 79755	5	3	2	7	Include	2.00	7.00
16	G 96563 81559	5	2	1	4	Include	1.20	4.80
17	G 96727 84389	3	3	1	0	Include	1.00	0.00
20	H 02836 85570	3	1	0	10	Include	0.00	12.00
22	G 93761 78577	4	3	0	3	Include	0.00	4.00
25	G 99658 82787	4	2	0	25	Include	0.00	26.00
29	H 03519 86248	3	2	1	16	Include	1.18	18.82
32	H 00120 83267	4	2	2	17	Include	2.00	17.00
34	G 96831 78986	3	2	6	0	Include	7.00	0.00
35	G 94991 78483	4	2	3	8	Include	3.55	9.45
36	G 97525 86293	3	1	4	20	Include	4.50	22.50

Map A.7.3.1: Showing locations of 2018 survey sites on Eske River.



A.7.4. River Glen

IFI Salmon Catchment #: 219
2018 survey dates: 4/9/2018
Mean Salmon Fry/5 min (2018): 18.56 fry/5min.
CWEF Index: 18.79 fry/5min.

Sampling carried out by:
J Barrow
Dara Timpson

Fish Species Present:
Brown Trout
Salmon

Figure A.7.4.1: Length distribution of salmon captured in 2018 CWEF survey on the Glen Catchment.

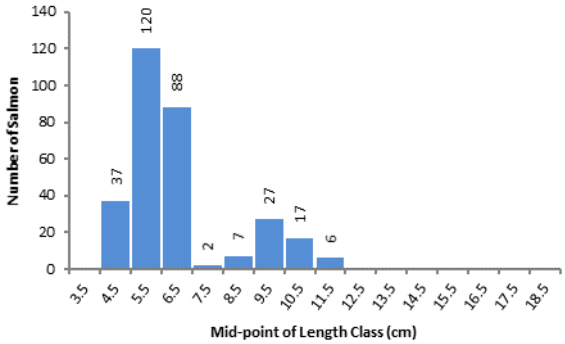


Figure A.7.4.2: Comparison of mean salmon fry/5min for all surveys on the Glen catchment to 2018.

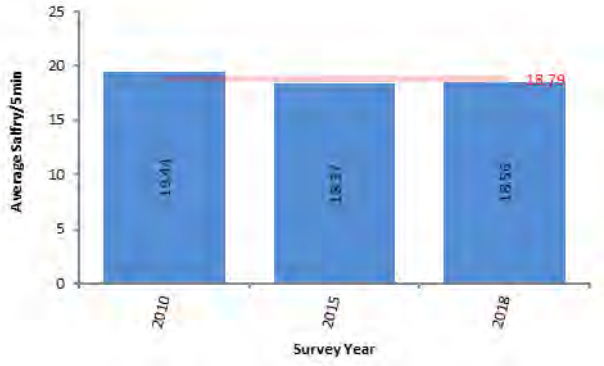


Table A.7.4.1: Conservation limits and provisional returns on the Glen catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2009	2010	957	809	Open	18					4.56	19.44
2010	2011	957	256	Open							
2011	2012	957	558	Open							
2012	2013	957	505	Open							
2013	2014	1017	351	Open							
2014	2015	1196	224	Open	14					5.86	18.37
2015	2016	1196	207	Open							
2016	2017	1196	116	Open							
2017	2018	1196	-99	C&R	15					5.47	18.56

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This, the third CWEF survey of this catchment in the 2007 to 2017 period, was carried out during on 4th Sept 2018. The survey comprised 15 sites, all of which were included in the analysis. Salmon fry were present at all sites. The maximum fry catch was 27 salmon at site 7. The mean catch of included sites was 18.56 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm

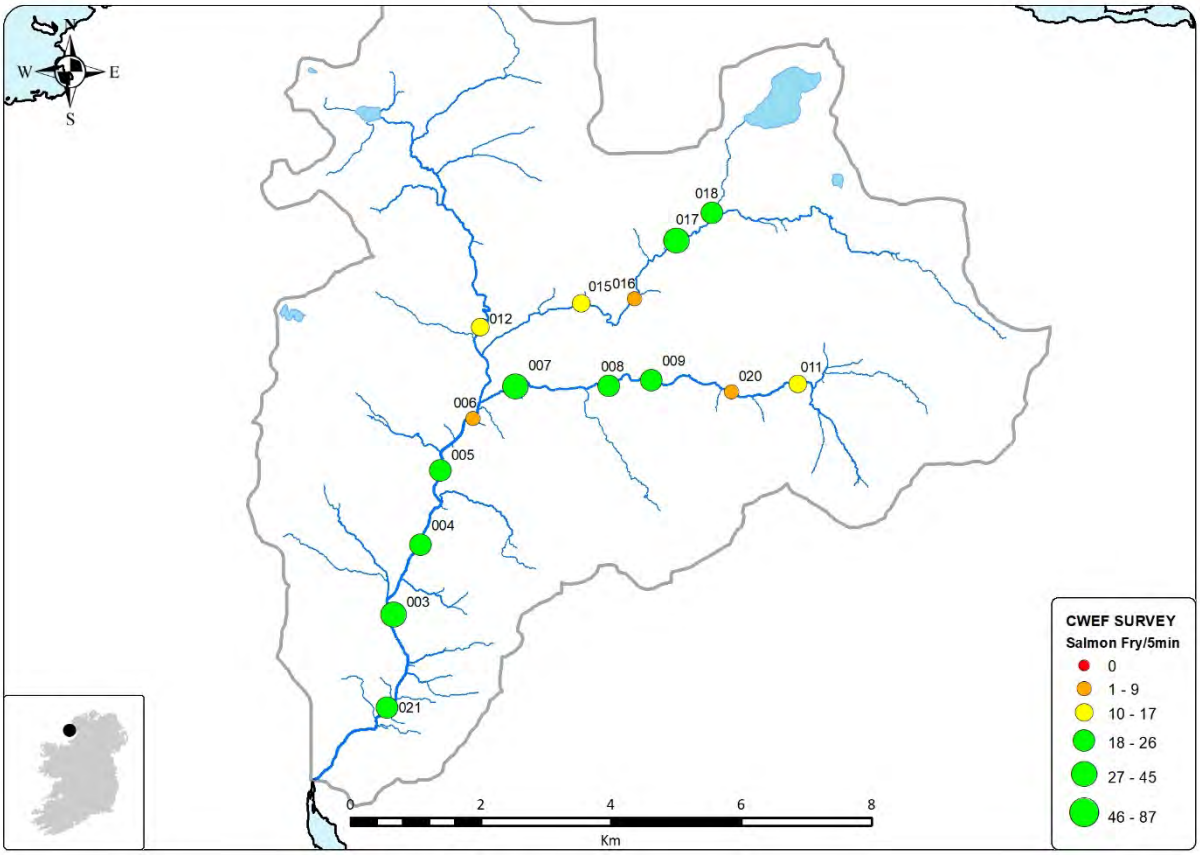
Conclusion

The Glen had a mean catch of 18.56 salmon fry/5min in 2018. Taking two previous surveys into account this results in a cumulative average of 18.79 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.7.4.2: Conservation results of CWEF on the Glen catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
3	G 59781 80749	5	1	0	26	Include	0.00	29.00
4	G 60197 81821	5	1	1	16	Include	1.12	17.88
5	G 60502 82964	5	1	0	24	Include	0.00	26.00
6	G 61005 83761	5	3	2	7	Include	2.22	7.78
7	G 61659 84257	4	2	3	27	Include	3.30	29.70
8	G 63095 84260	4	3	2	19	Include	2.29	21.71
9	G 63749 84349	4	2	6	18	Include	6.75	20.25
11	G 66006 84287	4	2	2	9	Include	2.36	10.64
12	G 61115 85162	4	2	2	14	Include	2.25	15.75
15	G 62672 85529	3	2	2	14	Include	2.38	16.63
16	G 63490 85598	3	2	0	6	Include	0.00	7.00
17	G 64136 86494	3	2	0	25	Include	0.00	28.00
18	G 64683 86923	0	1	0	18	Include	0.00	20.00
20	G 64979 84168	0	2	0	6	Include	0.00	7.00
21	G 59683 79316	0	2	0	19	Include	0.00	21.00

Map A.7.4.1: Showing locations of 2018 survey sites Glen River.



A.7.5. River Owenea

IFI Salmon Catchment #: 223
2018 survey dates: 29/9/2018
Mean Salmon Fry/5 min (2018): 33.94 fry/5min.
CWEF Index: 33.94 fry/5min.

Sampling carried out by:
Hugh Mooney
Tony Holmes

Fish Species Present:
Brown Trout
European Eel
Salmon

Figure A.7.5.1: Length distribution of salmon captured in 2018 CWEF survey on the Owenea Catchment.

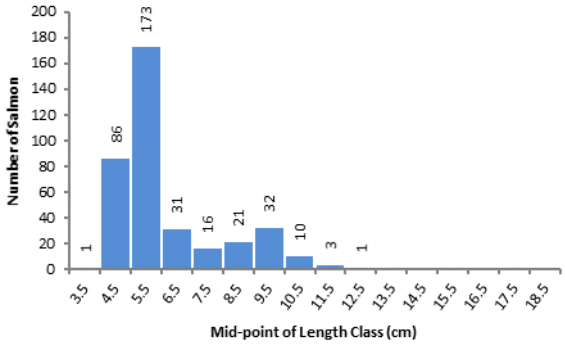


Figure A.7.5.2: Length distribution of brown trout captured in 2018 CWEF survey on the Owenea Catchment.

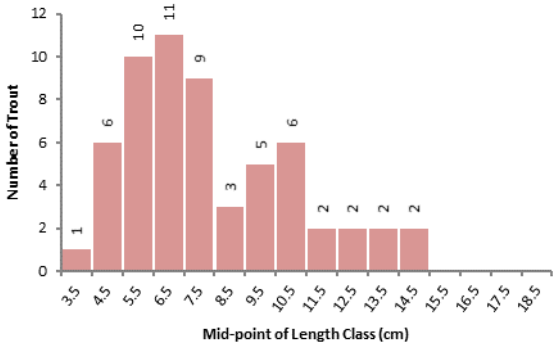


Table A.7.5.1: Conservation limits and provisional returns on the Owenea catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2007	2008	1712	2105	Open							
2008	2009	1712	1793	Open							
2009	2010	2231	1187	Open							
2010	2011	2231	864	Open							
2011	2012	2231	744	Open							
2012	2013	2231	1315	Open							
2013	2014	1691	1280	Open							
2014	2015	1690	935	Open							
2015	2016	1690	919	Open							
2016	2017	1690	558	Open							
2017	2018	1690	320	C&R	11					11.26	33.94

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit.

This is the first CWEF survey of this catchment in the 2007 to 2018 period, it was carried out during Sept 2018. The survey comprised 11 sites, all of which were included in the analysis. Salmon fry were present in good numbers at all sites. The minimum catch was 16 salmon at site 7, the maximum was 38 salmon at site 1. The mean catch of included sites was 33.94 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

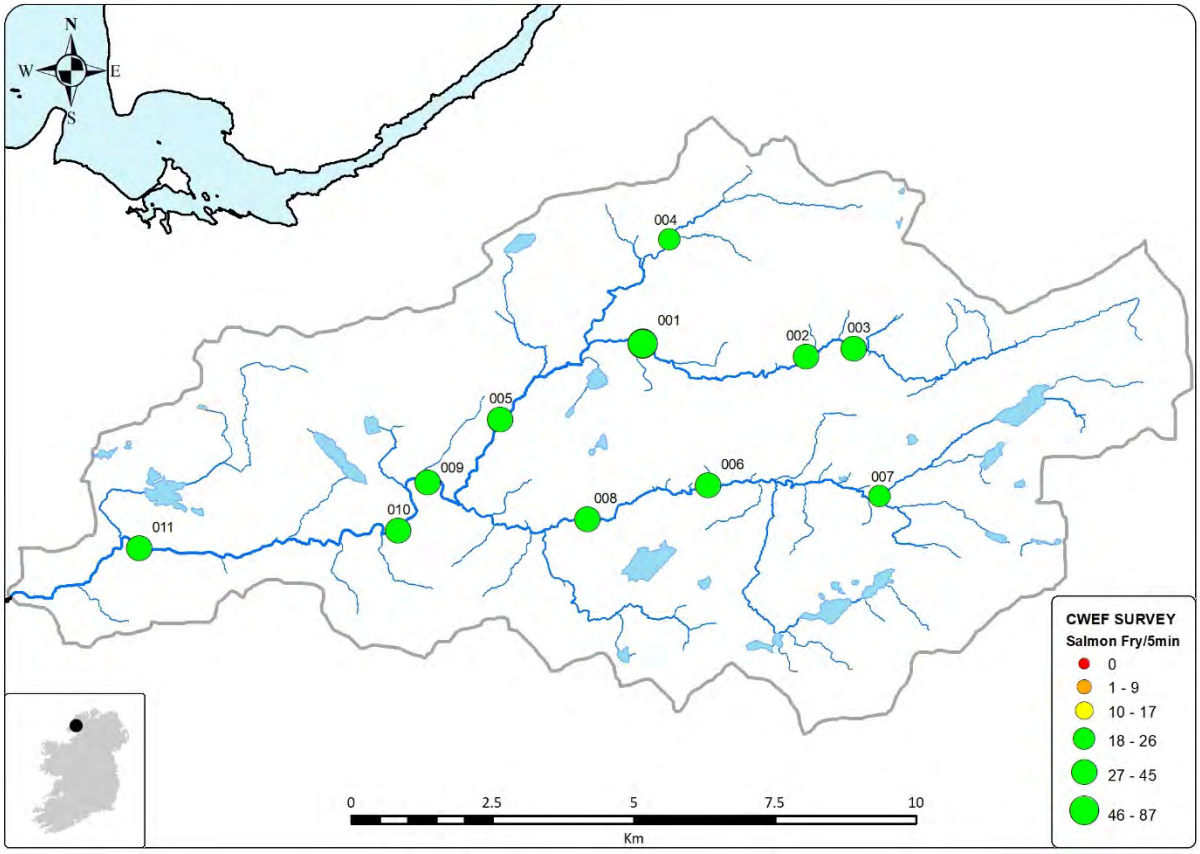
Conclusion

The Owenaea had a mean catch of 33.94 salmon fry/5min in 2018. As this is the only survey on this catchment the results in a cumulative average is also 33.94 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.7.5.2: Conservation results of CWEF on the Owenea catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
1	G 84778 96437	4	2	4	38	Include	5.43	51.57
2	G 87669 96203	4	1	3	28	Include	3.58	33.42
3	G 88516 96347	4	1	2	35	Include	2.38	41.62
4	G 85258 98277	3	1	8	15	Include	9.74	18.26
5	G 82256 95087	5	1	3	28	Include	3.97	37.03
6	G 85940 93923	4	1	5	27	Include	6.25	33.75
7	G 88975 93729	3	2	6	16	Include	7.36	19.64
8	G 83799 93319	4	2	5	30	Include	5.71	34.29
9	G 80962 93976	5	1	0	26	Include	0.00	34.00
10	G 80443 93117	5	1	1	26	Include	1.26	32.74
11	G 75858 92805	5	2	0	32	Include	0.00	37.00

Map A.7.5.1: Showing locations of 2018 survey sites on the Owenea River.



A.7.6. River Leannan

IFI Salmon Catchment #: 248
2018 survey dates: 7 - 9/8/2018
Mean Salmon Fry/5 min (2018): 20.11 fry/5min.
CWEF Index: 18.88 fry/5min.

Sampling carried out by:
James D
Matthew Kelly

Fish Species Present:
Brown Trout
European Eel
Salmon

Figure A.7.6.1: Length distribution of salmon captured in 2018 CWEF survey on the Leannan Catchment.

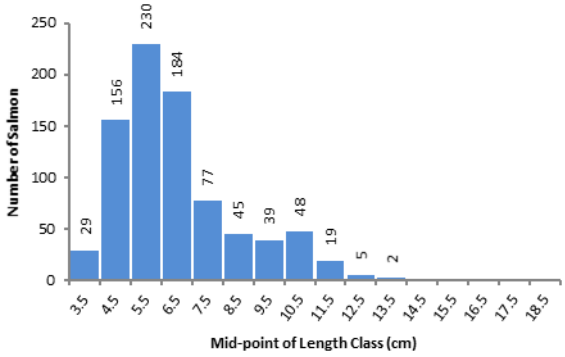


Figure A.7.6.2: Comparison of mean salmon fry/5min for all surveys on the Leannan catchment to 2018.

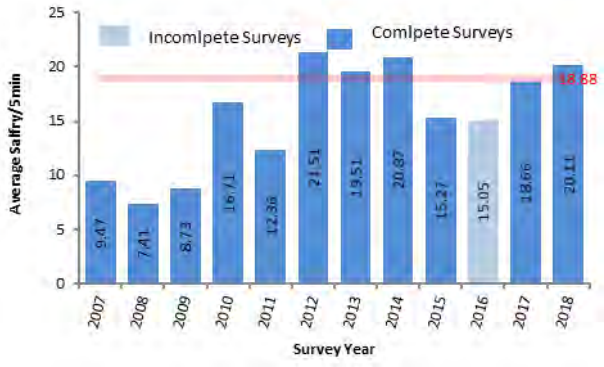


Table A.7.6.1: Conservation limits and provisional returns on the Leannan catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Efficiency Below Threshold	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2006	2007	100	1	Closed	9					24.34	9.47
2007	2008	3618	-2820	Closed	29					7.55	7.41
2008	2009	3618	-2620	Closed	29					7.55	8.73
2009	2010	3618	-2619	Closed	29					7.55	16.71
2010	2011	3618	-2609	Closed	28	1				7.55	12.36
2011	2012	3618	-2612	Closed	28				1	7.55	21.51
2012	2013	3618	-2612	Closed	26					8.42	19.51
2013	2014	516	-410	Closed	26					8.42	20.87
2014	2015	516	-409	Closed	25	1				8.42	15.27
2015	2016	516	-409	C&R	20					10.95	15.05*
2016	2017	516	-409	C&R	24	5				7.55	18.66
2017	2018	516	-267	C&R	35			1		6.08	20.11

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit; * = Incomplete Surveys.

This, the twelfth CWEF survey of this catchment in the 2007 to 2018 period, was carried out during August 2018. The survey comprised 36 sites, 35 of which were included in the analysis. Salmon fry were present at 29 sites. The maximum fry catch was 57 salmon at site 9. The mean catch of included sites was 20.11 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

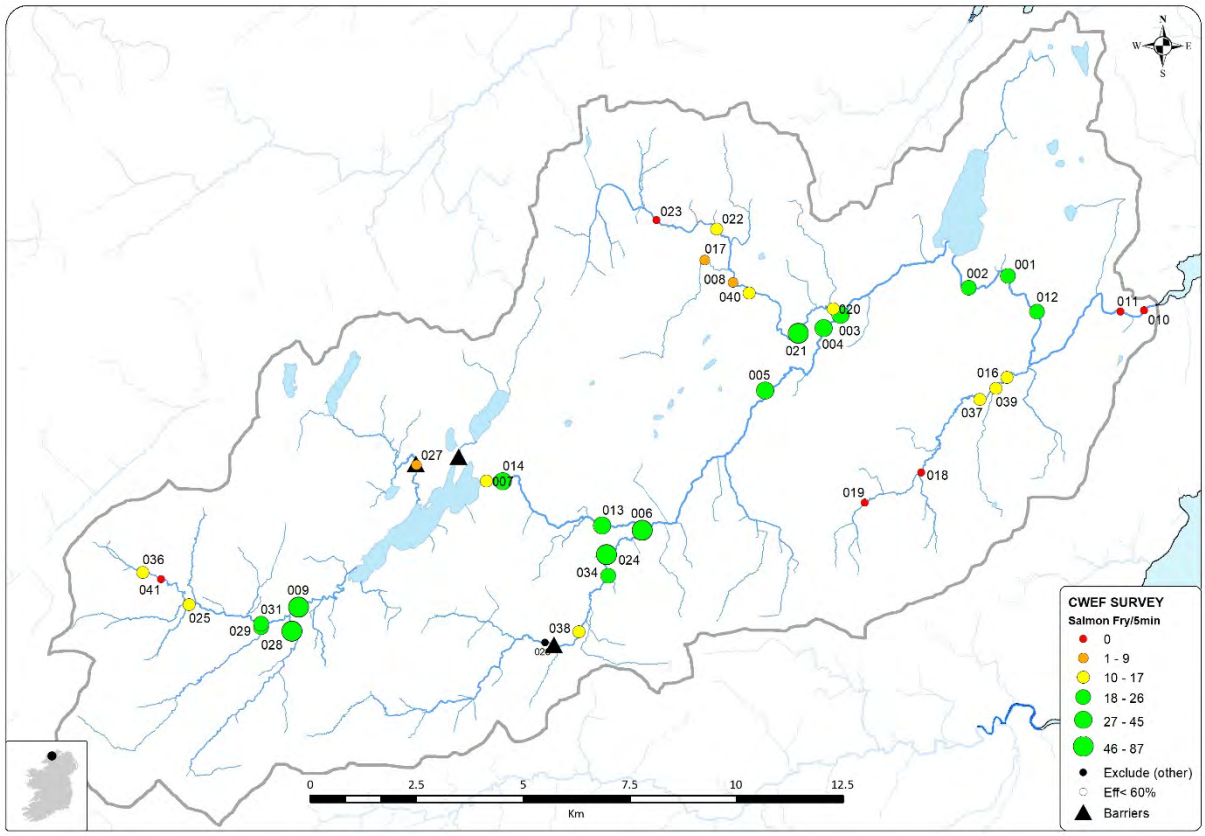
Conclusion

The Leannan had a mean catch of 20.11 salmon fry/5min in 2018. Taking the five most recent surveys into account this results in a cumulative average of 18.88 salmon fry/5min which is above the 17 salmon fry threshold.

Table A.7.6.2: Conservation results of CWEF on the Leannan catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
1	C 19032 21832	5	3	2	16	Include	2.78	22.22
2	C 18110 21555	5	3	5	18	Include	5.43	19.57
3	C 15115 20910	5	1	5	31	Include	5.69	35.31
4	C 14722 20597	5	1	5	35	Include	5.75	40.25
5	C 13349 19129	5	2	6	36	Include	6.29	37.71
6	C 10470 15850	5	1	3	43	Include	3.33	47.67
7	C 06817 16987	5	2	0	11	Include	0.00	12.00
8	C 12588 21655	4	3	13	5	Include	13.00	5.00
9	C 02422 14028	4	1	2	57	Include	2.10	59.90
10	C 22234 21028	5	2	0	0	Include	0.00	0.00
11	C 21677 20999	5	3	0	0	Include	0.00	0.00
12	C 19710 21001	5	2	0	22	Include	0.00	22.00
13	C 09540 15957	5	3	3	23	Include	3.46	26.54
14	C 07206 16991	5	1	4	37	Include	4.29	39.71
16	C 19019 19448	4	2	7	16	Include	7.00	16.00
17	C 11925 22178	2	2	14	5	Include	14.00	5.00
18	C 17013 17222	4	1	23	0	Include	25.00	0.00
19	C 15696 16505	3	1	11	0	Include	13.00	0.00
20	C 14938 21045	4	2	4	14	Include	4.44	15.56
21	C 14125 20475	4	1	5	48	Include	5.00	48.00
22	C 12199 22907	4	2	32	10	Include	32.00	10.00
23	C 10793 23117	4	3	48	0	Include	48.00	0.00
24	C 09643 15275	4	1	17	46	Include	17.00	46.00
25	B 99853 14070	4	3	0	10	Include	0.00	10.00
26	C 08212 13214	4	3	5	0	Above Barrier		
27	C 05181 17366	4	3	0	6	Include	0.00	6.00
28	C 02269 13466	3	1	13	56	Include	13.00	56.00
29	C 01542 13558	3	2	6	24	Include	6.00	24.00
31	C 01544 13637	4	2	3	18	Include	3.00	18.00
34	C 09680 14776	4	1	7	22	Include	7.00	22.00
36	B 98773 14828	3	3	3	10	Include	3.00	10.00
37	C 18382 18934	4	2	20	11	Include	20.00	11.00
38	C 09004 13462	4	2	1	15	Include	1.00	15.00
39	C 18760 19189	4	3	21	10	Include	21.68	10.32
40	C 12972 21411	4	2	17	13	Include	17.00	13.00
41	B 99203 14674	3	3	3	0	Include	3.00	0.00

Map A.7.6.1: Showing locations of 2018 survey sites on the Leannan River.



A.7.7. River Crana

IFI Salmon Catchment #: 102
2018 survey dates: 7-13/08/2018
Mean Salmon Fry/5 min (2018): 16.38 fry/5min.
CWEF Index: 16.06 fry/5min.

Sampling carried out by:
Mick Mullane
Tony Holmes

Fish Species Present:
Brown Trout
European Eel
3-Spined Sticckleback
Salmon

Figure A.7.7.1: Length distribution of salmon captured in 2018 CWEF survey on the Crana Catchment.

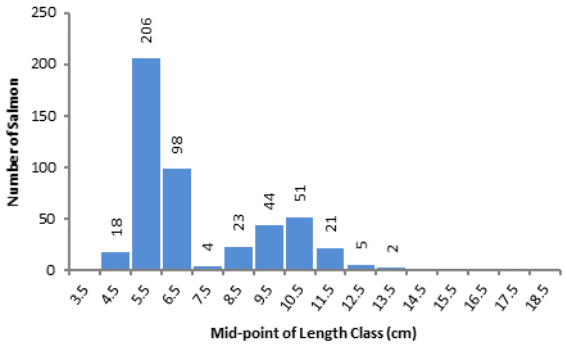


Figure A.7.7.2: Length distribution of brown trout captured in 2017 CWEF survey on the Crana catchment.

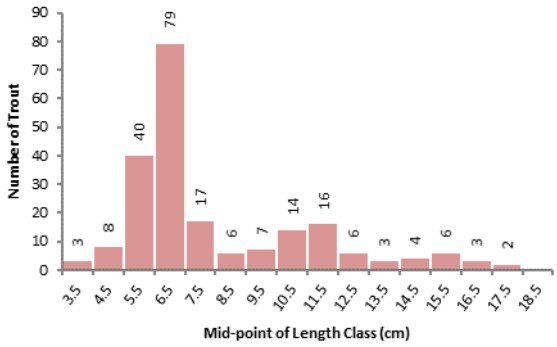


Figure A.7.7.3: Comparison of mean salmon fry/5min for all suveys on the Crana catchment to 2018.

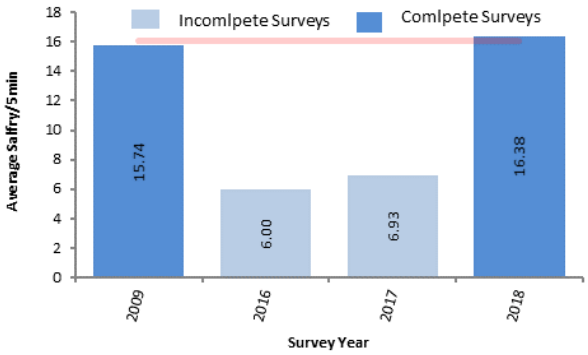


Table A.7.7.1: Conservation limits and provisional returns on the Crana catchment along with the details and results of 2018 CWEF Survey.

Spawning Year	Fry Year	1SW CL	1SW Predicted Surplus	Status	Sites Included	Below Threshold	Efficiency	Stream order<2	Other Exclusions	Not Sampled	Km per Included Site	Salmon Fry/5min
2008	2009	1119	611	Open	23	1					3.61	15.74
2009	2010	1119	682	Open								
2010	2011	1119	676	Open								
2011	2012	1119	663	Open								
2012	2013	1119	457	Open								
2013	2014	1073	635	Open								
2014	2015	1074	160	Open								
2015	2016	1074	280	Open	2						43.29	6.00†
2016	2017	1074	-41	C&R	5	1			1		12.37	6.93†
2017	2018	1074	-282	C&R	39				1		2.16	16.38

C&R = Catch and Release; 1SW = One Sea Winter; CL= Conservation Limit; †=Incomplete surveys

This, the second complete CWEF survey of this catchment in the 2007 to 2018 period, it was carried out during August 2018. The survey comprised 26 sites, 25 of which were included in the analysis. Salmon fry were present at 16 sites. The maximum fry catch was 61 salmon at site 27. The mean catch of included sites was 16.38 salmon fry/5min. The modal length category of 0+ fry caught was 5.5cm.

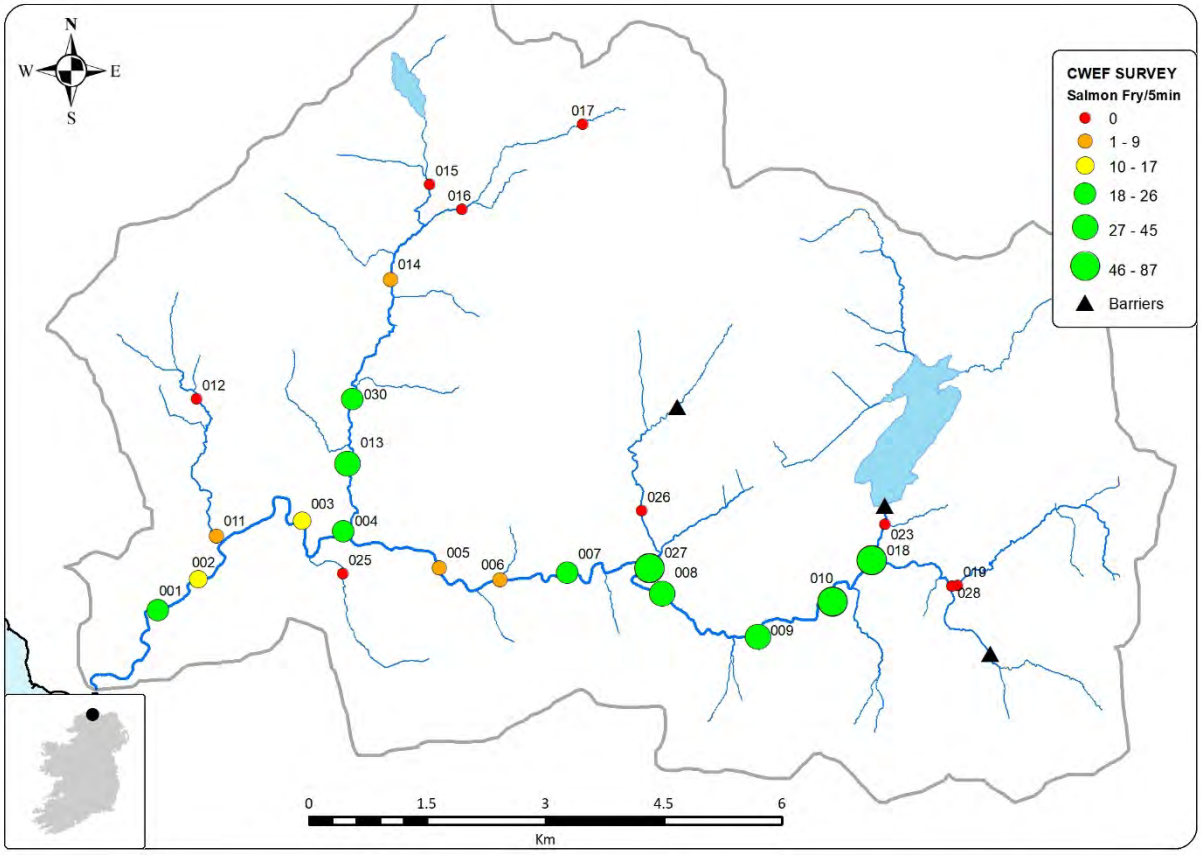
Conclusion

The Crana had a mean catch of 16.38 salmon fry/5min in 2018. Taking the five most recent surveys into account this results in a cumulative average of 16.06 salmon fry/5min which is below the 17 salmon fry threshold.

Table A.7.7.2: Conservation results of CWEF on the Crana catchment in 2018.

Site #	Grid Ref.	Stream Order	Riffle Grade	Trout Fry Captured	Salmon Fry Captured	Site Status	Trout Fry/5min	Salmon Fry/5min
001	C 35134 33651	5	1	1	17	Include	1.28	21.72
002	C 35649 34035	5	3	0	8	Include	0.00	12.00
003	C 36965 34778	5	2	3	10	Include	4.15	13.85
004	C 37490 34645	5	2	1	17	Include	1.22	20.78
005	C 38701 34178	5	3	2	3	Include	2.40	3.60
006	C 39471 34032	5	2	7	6	Include	9.15	7.85
007	C 40325 34119	5	2	5	18	Include	6.09	21.91
008	C 41529 33856	5	2	11	33	Include	12.75	38.25
009	C 42742 33314	5	2	10	28	Include	11.32	31.68
010	C 43692 33754	5	1	2	39	Include	2.59	50.41
011	C 35876 34582	3	2	3	5	Include	4.13	6.88
012	C 35626 36322	3	2	5	0	Include	5.00	0.00
013	C 37540 35502	4	1	9	23	Include	10.97	28.03
014	C 38082 37837	4	2	2	2	Include	3.00	3.00
015	C 38581 39045	3	2	19	0	Include	23.00	0.00
016	C 38989 38729	3	1	1	0	Include	1.00	0.00
017	C 40520 39807	2	2	3	0	Include	3.00	0.00
018	C 44188 34284	4	1	5	33	Include	6.97	46.03
019	C 45276 33955	3	2	10	0	Include	13.00	0.00
023	C 44353 34735	2	2	12	0	Include	14.00	0.00
025	C 37478 34107	2	2	20	0	Include	25.00	0.00
026	C 41273 34908	3	2	0	0	Include	0.00	0.00
027	C 41369 34179	4	1	8	61	Include	10.32	78.68
028	C 45207 33952	4	1	6	0	Include	7.00	0.00
030	C 37604 36325	4	2	2	22	Include	2.25	24.75
029	C 44387 34774	4	3	4	0	Wrong Location		

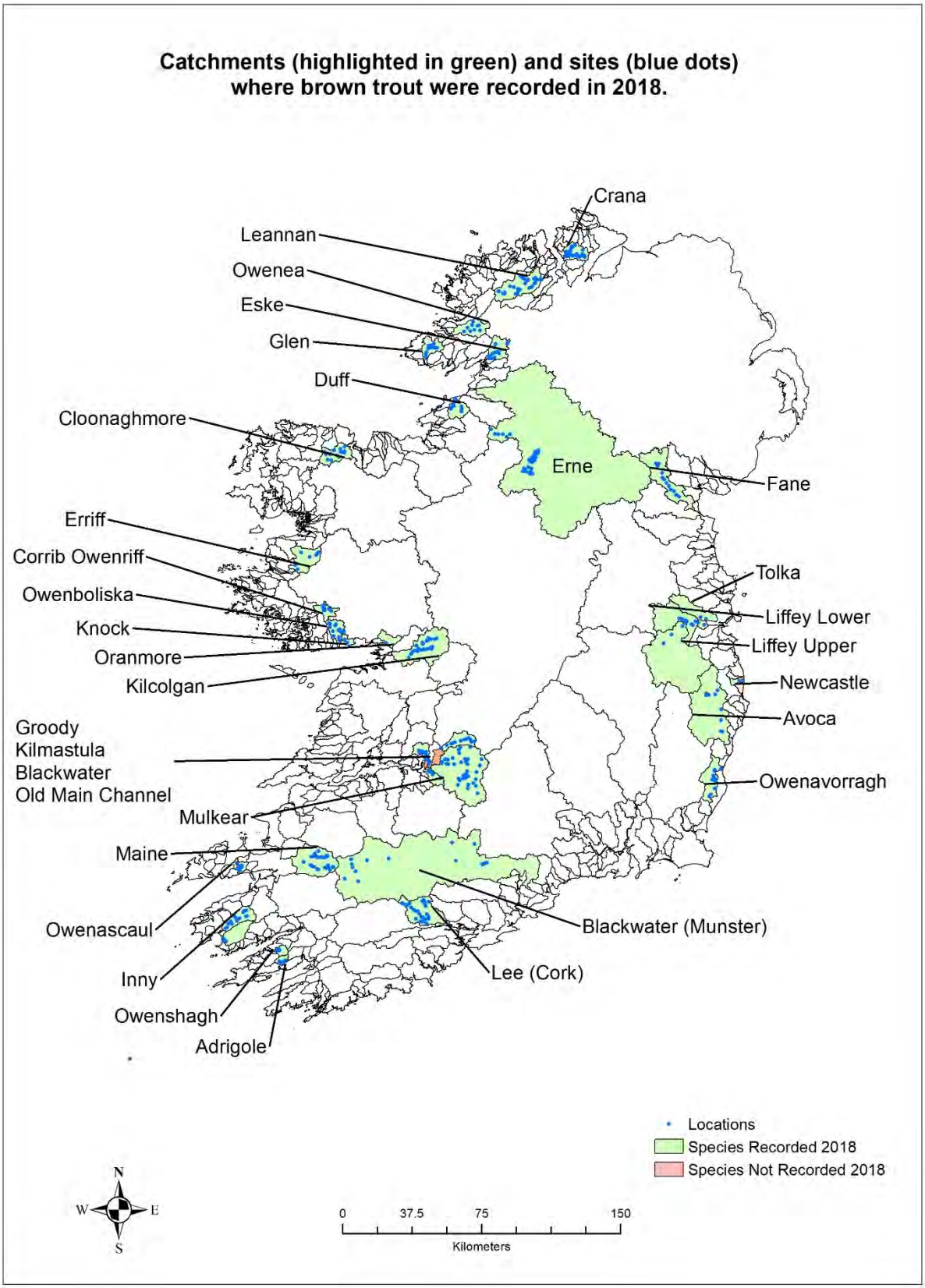
Map A.7..1: Showing salmon abundances at CWEF survey sites on the Crana River 2018.



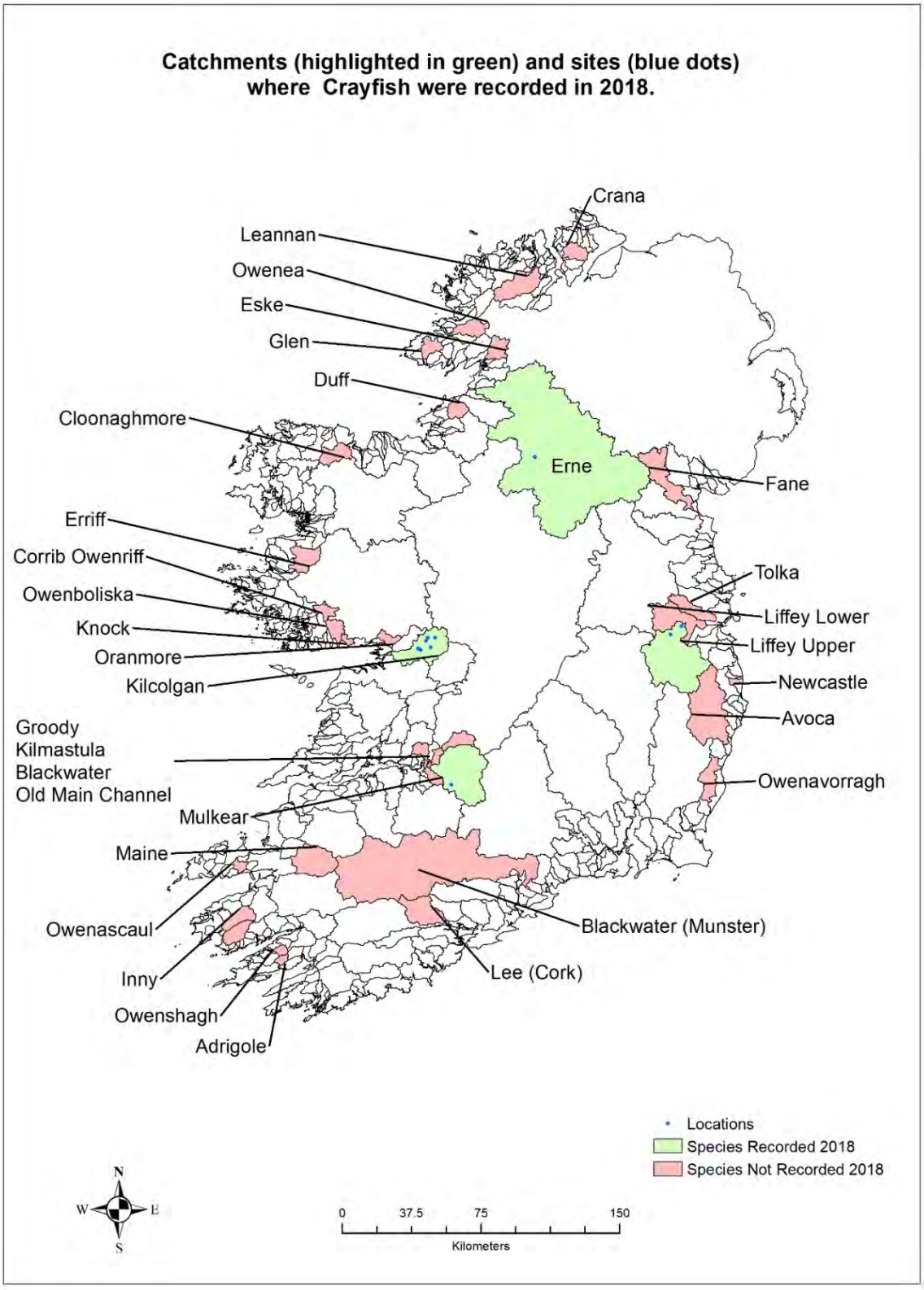
B. Other Species –

Maps include *all* sites visited this year- including those in unfinished survey areas.

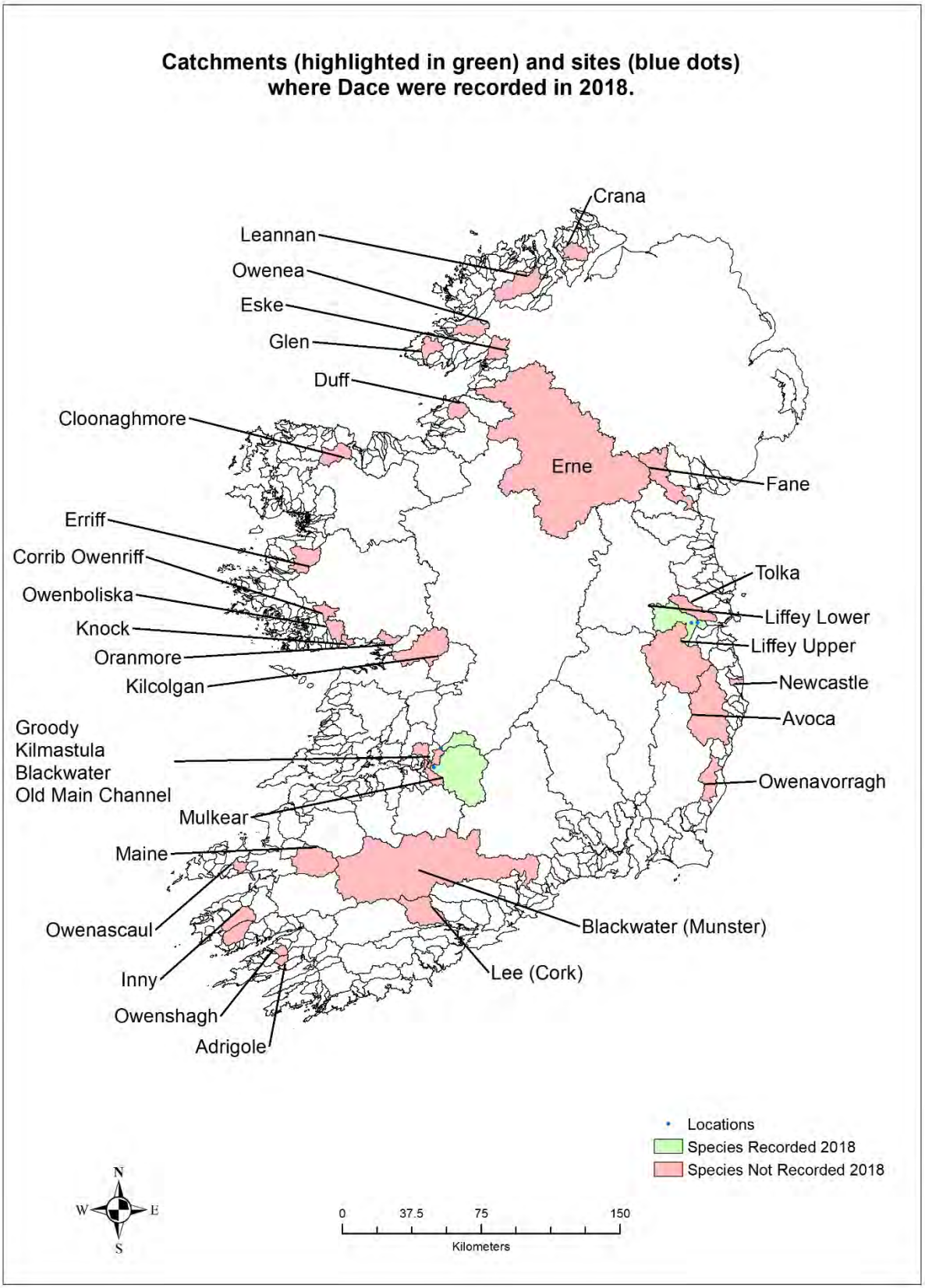
B.1. Brown Trout



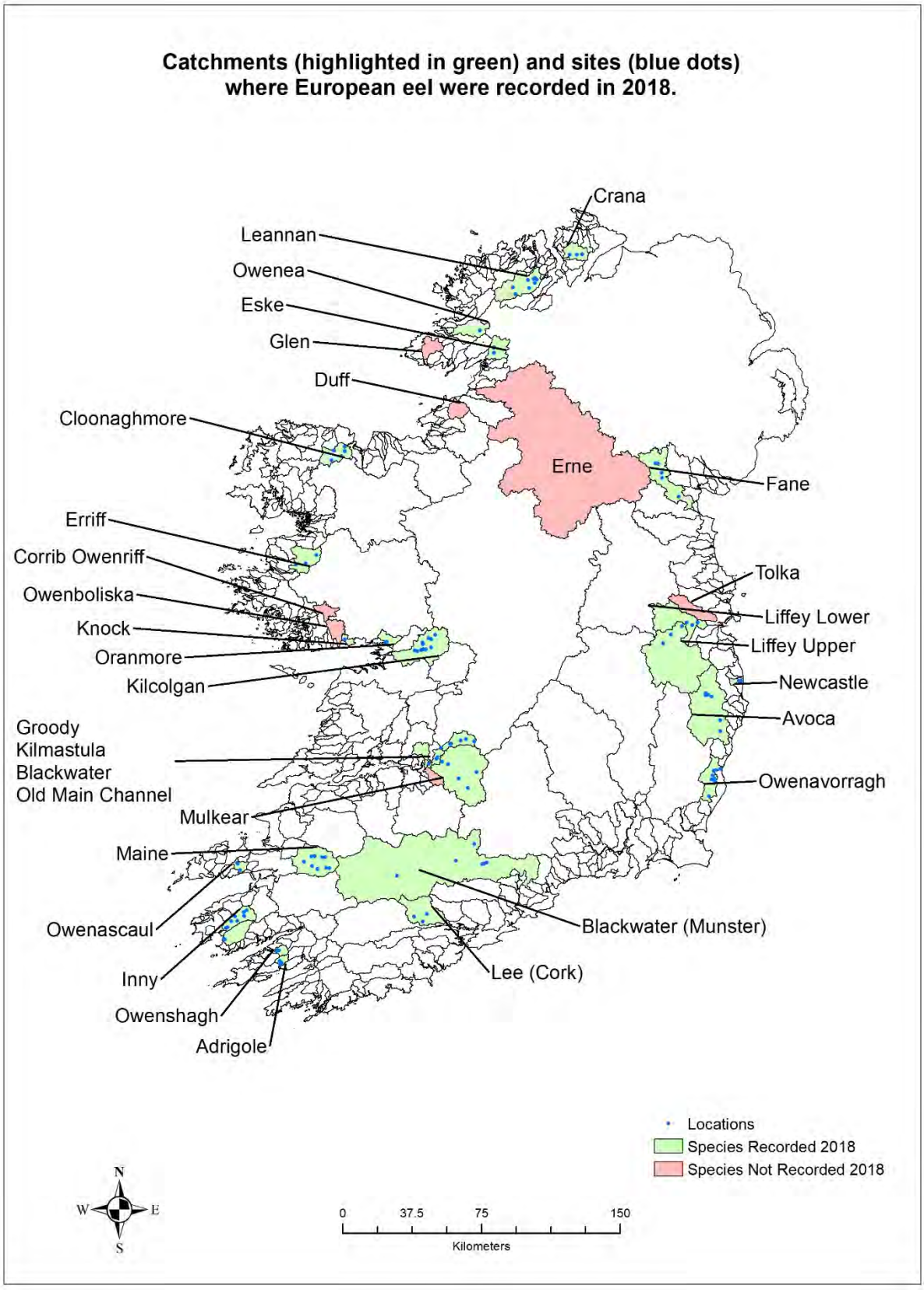
B.2. Crayfish


Catchments (highlighted in green) and sites (blue dots) where Crayfish were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Groody
Kilmastula
Blackwater
Old Main Channel
Owenavorragh
Mulkear
Maine
Owenascaul
Blackwater (Munster)
Inny
Lee (Cork)
Owenshagh
Adrigole
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

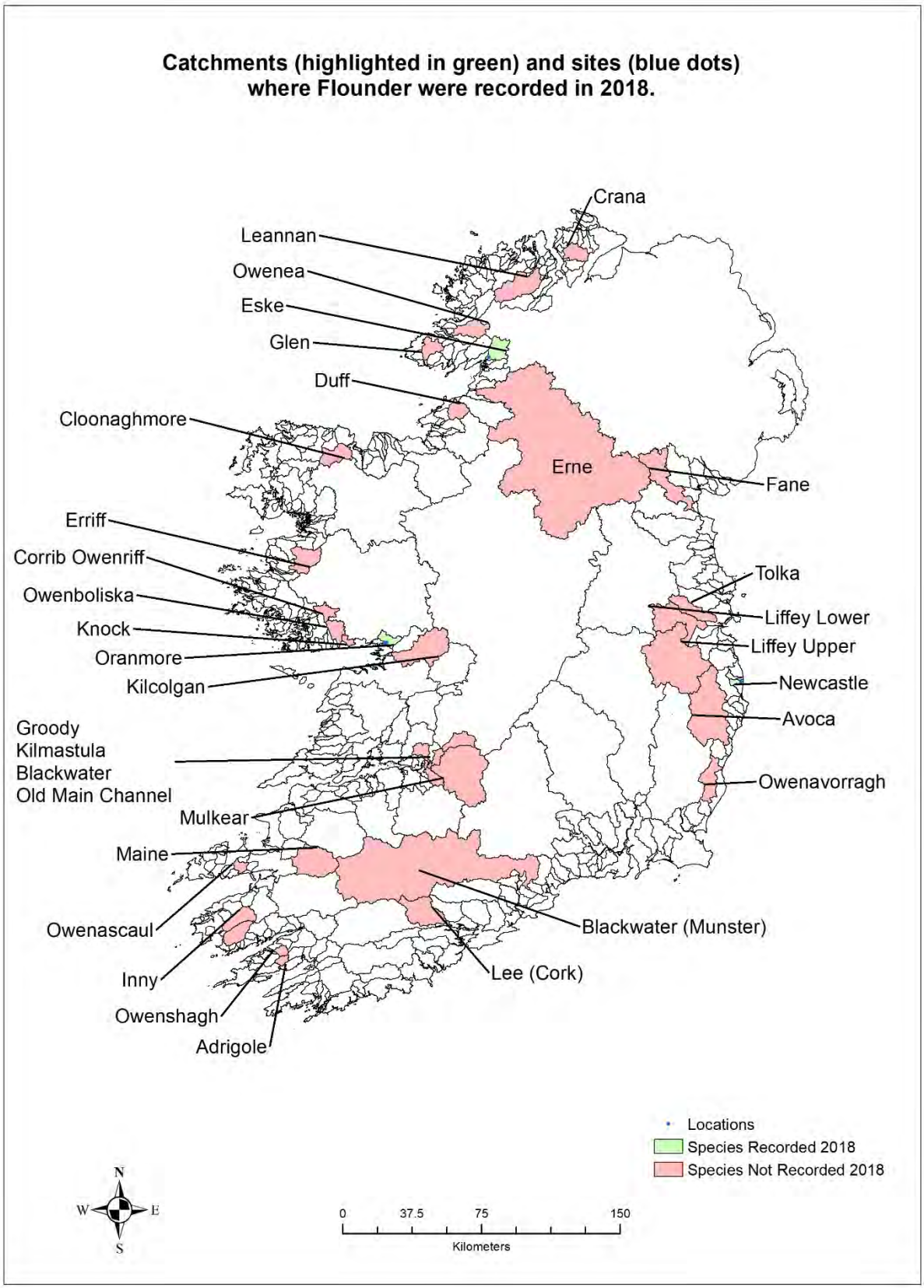
B.3. Dace


Catchments (highlighted in green) and sites (blue dots) where Dace were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Groody
Kilmastula
Blackwater
Old Main Channel
Owenavorragh
Mulkear
Maine
Owenascaul
Blackwater (Munster)
Inny
Lee (Cork)
Owenshagh
Adrigole
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

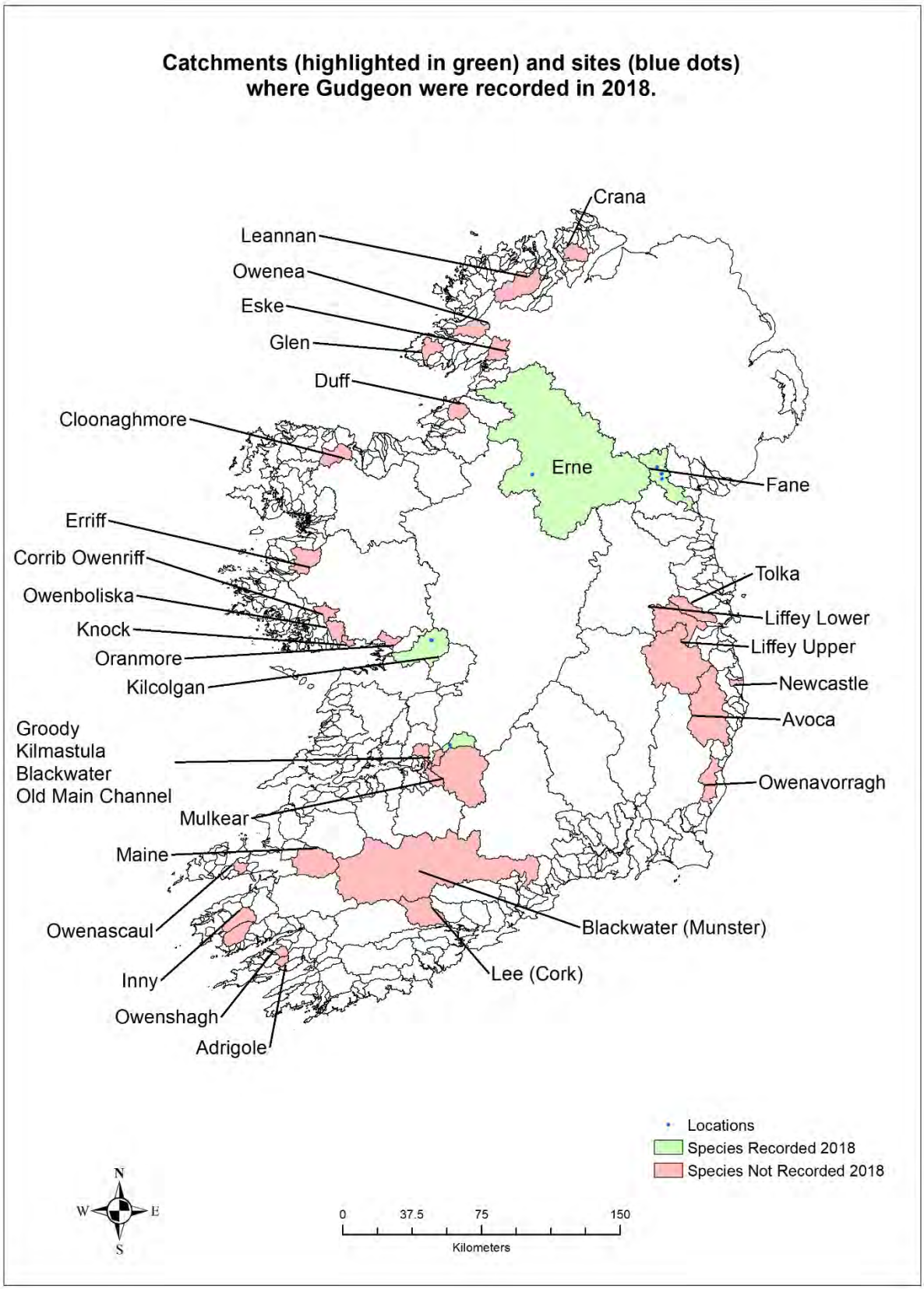
B.4. Eel


Catchments (highlighted in green) and sites (blue dots) where European eel were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Groody
Kilmastula
Blackwater
Old Main Channel
Owenavorragh
Mulkear
Maine
Owenascaul
Blackwater (Munster)
Lee (Cork)
Inny
Owenshagh
Adrigole
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

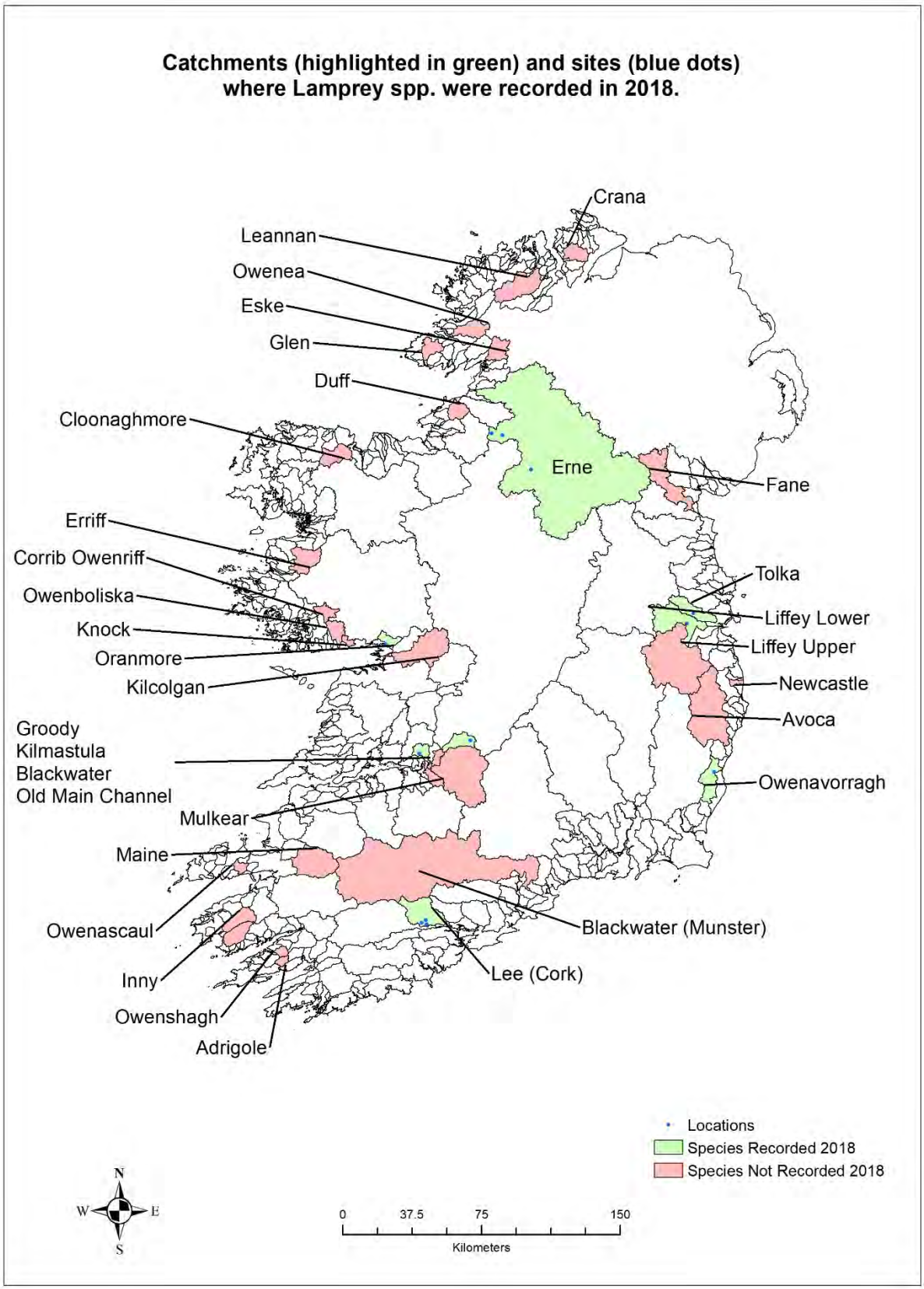
B.5. Flounder

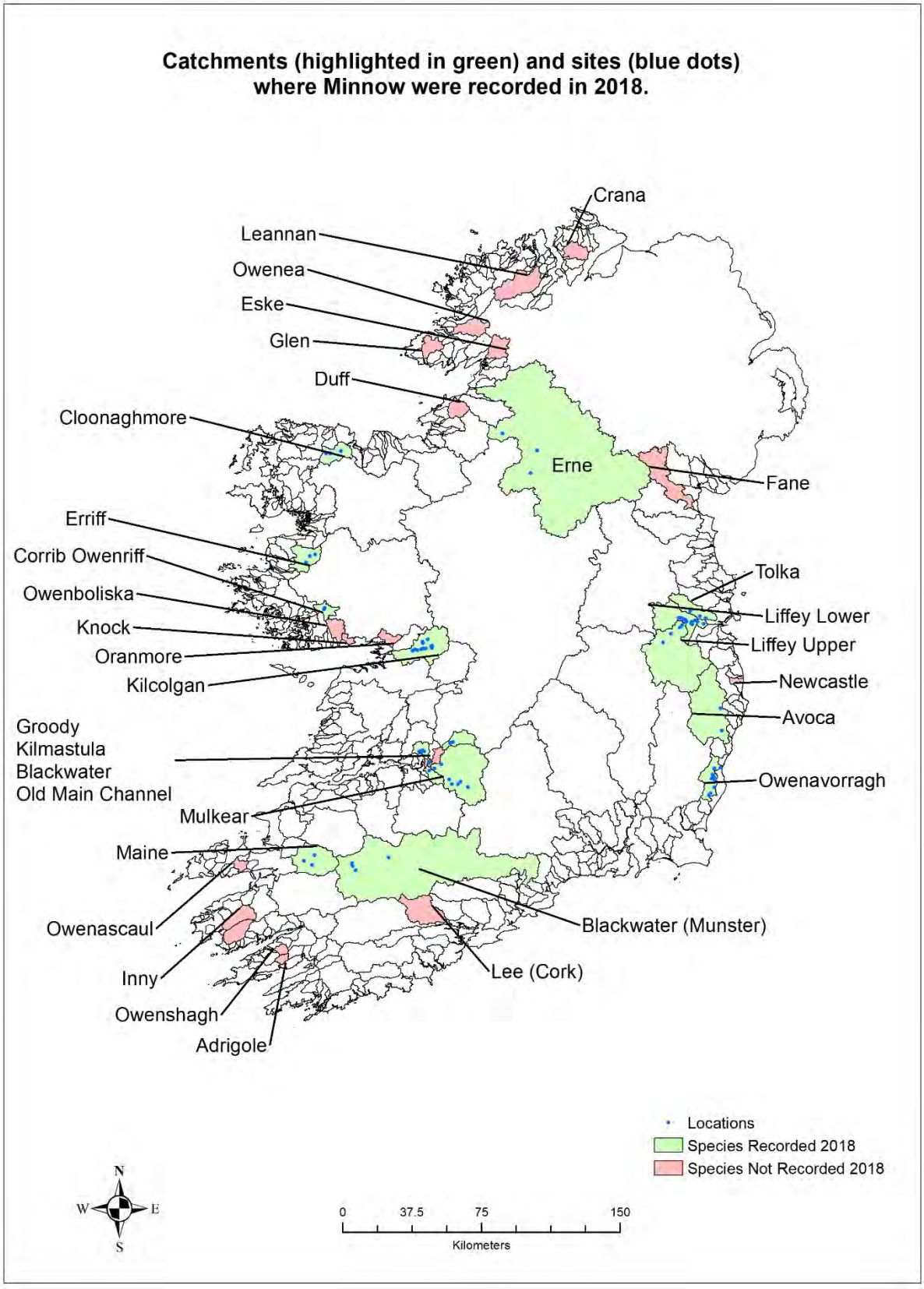

Catchments (highlighted in green) and sites (blue dots) where Flounder were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Groody
Kilmastula
Blackwater
Old Main Channel
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Owenavorragh
Mulkear
Maine
Owenascaul
Inny
Owenshagh
Adrigole
Blackwater (Munster)
Lee (Cork)
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

B.6. Gudgeon


Catchments (highlighted in green) and sites (blue dots) where Gudgeon were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Groody
Kilmastula
Blackwater
Old Main Channel
Owenavorragh
Mulkear
Maine
Owenascaul
Blackwater (Munster)
Inny
Lee (Cork)
Owenshagh
Adrigole
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

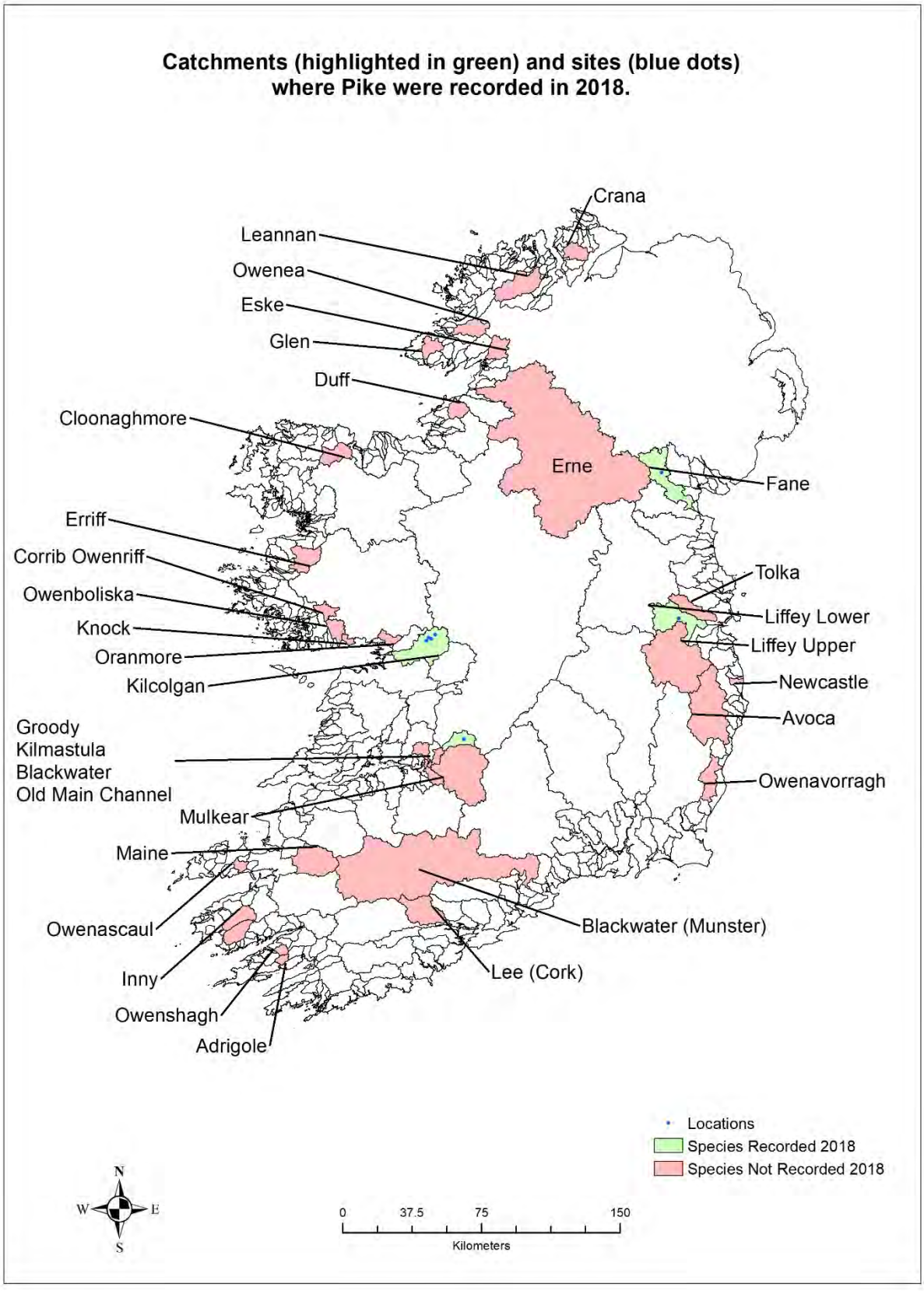
B.7. Lamprey Spp.



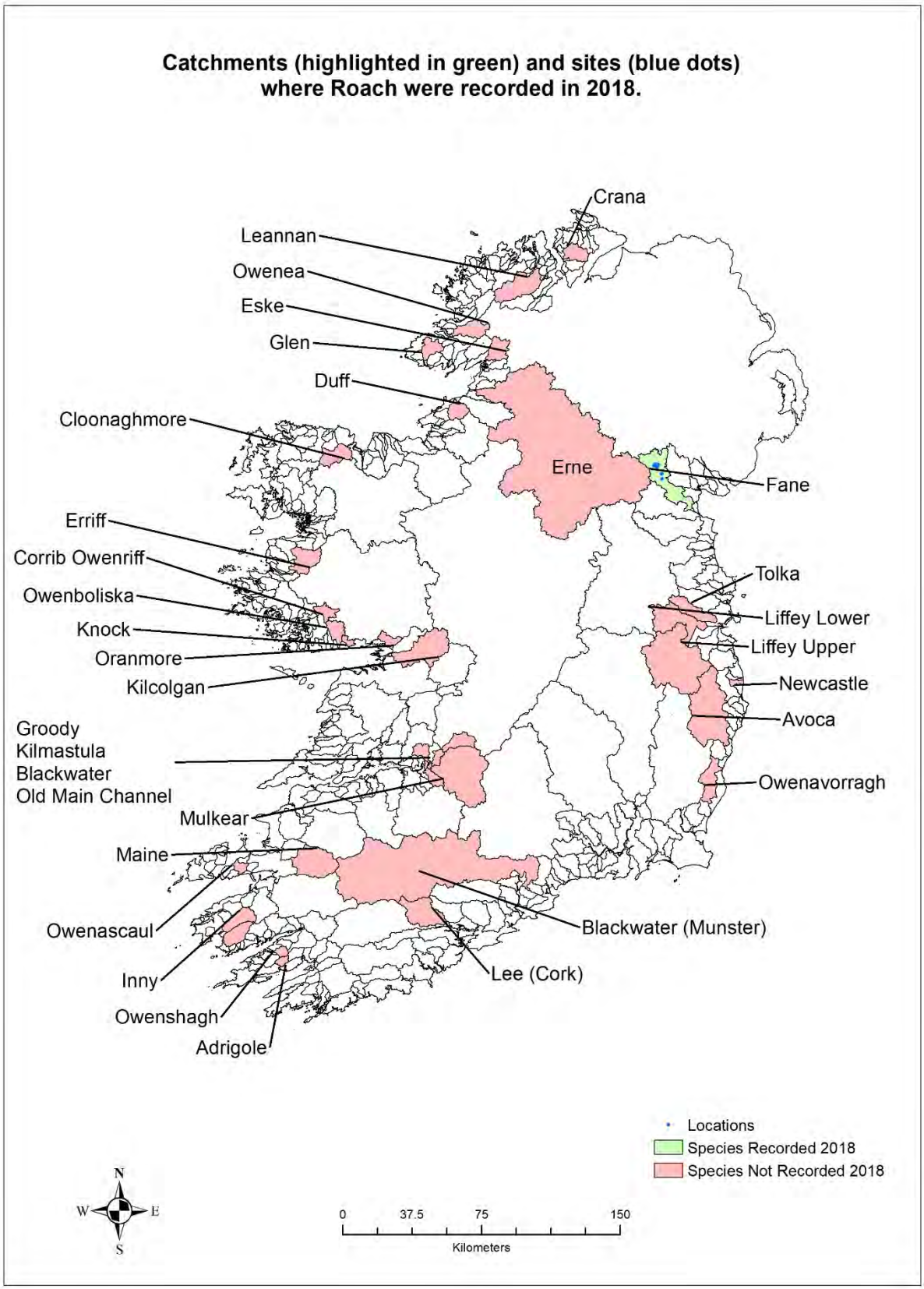

Catchments (highlighted in green) and sites (blue dots)
where Minnow were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Groody
Kilmastula
Blackwater
Old Main Channel
Owenavorragh
Mulkear
Maine
Owenascaul
Blackwater (Munster)
Inny
Lee (Cork)
Owenshagh
Adrigole
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

B.8. Minnow

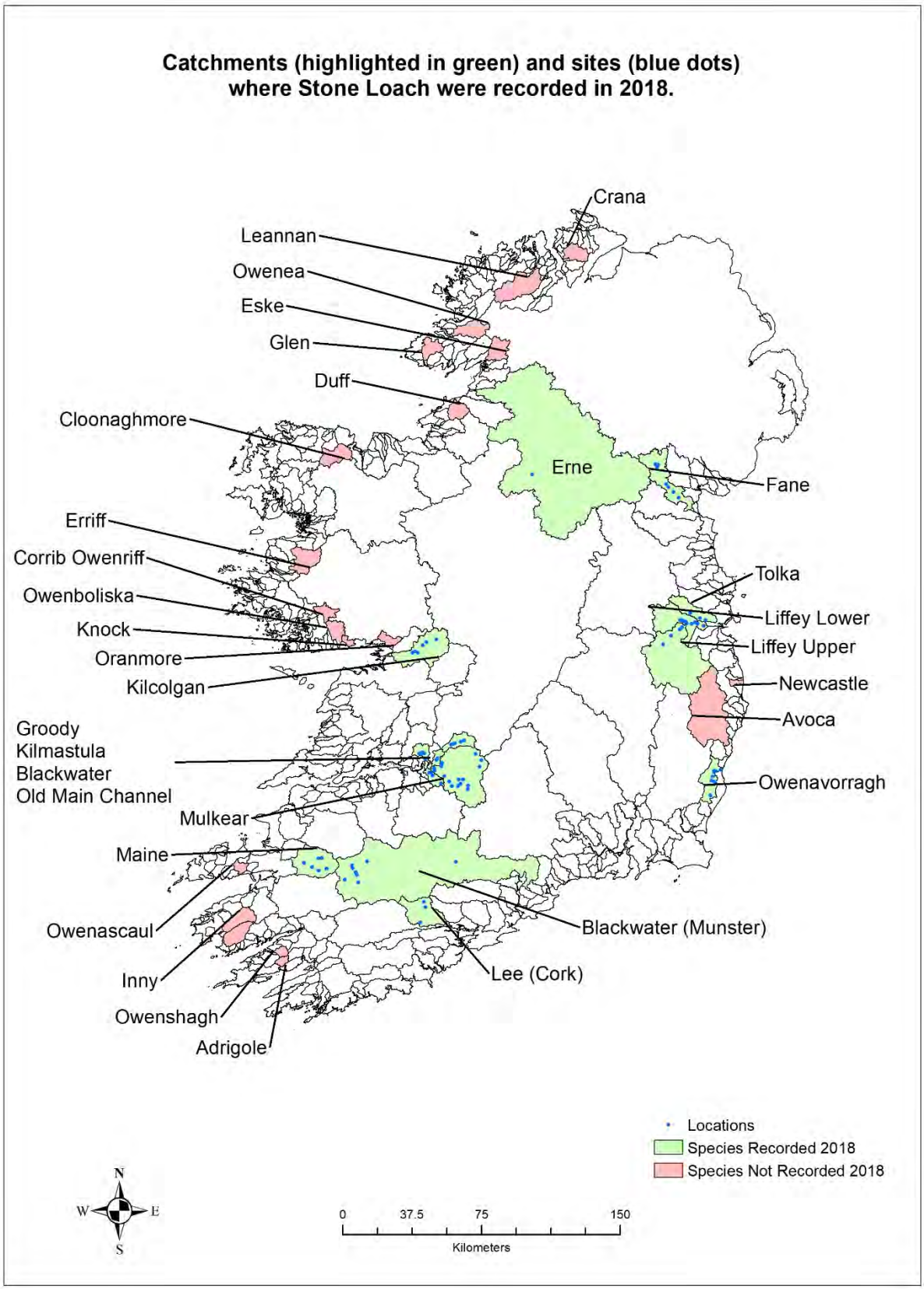
B.9. Pike


Catchments (highlighted in green) and sites (blue dots)
where Pike were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Groody
Kilmastula
Blackwater
Old Main Channel
Owenavorragh
Mulkear
Maine
Owenascaul
Blackwater (Munster)
Lee (Cork)
Inny
Owenshagh
Adrigole
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

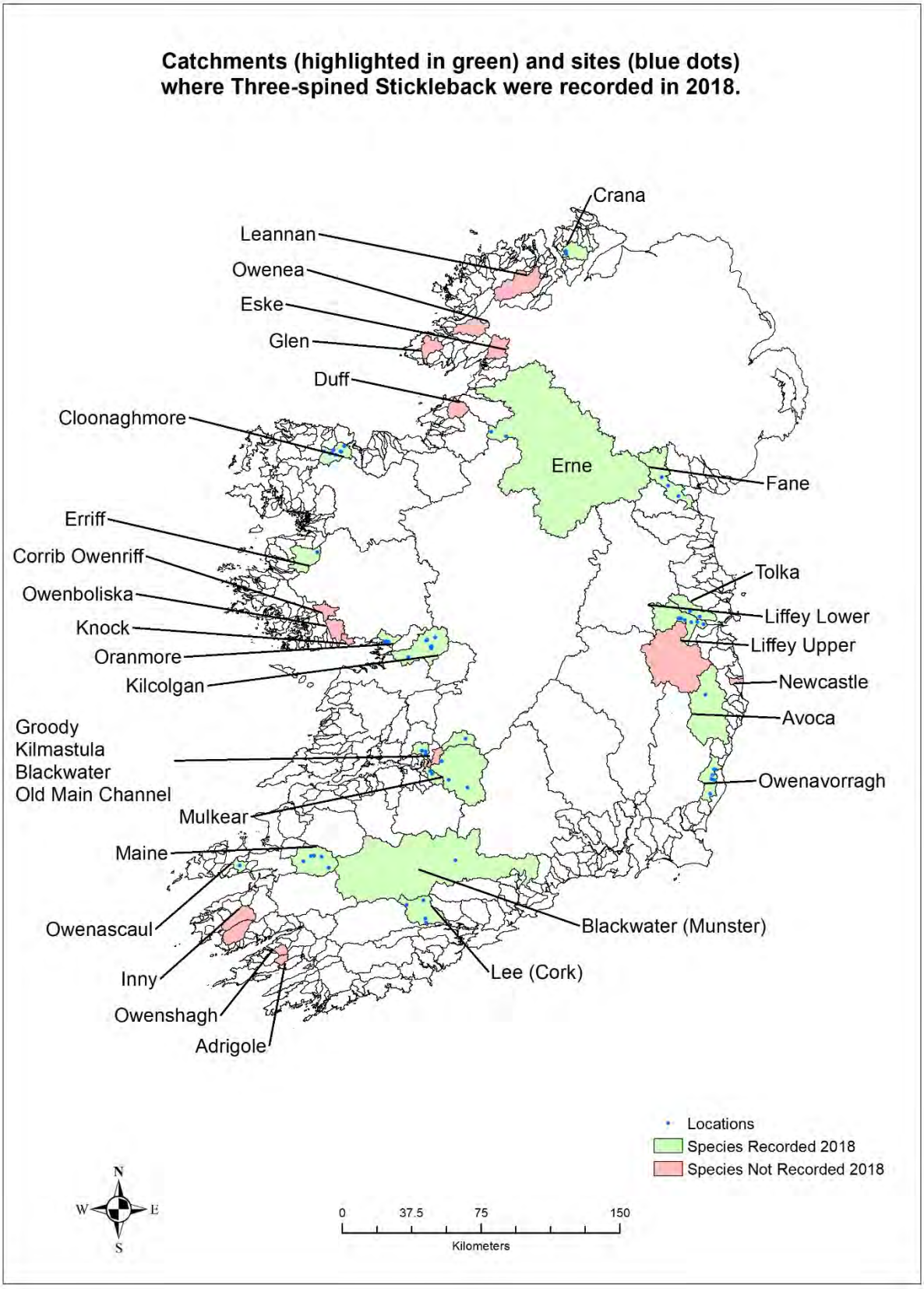
B.10. Roach


Catchments (highlighted in green) and sites (blue dots) where Roach were recorded in 2018.
Crana
Leannan
Owenea
Eske
Glen
Duff
Cloonaghmore
Erne
Fane
Erriff
Corrib Owenriff
Owenboliska
Knock
Oranmore
Kilcolgan
Tolka
Liffey Lower
Liffey Upper
Newcastle
Avoca
Groody
Kilmastula
Blackwater
Old Main Channel
Owenavorragh
Mulkear
Maine
Owenascaul
Blackwater (Munster)
Inny
Lee (Cork)
Owenshagh
Adrigole
Locations
Species Recorded 2018
Species Not Recorded 2018
N
W
E
S
0
37.5
75
150
Kilometers

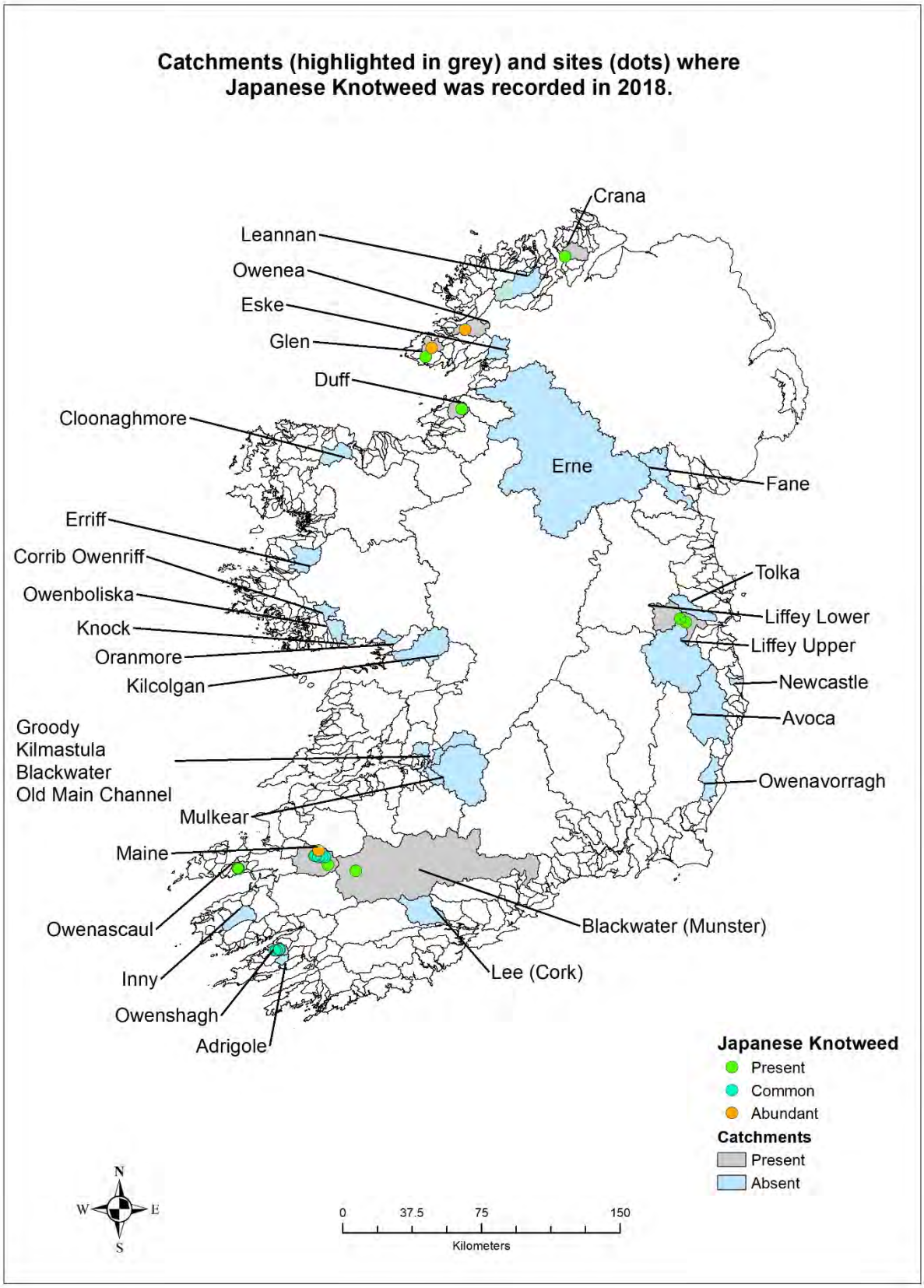
B.11. Stone Loach



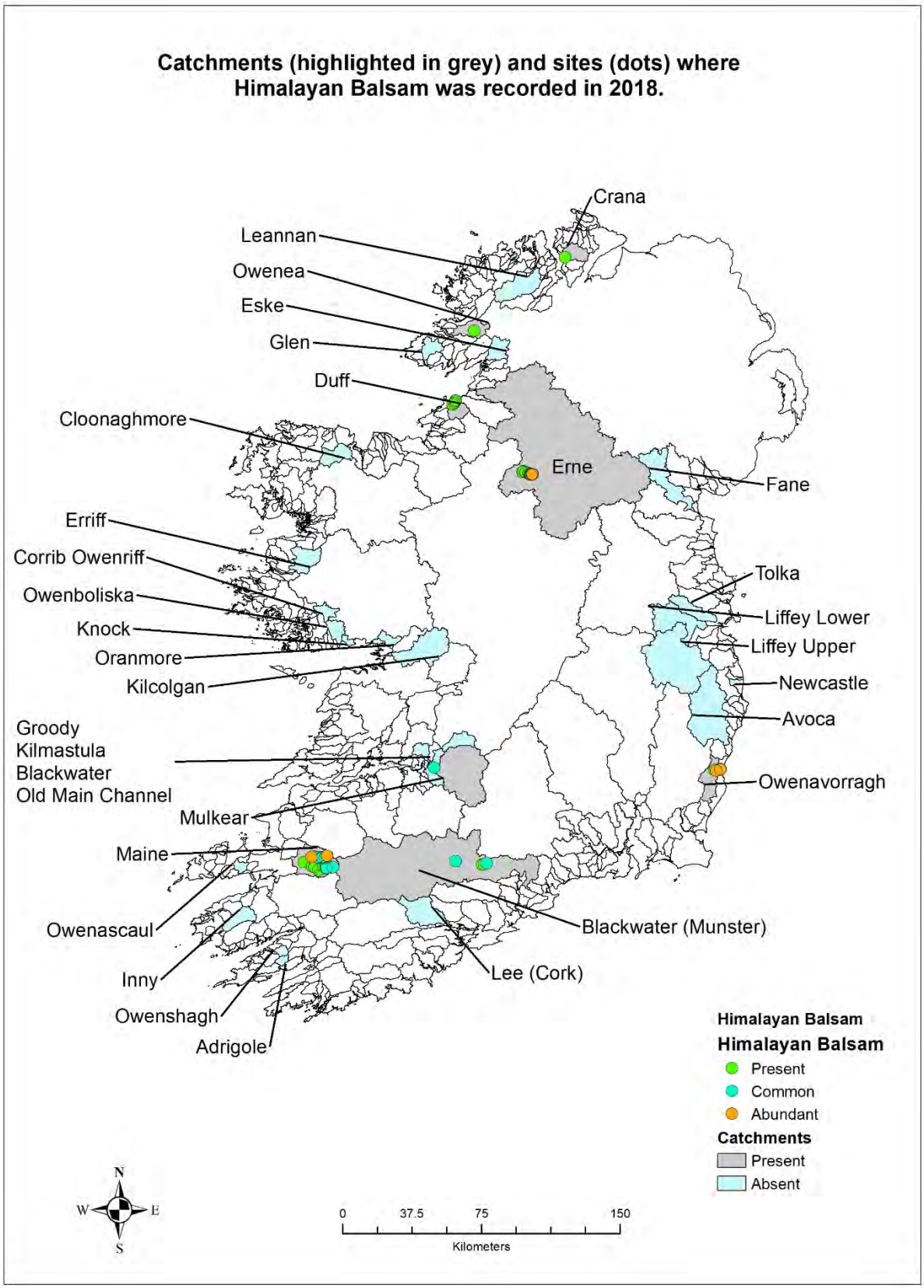
B.12. Three-Spined Stickleback.



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 (2014-2018)	
Code/River	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	CWEF	#Surveys	CWEF	#Surveys
002/Flurry				5.24					17.15				11.20	2	17.15	1
003/Castletown			26.41				22.96	13.59					20.99	3	13.59	1
004/Fane			16.17			22.09			8.94*		0.5*	3.65	13.97	3	3.65	1
005/Glyde		2.49	17.08	31.61					5.56				14.19	4	5.56	1
006/Dee		8.55	16.92	21.72	20.13				10.51				15.57	5	10.51	1
008/Boyne		21.91	17.54	19.38				13.21		14.37			17.28	5	13.79	2
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	11.72	2
015/Liffey Upper		12.93	5.11	8.15	16.20	10.13				2.63*		5.33*	10.50	5		
016/Dodder					13.93								13.93	1		
018/Dargle			1.40	2.53	7.52				4.19				3.91	4	4.19	1
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	3.55	2
026/Avoca		3.79	5.56	5.20	18.88	5.15				1.89		8.37*	7.34	5	1.89	1
028/Owenavorragh				19.76			0.33		4.61			5.37	7.52	4	4.99	2
031/Slaney	19.05		15.94	18.42				17.68		8.70	14.30		15.01	5	13.56	3
032/Duncormick								11.54					11.54	1	11.54	1
033/Corock					37.11					5.47	1.23		14.60	3	3.35	2
034/Owenduff (Wexford)				4.97	10.65	15.91				3.47	0.40		7.08	5	1.94	2
037/Barrow	17.72		10.93	8.71	21.23	26.72				8.93*	11.54		15.83	5	11.54	1
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				5.58	3	7.32	2
051/Tay					8.75				3.07	1.40			4.41	3	2.24	2
053/Colligan					29.32			9.50		3.62			14.15	3	6.56	2
055/Lickey		12.37							14.14				13.26	2	14.14	1
059/Blackwater (Munster)	22.72	10.67								13.56		22.76*	15.65	3	13.56	1
060/Bride		10.40		24.70				19.85			7.65		15.65	4	13.75	2
061/Tourig						9.40					0.73		5.07	2	0.73	1
062/Womanagh		15.45						2.39			1.43		6.42	3	1.91	2
064/Owennacurra	15.76										1.77		8.77	2	1.77	1
066/Lee (Cork)			0.26										0.26	1		
066/Lower Lee (Cork)												17.97	17.97	1	17.97	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 (2014-2018)	
Code/River	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	CWEF	#Surveys	CWEF	#Surveys
080/Glengarriff			5.93										5.93	1		
081/Adrigole							4.01	1.33				15.64	6.99	3	8.49	2
082/Kealincha	0.00								0.00				0.00	2	0.00	1
083/Lough Fada	3.23								1.68				2.46	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		24.44	3	24.09	1
088/Roughty					19.78								19.78	1		
089/Finnihy						8.61	0.00				0.58		3.06	3	0.58	1
090/Blackwater (Kerry)	30.54	15.52	13.35					18.01					19.36	4	18.01	1
093/Owreagh	8.94						2.07	2.81					4.61	3	2.81	1
097/Currane								24.51					24.51	1	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					10.14	3	8.61	1
102/Ferta	19.42							10.74			6.88		12.35	3	8.81	2
103/Behy	15.41	6.14	4.03	8.71	7.17					2.89			5.79	5	2.89	1
106/Laune		17.42*									21.41		21.41	1	21.41	1
107/Maine	31.88	32.81	34.23*								22.05†	19.61†	32.35	2		
108/Emlagh	10.37	3.66	13.38	3.84	2.59					2.10			5.11	5	2.10	1
109/Owenascaul	20.41		22.27				16.08	16.28				9.51	16.91	5	12.90	2
110/Owenalondrig			21.90										21.90	1		
111/Milltown (Kerry)		15.33		26.44			13.02		8.76				15.89	4	8.76	1
112/Feohanagh			16.61				3.20	11.93					10.58	3	11.93	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	2
118/Brick	0.00												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	0.14	2
126/Maigue			2.82	16.05			12.05						10.31	3		
128/Shannon Mulkear												8.00†	8.00	1	8.00	1
128/Shannon Blackwater											10.74†	10.74†	10.74	2		

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

	Fry Year												Most recent 5 surveys		Most Recent 5yrs Data (2014-2018)	
Code/River	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	CWEF	#Surveys	CWEF	#Surveys
128/Shannon Groody											0†	7.45†	3.73	2		
128/Shannon Kilmastula											10.35†	24.45†	17.40	2		
128/Shannon Old M. Channel											5.5*†	18.25*†				
128/Shannon Kilcrow				0.69									0.69	1		
128/Shannon Graney				0.19									0.19	1		
128/Shannon Woodford				0.00									0.00	1		
130/Owenagarney (Ratty)							16.97	9.97					13.47	2	9.97	1
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	18.08	2
134/Skivaleen					14.82				11.70	14.54*			13.26	2	11.70	1
135/Annageeragh							1.82	9.24					5.53	2	9.24	1
142/Inagh								5.31	3.59				4.45	2	4.45	2
143/Aughyvackeen					1.00						1.70		1.35	2	1.70	1
145/Kilcolgan			2.51								0.1*	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							1.50*	12.53	1		
149/Owenboliska (Spiddal)		4.06						4.52				0.60	3.06	3	2.56	2
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	22.13	5	22.33	5
171/Carrownisky		18.25				20.60	18.22				4.25*		19.02	3		
172/Bunowen			13.62										13.62	1		
173/Owenwee (Belclare)				8.47	7.25	15.27							10.33	3		
178/Newport (L. Beltra)	16.06		5.53					17.40					13.00	3	17.40	1
179/Srahmore			4.33										4.33	1		
181/Owengarve			5.51					6.19	0.72				4.14	3	3.46	2
185/Owenduff (Bangor)			6.00					6.20					6.10	2	6.20	1
186/Owenmore - MC							27.65						27.65	1		
186/ Carrowmore							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
194/Cloonaghmr (Palmerstn)		8.96		9.71	22.27	17.32	15.02				5.07*	14.63	15.79	5	14.63	1
196/Brusna			4.70				14.16	14.74					11.20	3	14.74	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 (2014-2018)	
Code/River	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	CWEF	#Surveys	CWEF	#Surveys
198/Leaffony	5.76		7.95						1.87				5.19	3	1.87	1
203/Garvogue (Bonnet)	18.41	13.26	16.83	11.31	7.08	18.54							13.4	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	19.20	2
210/Erne		7.37†	0.17†	0.08†	0.00†	0.00†	0.00†	1.6†	1.16†	1.25†	0.00†	0.24†	-	-		
211/Abbey							7.20	28.14					17.67	2	28.14	1
212/Ballintra			10.27				13.40	18.30					13.99	3	18.30	1
213/Laghy			8.58				14.97	11.02					11.52	3	11.02	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	18.94	2
217/Bungosteen					27.91		19.23				13.17		20.10	3	13.17	1
219/Glen (Ballyshannon)				19.44					18.37			18.56	18.79	3	18.47	2
220/Owenwee (Yellow R)	24.13	5.00	14.81			20.31	19.65						16.78	5		
221/Bracky		10.82				21.57		12.24					14.88	3	12.24	1
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	1.00	1
228/Gweedore (Crolly R.)		15.99			11.32								13.66	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		6.43			14.89			17.31		3.71*			12.88	3	17.31	1
240/Lackagh		18.86	15.82		19.20	23.57				17.5*	22.50		19.99	5	22.50	1
248/Leannan	9.47	7.41	8.73	16.71	12.36	21.51	19.51	20.87	15.27	15.05*	18.66	20.11	18.88	5	18.73	4
249/Swilly		9.33	7.36				18.08	8.05					10.71	4	8.05	1
250/Isle (Burn)						2.12							2.12	1		
251/Burnfoot		7.77		2.90									5.34	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				2.47	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
930/Quin									6.47				6.47	1	6.47	1
1461/Oranmore												0.63	0.63	1	0.63	1

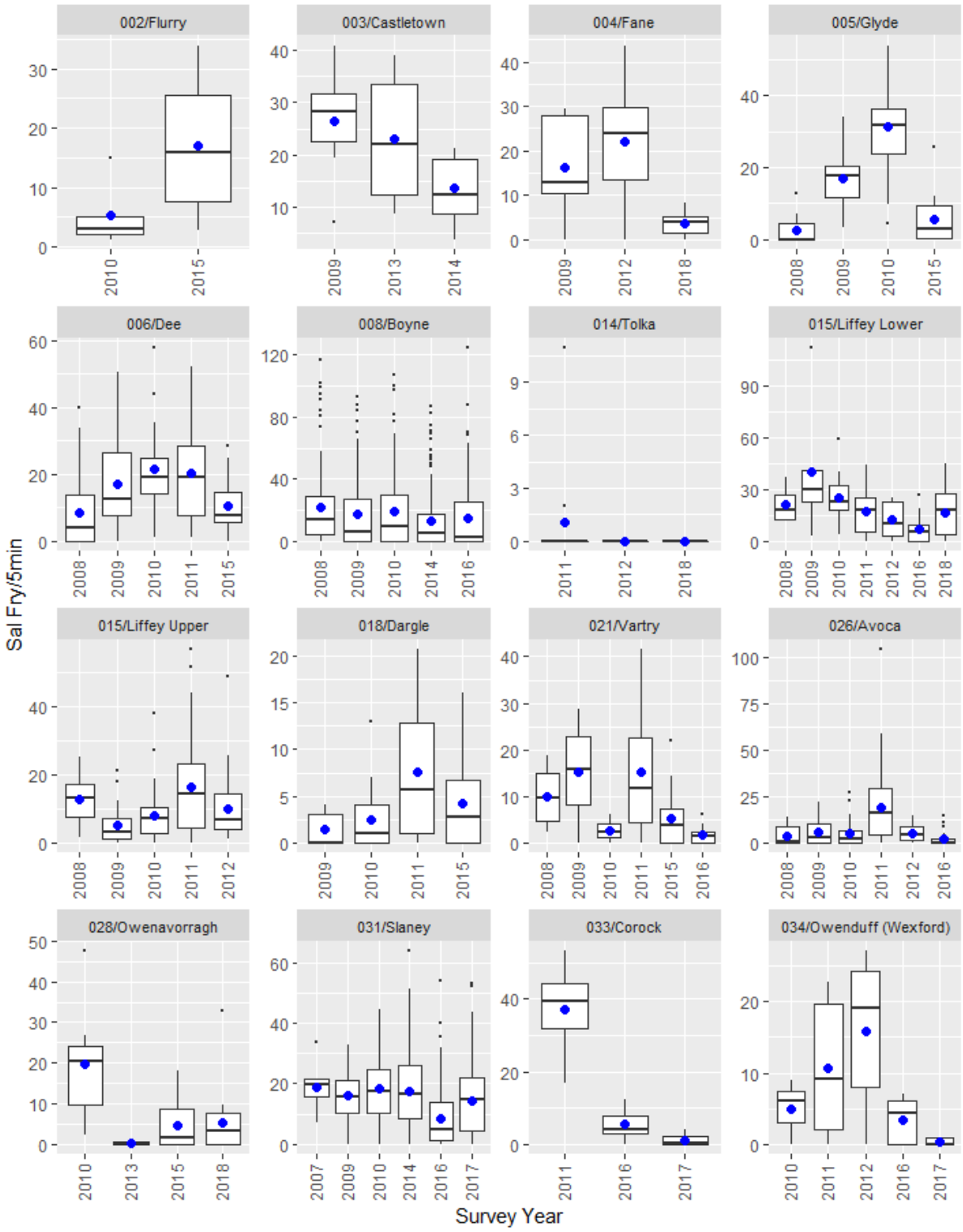
*- Partial or incomplete surveys not included in calculation of CWEF average. † - Sub-catchment Surveys

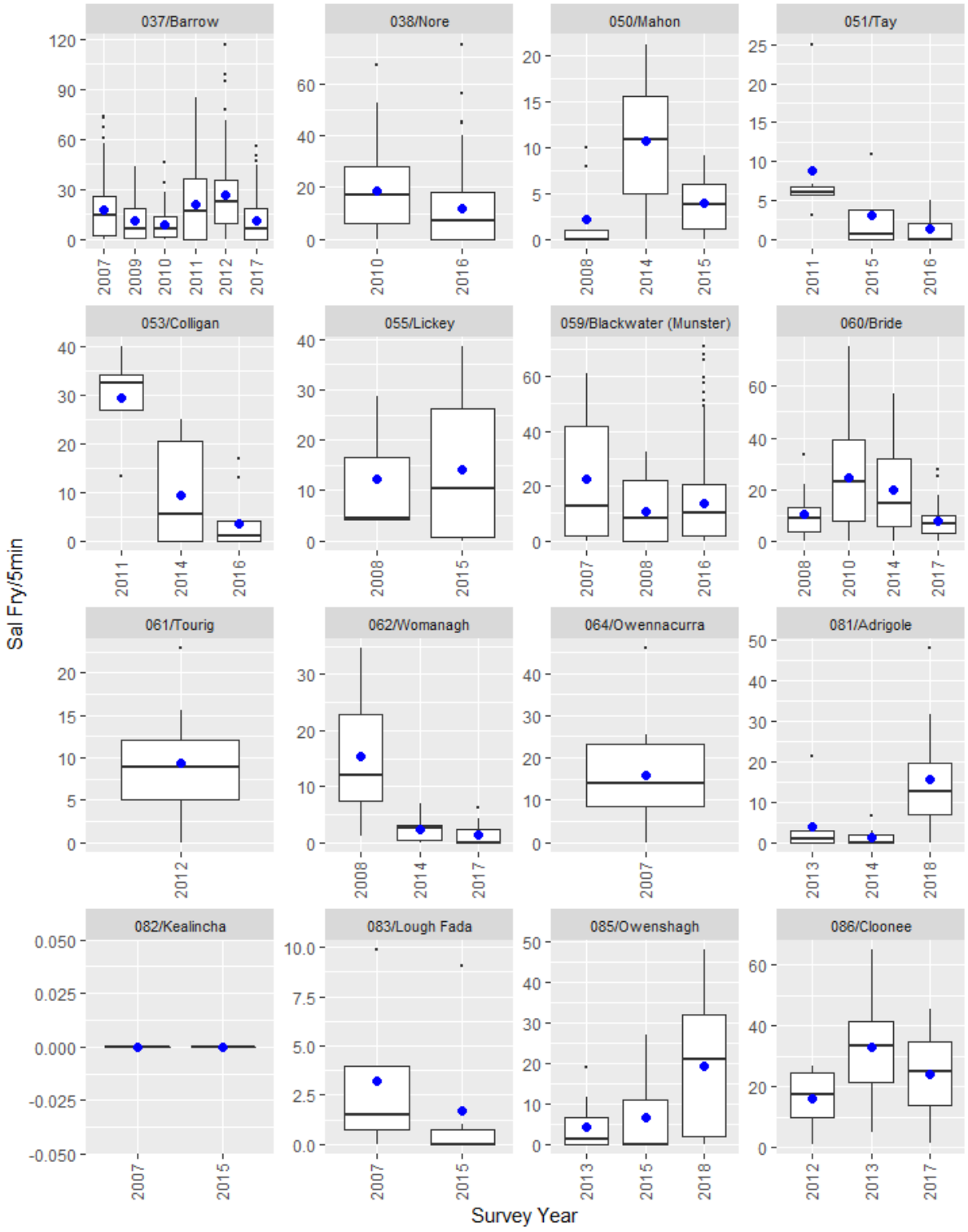
Code/River	Fry Year												Most recent 5 surveys		Most Recent 5yrs Data (2014-2018)	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	CWEF	#Surveys	CWEF	#Surveys
1551/Loch An Mhuillin											0.00		0.00	1	0.00	1

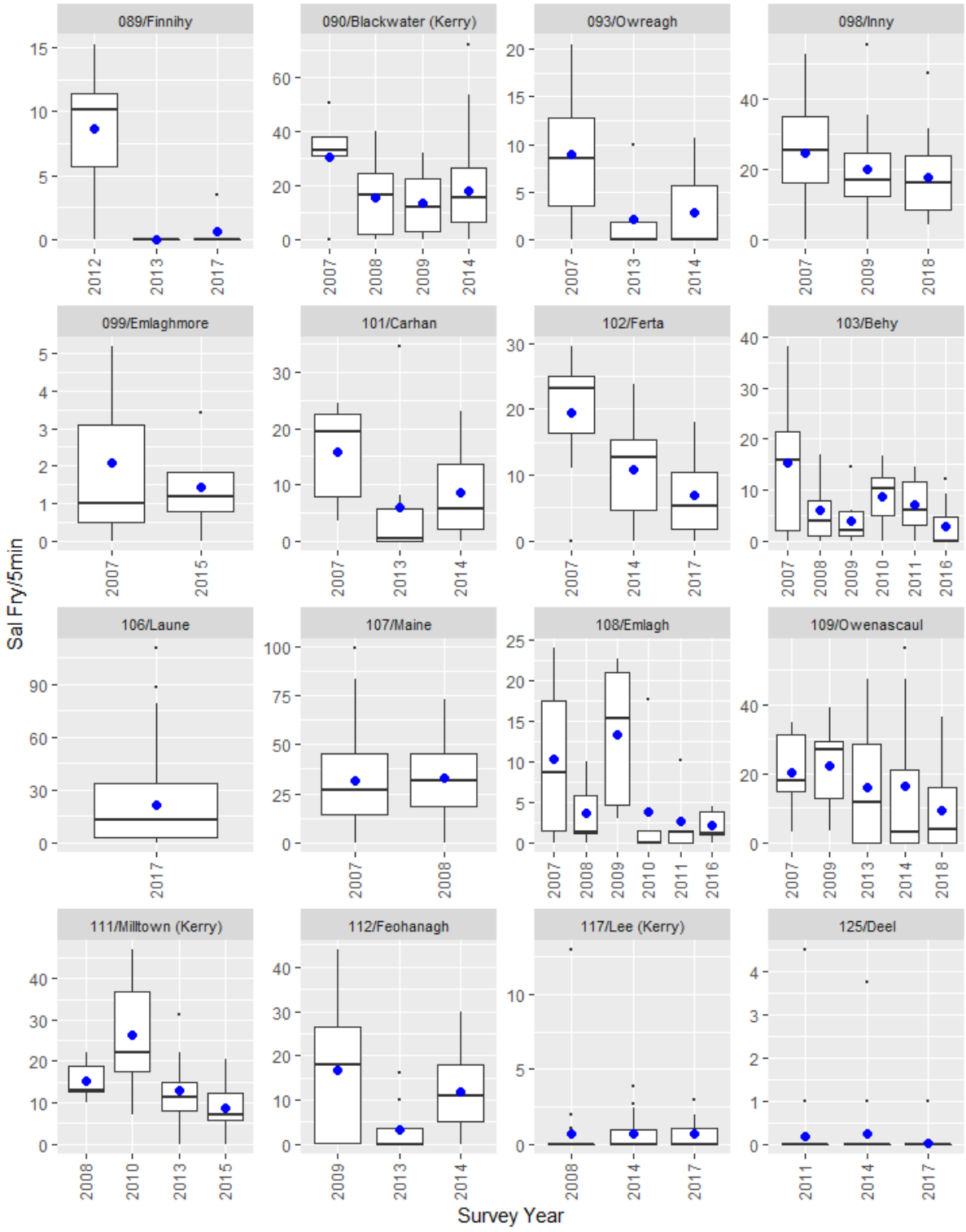
*- Partial or incomplete surveys not included in calculation of CWEF average. † - Sub-catchment Surveys

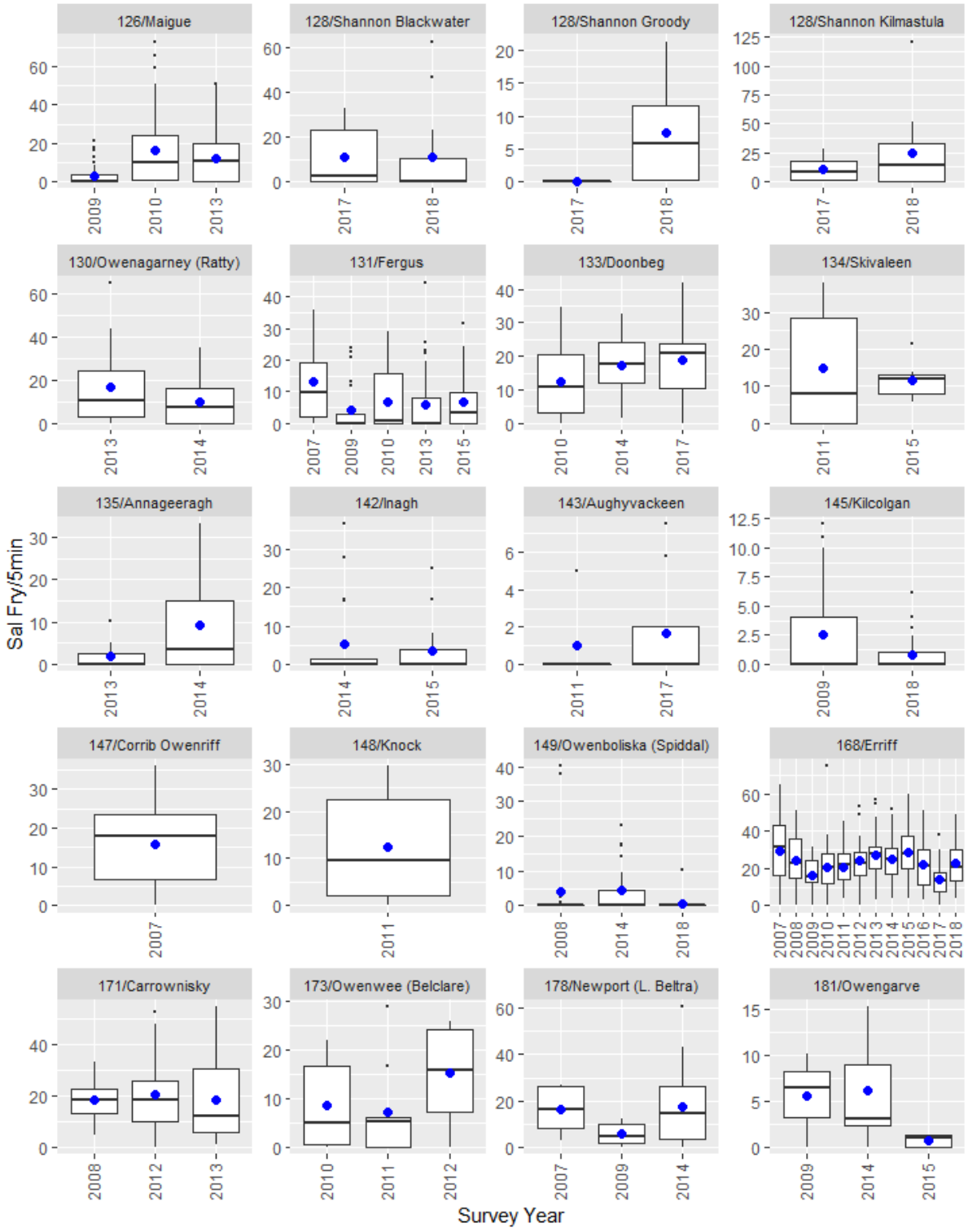
D. Boxplots: CWEF results included in analysis for each catchment >2 surveys from 2007-2018.

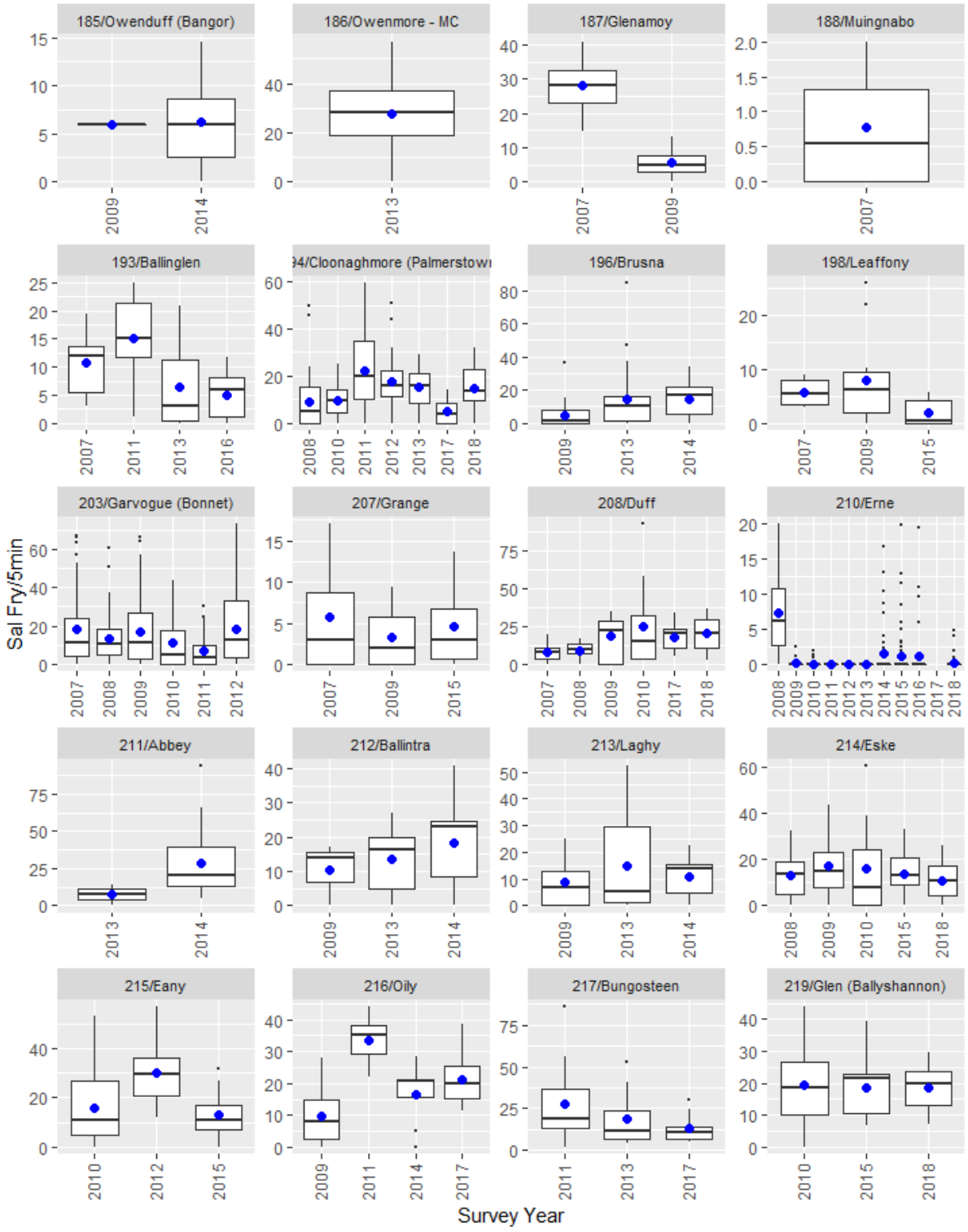
Boxplots represent the distribution of individual site abundances; blue points indicate the average.

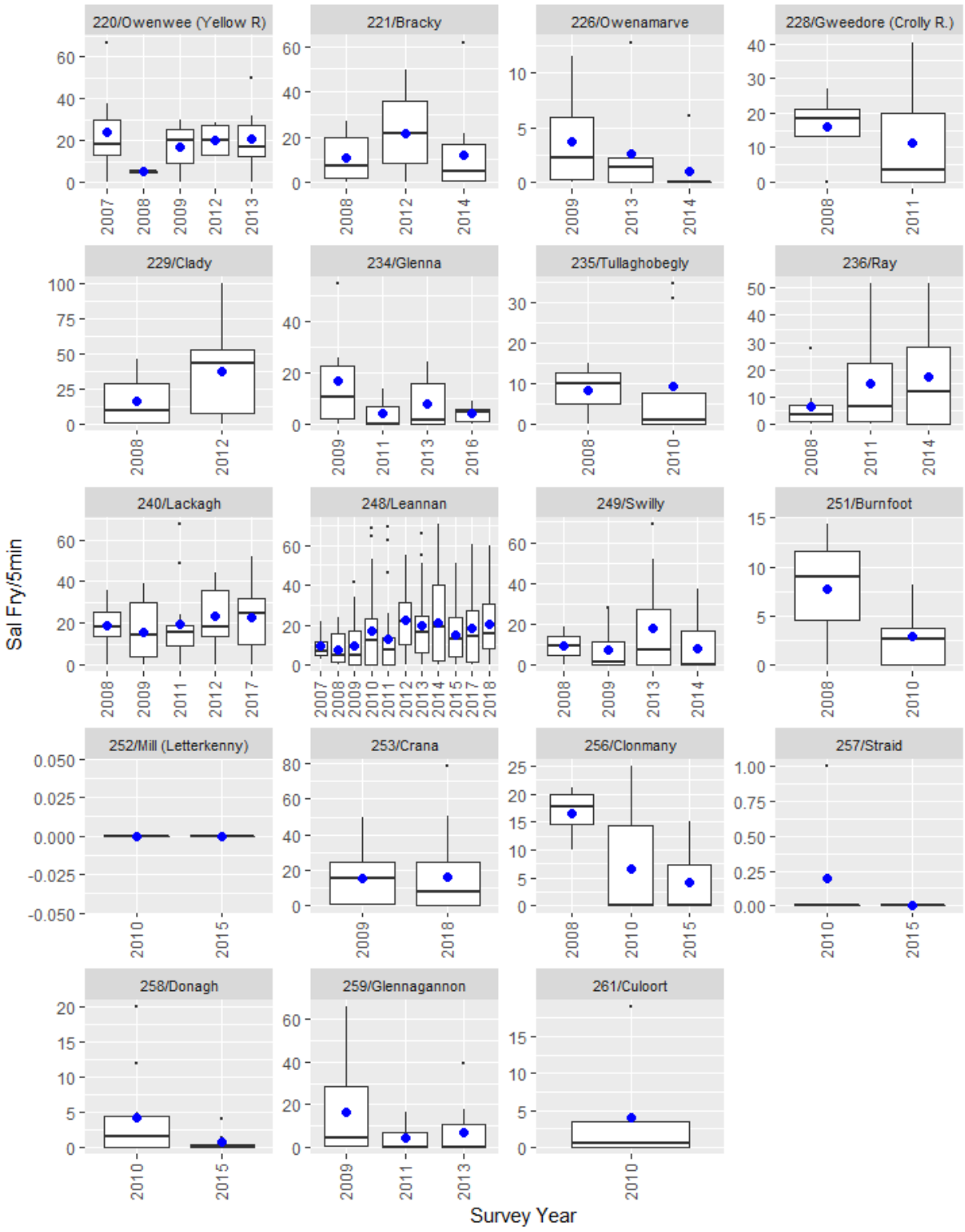



037/Barrow
038/Nore
050/Mahon
051/Tay
053/Colligan
055/Lickey
059/Blackwater (Munster)
060/Bride
061/Tourig
062/Womanagh
064/Owennacurra
081/Adrigole
082/Kealincha
083/Lough Fada
085/Owenshagh
086/Cloonee
Sal Fry/5min
Survey Year


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)
125/Deel
Sal Fry/5min
Survey Year


126/Maigue
128/Shannon Blackwater
128/Shannon Groody
128/Shannon Kilmastula
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)
178/Newport (L. Beltra)
181/Owengarve
Sal Fry/5min
Survey Year


185/Owenduff (Bangor)
186/Owenmore - MC
187/Glenamoy
188/Muingnabo
193/Ballinglen
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
217/Bungosteen
219/Glen (Ballyshannon)
Sal Fry/5min
Survey Year


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
261/Culoort
Sal Fry/5min
Survey Year

E. Scale Database

River	Year	Fisher Type			Length Weight Information				Scale Reading Status		Grand Total	Dates Fish Captured	
		Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined		From	To
Avoca	2010	4					4		4		4	13/09/2010	27/09/2010
Ballinakill	2018	1					1		1		1	23/07/2018	23/07/2018
Bandon	2015	51				1	46	4		51	51	10/05/2015	27/09/2015
Bandon	2016	55	3				57	1		58	58	05/03/2016	26/08/2016
Barrow	2006		4			4			4		4	14/06/2006	14/06/2006
Blackwater			1				1		1		1		
Blackwater	1994		2		2				2		2	28/09/1994	29/09/1994
Blackwater	2006		52			3	49		52		52	05/04/2006	14/08/2006
Blackwater	2011		1				1		1		1	19/07/2011	19/07/2011
Blackwater	2013	6					4	2		6	6	28/04/2013	17/09/2013
Blackwater	2016		689			2	674	13	689		689	24/05/2016	10/08/2016
Blackwater	2017	3	856		4	7	830	18	859		859	28/05/2017	14/08/2017
Blackwater (Kerry)	1999	3					3		3		3	11/08/1999	11/08/1999
Blackwater (Kerry)	2001	1	4				3	2	5		5	15/06/2001	19/06/2001
Blackwater (Munster)	2011	13	54				63	4		67	67	13/07/2011	12/08/2011
Blackwater (Munster)	2012	1	133				103	31	2	132	134	28/05/2012	27/08/2012
Blackwater (Munster)	2013	6					1	5		6	6	02/05/2013	26/06/2013
Blackwater (Munster)	2014		8				8			8	8	08/08/2014	13/08/2014
Boyne	1992	1					1		1		1	27/09/1992	27/09/1992
Boyne	2008		6		4	1	1		6		6	10/10/2008	22/10/2008
Boyne	2013		187		3			184	86	101	187	18/06/2013	25/09/2013
Bundorragh	1985		1				1		1		1	02/06/1985	02/06/1985
Bundorragh	1986		1		1				1		1	10/08/1986	10/08/1986
Bundorragh	2005		1				1		1		1	17/05/2005	17/05/2005
Bundorragh	2011		50				50		50		50	15/04/2011	13/05/2011
Caragh	2007	13	12				14	11	25		25	08/02/2007	21/06/2007
Caragh	2008	1						1	1		1	01/03/2008	01/03/2008
Caragh	2009		1					1	1		1	28/05/2009	28/05/2009
Caragh	2010	4	2		1			5	6		6	10/03/2010	08/04/2010
Caragh	2011	1					1		1		1	02/06/2011	02/06/2011

		Fisher Type			Length Weight Information				Scale Reading Status			Dates Fish Captured	
River	Year	Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined	Grand Total	From	To
Cashen	2017		157			21	135	1	120	37	157	28/05/2017	31/07/2017
Castlemaine Harbour	2010		785				785		622	163	785	10/06/2010	28/08/2010
Castlemaine Harbour	2013		238		54	6	32	146	210	28	238	03/05/2013	30/07/2013
Castlemaine Harbour	2016		36		1	30	5		2	34	36	15/06/2016	28/07/2016
Castlemaine Harbour	2017		9		9				9		9	11/07/2017	18/07/2017
Castletown	1996		2		2				2		2	10/09/1996	10/09/1996
Cork Harbour	2013		142		21	1	80	40	117	25	142	16/05/2013	01/08/2013
Cork Harbour	2016		129		2	17	103	7	87	42	129	01/06/2016	15/09/2016
Cork Harbour	2017		54				54		27	27	54	18/05/2017	14/07/2017
Cork Harbour	2018		38			1	33	4	5	33	38	18/05/2018	25/07/2018
Corrib	1987	1					1		1		1	22/04/1987	22/04/1987
Corrib	1990		1					1	1		1	09/05/1990	09/05/1990
Corrib	1998		1					1	1		1	25/06/1998	25/06/1998
Corrib	2000		1		1				1		1	19/08/2000	19/08/2000
Corrib	2005	279	171			3	446	1	450		450	01/02/2005	26/08/2005
Corrib	2006	401			4	2	392	3	401		401	27/03/2006	30/08/2006
Corrib	2011	301	11			1	311		312		312	26/03/2011	14/08/2011
Corrib	2012	2	186			3	184	1	187	1	188	09/03/2012	15/08/2012
Corrib	2014	385				6	376	3	335	50	385	02/04/2014	22/08/2014
Corrib	2015	708					708		532	176	708	24/03/2015	31/07/2015
Corrib	2016	506				2	492	12	506		506	12/04/2016	16/09/2016
Corrib	2017	27	474		1	6	492	2	501		501	30/03/2017	09/07/2017
Corrib	2018	485				4	475	6	485		485	13/04/2018	11/09/2018
Corrib	2013	439	2		4	5	426	6	441		441	16/01/2013	25/09/2013
Corrib	2017				1	1	67		69		69	09/07/2017	09/08/2017
Costello	1987	8					8		8		8	13/08/1987	01/10/1987
Costello	1988	60					59	1	60		60	25/05/1988	30/09/1988
Costello	1989		1				1		1		1	08/09/1989	08/09/1989
Costello	1998		1			1			1		1	26/08/1998	26/08/1998
Crana	1993		3				3		3		3	12/05/1993	10/06/1993
Crana	2010		1				1		1		1	04/06/2010	04/06/2010
Currane	1992		2				1	1	2		2	07/04/1992	25/05/1992
Currane	2006	20					20		20		20	10/06/2006	28/07/2006
Currane	2007	13					13		13		13	08/05/2007	20/07/2007

		Fisher Type			Length Weight Information				Scale Reading Status			Dates Fish Captured	
River	Year	Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined	Grand Total	From	To
Deel			9					9	9		9		
Delphi	1993		1			1			1		1	15/03/1993	15/03/1993
Drowes	1992	1					1		1		1	19/05/1992	19/05/1992
Eany	2012	1	42				24	19	43		43	10/07/2012	01/08/2012
Eany	2017		2				2		2		2	08/05/2017	08/05/2017
Erriff	1983	168	6		2	46	115	11	120	54	174	09/05/1983	10/10/1983
Erriff	1984	390				15	369	6	184	206	390	16/05/1984	30/09/1984
Erriff	1985	283	52		2	2	324	7	294	41	335	10/03/1985	03/12/1985
Erriff	1986	565	83			83	558	7	615	33	648	19/01/1986	31/12/1986
Erriff	1987	634	35		1	35	612	21	669		669	02/01/1987	30/12/1987
Erriff	1988	61	25			25	53	8	86		86	02/01/1988	30/09/1988
Erriff	1989	33					20	13	33		33	17/05/1989	24/09/1989
Erriff	1990		6			6			6		6	11/02/1990	09/03/1990
Erriff	1991	5	246		1	238	10	3	252		252	26/03/1991	24/07/1991
Erriff	1992		106			106			104	2	106	04/05/1992	01/09/1992
Erriff	1993	2			1			1	2		2	19/06/1993	22/09/1993
Erriff	1994		8			8			8		8	23/03/1994	25/03/1994
Erriff	1995		6			6			6		6	26/09/1995	27/09/1995
Erriff	1997		2				1	1	2		2	14/09/1997	22/09/1997
Erriff	1998	11	1				1	11	12		12	12/06/1998	07/09/1998
Erriff	2001		6			6			6		6	06/12/2001	06/12/2001
Erriff	2002		4				1	3	4		4	30/05/2002	10/08/2002
Erriff	2005	113	130		1	2	237	3	237	6	243	16/03/2005	29/09/2005
Erriff	2006	84	129		1	1	195	16	213		213	19/05/2006	24/09/2006
Erriff	2007	15	42			42	15		57		57	24/04/2007	18/08/2007
Erriff	2008	62			1		50	11	62		62	01/07/2008	22/09/2008
Erriff	2010	55	176			16	215		231		231	09/06/2010	30/12/2010
Erriff	2011	23	25			2	44	2	48		48	05/05/2011	19/09/2011
Erriff	2012	2					2		2		2	16/06/2012	16/06/2012
Erriff	2014	5	114				119		119		119	13/04/2014	23/10/2014
Erriff	2015	131	214				344	1	345		345	28/04/2015	25/10/2015
Erriff	2016	56	59			3	108	4	115		115	30/03/2016	16/11/2016
Erriff	2017	46	568			61	552	1	614		614	10/05/2017	26/10/2017
Erriff	2018	44	179		2		219	2	223		223	21/05/2018	25/09/2018

		Fisher Type			Length Weight Information				Scale Reading Status			Dates Fish Captured	
River	Year	Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined	Grand Total	From	To
Erriff			11		1		3	7	11		11		
Eske	2004		3				3		3		3	19/05/2004	22/05/2004
Fane	1986	5					5		5		5	05/03/1986	05/03/1986
Feale	2006		15			15				15	15		
Feale	2012		88		17	1	63	7	88		88	12/06/2012	27/08/2012
Feale	2013	1					1		1		1	26/07/2013	26/07/2013
Feale	2016	36	107			28	115		143		143	10/06/2016	14/09/2016
Feale	2018		85				83	2	85		85	06/06/2018	30/07/2018
Glenamoy	2005	1						1	1		1		
Gweebarra	2007	2	7				7	2	9		9	18/05/2007	30/07/2007
Gweebarra	2018		31			17	14		31		31	02/07/2018	12/07/2018
Ilen	2013		13					13		13	13	14/05/2013	22/07/2013
Inagh	1995		2			2			2		2	28/09/1995	28/09/1995
Inagh	2003		1				1		1		1	22/12/2003	22/12/2003
Inny	1992	1					1		1		1	25/07/1992	25/07/1992
Inny	2006	1					1		1		1	03/09/2006	03/09/2006
Inny	2013		9		3		3	3	3	6	9	26/06/2013	02/07/2013
Invermore	1995		12			12			12		12	12/04/1995	12/04/1995
Invermore	1996		2				2		2		2		
Invermore	2005		3				3			3	3	13/04/2005	13/04/2005
Invermore	2006		1				1		1		1	13/07/2006	13/07/2006
Killary Harbour	1984		89			6	83		80	9	89	29/06/1984	29/07/1984
Killary Harbour	1985		161				161		160	1	161	01/07/1985	19/07/1985
Killary Harbour	1987		263				263		263		263	22/06/1987	24/07/1987
Killary Harbour	1989		1					1	1		1	18/07/1989	18/07/1989
Killary Harbour	2001		1					1	1		1	29/06/2001	29/06/2001
Killary Harbour	2004		9				9		9		9	29/04/2004	05/05/2004
Killary Harbour	2005		30				30		30		30	29/04/2005	31/05/2005
Killary Harbour	2006		9			2	7		9		9	13/05/2006	27/07/2006
Killary Harbour	2015	1					1		1		1	16/06/2015	16/06/2015
Killary Harbour	2017		7			1	6		7		7	03/05/2017	19/05/2017
Laune	1994	1					1		1		1	29/06/1994	29/06/1994
Laune	2005	1			1				1		1		
Laune	2013		18		18				18		18	07/06/2013	10/07/2013

		Fisher Type			Length Weight Information				Scale Reading Status			Dates Fish Captured	
River	Year	Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined	Grand Total	From	To
Laune	2017		12			12				12	12	14/06/2017	10/07/2017
Laune	2018		8		1	7				8	8	23/05/2018	06/07/2018
Leannan	1992		119			119			36	83	119		
Leannan	2006	21	16		2		26	9	37		37	01/02/2006	25/07/2006
Liffey	2008		26		7	17	1	1	25	1	26	27/05/2008	02/10/2008
Moy	1982		1				1		1		1	21/02/1982	21/02/1982
Moy	1990		1					1	1		1	18/08/1990	18/08/1990
Moy	1993		1				1		1		1	10/06/1993	10/06/1993
Moy	1994		1				1		1		1	03/06/1994	03/06/1994
Moy	1997		12				12		12		12	20/05/1997	23/07/1997
Moy	2004	1					1		1		1	19/08/2004	19/08/2004
Moy	2008		1				1		1		1	21/04/2008	21/04/2008
Moy	2010	196					194	2	196		196	27/04/2010	11/09/2010
Moy	2011	185	3			1	182	5	188		188	23/04/2011	15/08/2011
Moy	2012	77	1			2	69	7	77	1	78	28/02/2012	17/07/2012
Moy	2016	12					12		12		12	21/07/2016	03/08/2016
Moy	2017	22	2				24		24		24	31/05/2017	14/07/2017
Mulkear	2017	2		9		1	10			11	11	12/06/2017	18/06/2017
Nore	2006	3					2	1	3		3	21/05/2006	21/06/2006
Nore	2009	2	42		2	22	16	4		44	44	03/08/2009	29/09/2009
Nore	2010	4	87		6		80	5	13	78	91	05/07/2010	30/09/2010
Nore	2011	1	1205		5	8	1182	11	1063	143	1206	12/05/2011	12/08/2011
Nore	2012	2	494	2	1	1	474	22	418	80	498	10/05/2012	25/09/2012
Nore	2013	1	1540		9	23	1450	59	1460	81	1541	14/05/2013	28/09/2013
Nore	2014		561			3	542	16	561		561	13/05/2014	14/08/2014
Owenboliska	2007		16		1	15			16		16	14/09/2007	14/09/2007
Owenduff	2002	8			1		2	5	8		8	08/04/2002	08/09/2002
Owenduff	2003	37			3		14	20	37		37	10/03/2003	25/07/2003
Owenduff	2004	6					5	1	6		6	05/03/2004	28/06/2004
Owenduff	2005	45				1	40	4	45		45	18/04/2005	23/09/2005
Owenduff	2006	4						4	4		4	17/03/2006	19/04/2006
Owenea	2006	1	15				14	2	16		16	13/06/2006	04/09/2006
Owenea	2007	1	16				17		17		17	25/07/2007	27/07/2007
Owengowla	1991		11			11			10	1	11	13/04/1991	13/06/1991

		Fisher Type			Length Weight Information				Scale Reading Status			Dates Fish Captured	
River	Year	Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined	Grand Total	From	To
Owengowla	1992		56			56			56		56	14/04/1992	24/04/1992
Owengowla	1993		1				1		1		1		
Owengowla	1994		23			23			23		23	04/05/1994	04/05/1994
Owengowla	1995		12			12			12		12	30/03/1995	12/04/1995
Owengowla	1996		4				4		4		4	27/04/1996	27/04/1996
Owengowla	1997		3			3			3		3	02/05/1997	02/05/1997
Owengowla	2005		20			2	18		6	14	20	14/04/2005	13/06/2005
Owengowla	2006		20			8	12		20		20	03/05/2006	09/12/2006
Owengowla	2007		1				1		1		1	26/02/2007	26/02/2007
Owenmore	2006	68			26		1	41	68		68	28/03/2006	07/07/2006
Owenmore - Ballinahinch	1995	43			1	4	37	1	43		43	05/07/1995	26/09/1995
Owenmore - Ballinahinch	1996	169				1	160	8	169		169	27/05/1996	30/09/1996
Owenmore - Ballinahinch	2001		4		1		3		4		4	28/06/2001	07/09/2001
Owenmore - Ballinahinch	2006	16	1				16	1	4	13	17	28/06/2006	29/09/2006
Owenmore - Ballinahinch	2007	13					12	1	1	12	13	16/07/2007	21/09/2007
Owenmore - Ballinahinch	2008	32					32		14	18	32	23/06/2008	19/09/2008
Owenmore - Ballinahinch	2009	13					13			13	13	13/07/2009	04/08/2009
Owenmore - Ballinahinch	2010	2					2			2	2	27/07/2010	23/08/2010
Owenmore - Ballinahinch	2011	9					8	1		9	9	09/05/2011	13/08/2011
Owenmore - Mc	1991		6			6			6		6		
Owenmore - Mc	2002	15					1	14	15		15	03/05/2002	04/07/2002
Owenmore - Mc	2003	4					4		4		4	29/03/2003	27/05/2003
Owenmore - Mc	2004	11			3		6	2	11		11	03/02/2004	30/12/2004
Owenmore - Mc	2005	13					6	7	13		13	31/03/2005	05/06/2005
Owenmore - Mc	2006	39	6		8		15	22	39	6	45	16/03/2006	15/06/2006
Owenmore - Mc		3	10				1	12	13		13		
Owenmore (Kerry)	2006		18			18			1	17	18		
Owenriff	1989		8				8		8		8	03/12/1989	03/12/1989
Screeb	1988	90					88	2	90		90	27/05/1988	29/09/1988
Screeb	1989	91					88	3	91		91	30/04/1989	25/09/1989
Shannon	2006		4				3	1	4		4	28/06/2006	28/06/2006
Shannon	2012		1		1				1		1	20/09/2012	20/09/2012
Slaney	1986	14					10	4	14		14	04/03/1986	04/03/1986
Slaney	1992		88			88			88		88		

		Fisher Type			Length Weight Information				Scale Reading Status			Dates Fish Captured	
River	Year	Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined	Grand Total	From	To
Slaney	1995		1				1		1		1	20/05/1995	20/05/1995
Slaney	1997	9	12			1	20		21		21	15/04/1997	29/06/1997
Slaney	1998							1	1		1		
Slaney	1999	1	2				1	2	3		3	20/03/1999	10/06/1999
Slaney	2001	14					10	4	14		14	03/04/2001	02/05/2001
Slaney	2002	12	6			1	14	3	17	1	18	10/03/2002	04/07/2002
Slaney	2003	9	11		1	2	10	7	20		20	10/03/2003	08/08/2003
Slaney	2004	5	5		1		4	5	10		10	31/03/2004	27/07/2004
Slaney	2005	4	1					5	5		5	11/04/2005	10/08/2005
Slaney	2006	44	62		2	1	81	22	106		106	10/03/2006	23/08/2006
Slaney	2008		5		2	2		1	5		5	19/03/2008	20/06/2008
Slaney	2013		6				6		6		6	06/08/2013	14/08/2013
Slaney	2018		1				1		1		1	22/03/2018	22/03/2018
Sneem	1998		1					1	1		1		
Sneem	2002	7				2	3	2	7		7	22/05/2002	19/07/2002
Sneem	2005	2	4					6	6		6	20/05/2005	15/06/2005
Sneem	2006	5					3	2	5		5	14/04/2006	25/07/2006
Sneem	2007	7	1				1	7	8		8	12/05/2007	30/07/2007
Sneem	2011	18					7	11	1	17	18	21/05/2011	17/09/2011
Suir	2010	8		2		1	9		2	8	10	12/08/2010	21/10/2010
Suir	2011	2	480		2	8	448	24	371	111	482	01/07/2011	09/09/2011
Suir	2012		438		14	18	363	43	429	9	438	02/07/2012	14/08/2012
Suir	2013		346		16	11	296	23	255	91	346	13/06/2013	13/09/2013
Swilly	1995		1		1				1		1	16/08/1995	16/08/1995
Unknown	2003	6			2		2	2	6		6	11/04/2003	05/05/2003
Unknown	2005	10				6	1	3	10		10	02/05/2005	20/09/2005
Unknown	2006	6					1	5	6		6	15/03/2006	01/06/2006
Unknown	2010		1			1				1	1	22/10/2010	22/10/2010
Unknown		16			12		2	2	16		16		

		Fisher Type			Length Weight Information				Scale Reading Status			Dates Fish Captured	
River	Year	Angling	Commercial or Scientific	Illegal	None	Length only	Length and Weight	Weight	Unread	Aged/ Examined	Grand Total	From	To
Waterford Estuary	2007	4		1		5				5	5	10/05/2007	09/08/2007
Waterford Estuary	2008	14				4	10			14	14	23/10/2008	23/11/2008
Waterford Estuary	2009	4	6			6	4		1	9	10	01/08/2009	03/11/2009
Waterford Estuary	2010	7	459		2	444	20		170	296	466	14/07/2010	27/10/2010
Grand Total		**8129**	**14093**	**14**	**300**	**1893**	**18919**	**1195**	**19664**	**2643**	**22307**		

F. Survey Density

Survey density achieved during CWEF surveys 2008-2018 expressed as number of kilometres of river with a stream order (SO) >1 per survey in each catchment. The lower the figure the more intensive the survey. (Incomplete surveys are included)

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>SO 1 (km)	km/site achieved											
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Min
2/Flurry	16	6	32			4.0					8.1				4.0
3/Castletown	15	6	31		2.4				2.8	2.8					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				10.3
6/Dee	100	40	201	6.9	10.6	10.0	10.0				10.0				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				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	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		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		15.8
34/Owenduff (Wexford)	16	6	33			10.9	5.5	5.5				6.5	6.5		5.5
37/Barrow	547	219	1095		13.0	13.2	13.0	10.4				273.8	8.5		8.5
38/Nore	555	222	1111			10.8						9.3			9.3
43/Suir	825	330	1650									11.9			11.9
50/Mahon	32	12	64	6.4						8.0	8.0				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			4.3
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
60/Bride	80	32	161	7.7		6.2				4.3			4.1		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

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>SO 1 (km)	km/site achieved											
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Min
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
88/Roughty	99	39	199				15.3								15.3
89/Finnihy	11	4	22					3.7	3.7				3.7		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
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
102/Ferta	17	6	34							2.6			2.2		2.2
103/Behy	14	5	28	2.8	2.8	3.1	2.8					2.6			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				1.8
112/Feohanagh	14	5	29		2.9				2.7	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

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>SO 1 (km)	km/site achieved											
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Min
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	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
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	2.7
171/Carrownisky	20	8	42	2.1				2.2	2.5				10.4		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
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/ Carrowmore	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

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>SO 1 (km)	km/site achieved											
				2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Min
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	3.8
211/Abbey	14	5	30						14.8	1.6					1.6
212/Ballintra	41	16	83		27.7				5.2	6.4					5.2
213/Laghy	23	9	47		5.2				4.2	3.9					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		4.4
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						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	6.1
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