NESS & BEAULY FISHERIES TRUST

River Beauly Catchment

Electro-fishing Results 2017

Lovat Bridge in the snow. Photo N. Barker

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1 INTRODUCTION

In the summer and autumn of 2017, the Ness and Beauly Fisheries Trust (NBFT) undertook a programme of electro-fishing in the Beauly catchment. In total, fifteen surveys were executed: twelve fully quantitative and three timed. Surveys of the Lower Beauly mainstem were again negated by consistently high-water levels during September and October. Given there have been no surveys executed on the mainstem for a number of years, NBFT will make this a priority for the 2018 season. See **Appendix 1** for a visual representation of site locations.

2 ELECTRO-FISHING METHODOLOGY

2.1 FULLY QUANTITATIVE SURVEYS

Back-pack electro-fishing equipment was utilised during the 2017 season. Fully quantitative surveys were carried out and recorded in accordance with the protocols established by the Scottish Fisheries Co-ordination Centre (SFCC). Where practicable, survey areas were isolated by placing stop nets at the upstream and downstream extent of the length to be fished to prevent fish from evading capture and escaping from the area.

The survey area was fished through in a methodical and thorough manner, with fish being retained in water filled buckets. Captured fish were lightly anaesthetised in order to facilitate species identification and accurate fork length measurements (mm). In most cases, the area was fished through a second and third time in an attempt to remove the majority of fish from the area and to provide a depletion curve for each species. By applying stream dimensions such as wetted width along with numbers of fish captured in successive fishing runs to a statistical formula, an estimate fish density (number of fish/100m^2, the Zippin value) was calculated.

2.2 TIME DELINEATED SURVEYS

Timed surveys involved electro-fishing in an upstream direction in a thorough and methodical manner for a set period of time, usually five or ten minutes. At the end of each time period the number and species of fish was recorded and divided by the number of minutes fished provide a catch per unit of effort value (CPUE).

3 DATA ANALYSIS

In their treatment of fully quantitative survey data, NBFT have historically ranked fish densities under the classification scheme described by the SFCC. NBFT now have a sizeable data set in terms of fish densities within the Beauly catchment. Analysis of these data has enabled NBFT to produce their own classification scheme based purely on data gathered from past fish surveys in the Beauly district. Fish densities were classified by splitting the results of all fully quantitative surveys since 2006 in to quartiles. The quartiles of a set of values are the three points that enable data sets to be divided in to four groups, in this case: poor, moderate, good and excellent. Fish densities with a value of zero were omitted from analysis and were simply classed as absent. **Table 1** below shows the classification scheme for the Beauly catchment.

Table 1 – Density Classification of Juvenile Salmonids on the Beauly Catchment

Salmon Fry (No/100m^2)	Classification	Salmon Parr (No/100m^2)	Trout Fry (No/100m^2)	Classification	Trout Parr (No/100m^2)
0	Absent	0	0	Absent	0
0.1 – 17	Poor	0.1 – 11	0.1 - 2	Poor	0.1 - 1
17.1 – 52	Moderate	11.1 – 22	2.1 – 10	Moderate	1.1 - 3
52.1 – 92	Good	22.1 – 37	10.1 - 24	Good	3.1 – 9
92.1.1 – 398	Excellent	37.1 – 62	24.1 - 314	Excellent	9.1 – 60

4 RESULTS

4.1 STRATHFARRAR

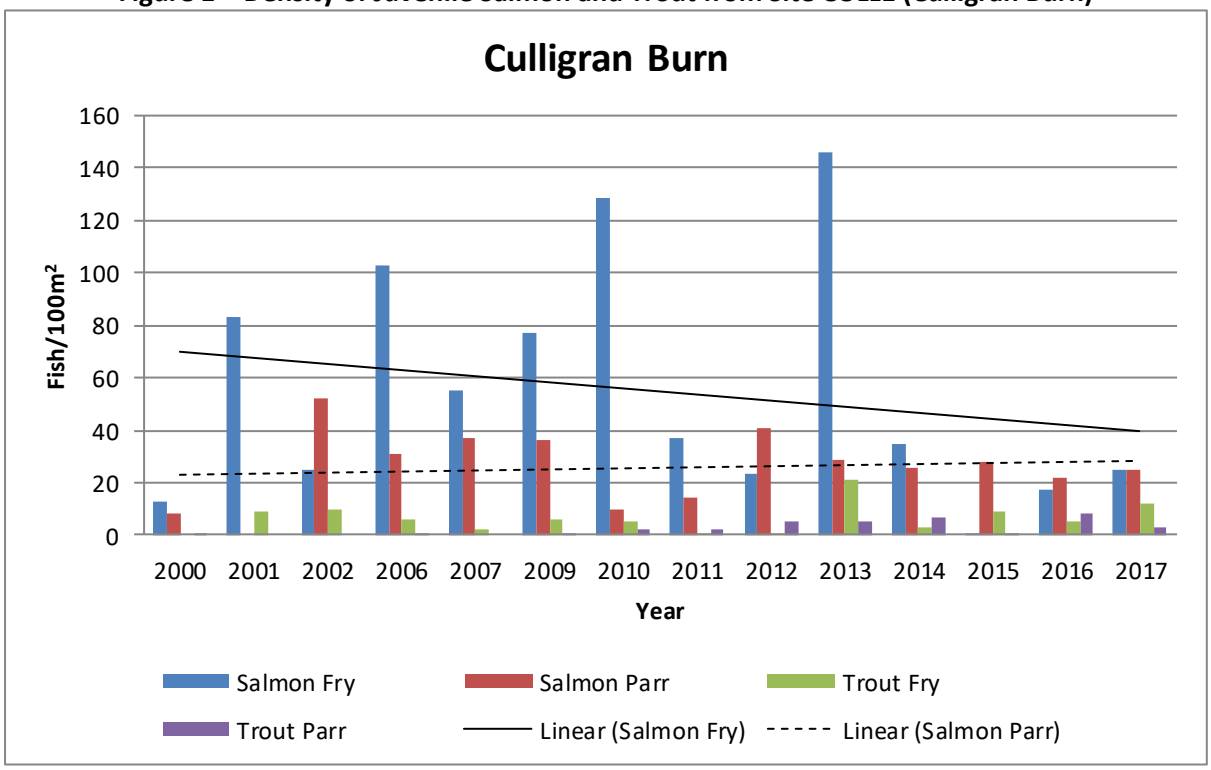
4.1.1 Culligran Burn (CULL1)

Figure 1 shows density of juvenile salmon and trout between 2000 and 2017. The average density of salmon fry between those years is 55/100m^2. The 2017 salmon fry density was 25/100m^2 ('moderate') and thus below the mean density and towards the lower end of the historical range of 1/100m^2 and 129/100m^2. Indeed, salmon fry density has been classed as 'moderate' in every survey since 2014. These results suggest a dearth of salmon spawning activity since 2014.

Despite a lack of salmon fry since 2014, density of salmon parr (1++) has remained quite consistent. The 2017 salmon parr (1++) density was 25/100m^2 ('good'); marginally below the mean density of 26/100m^2 and midway in terms of the historical range of 0/100m^2 and 52/100m^2.

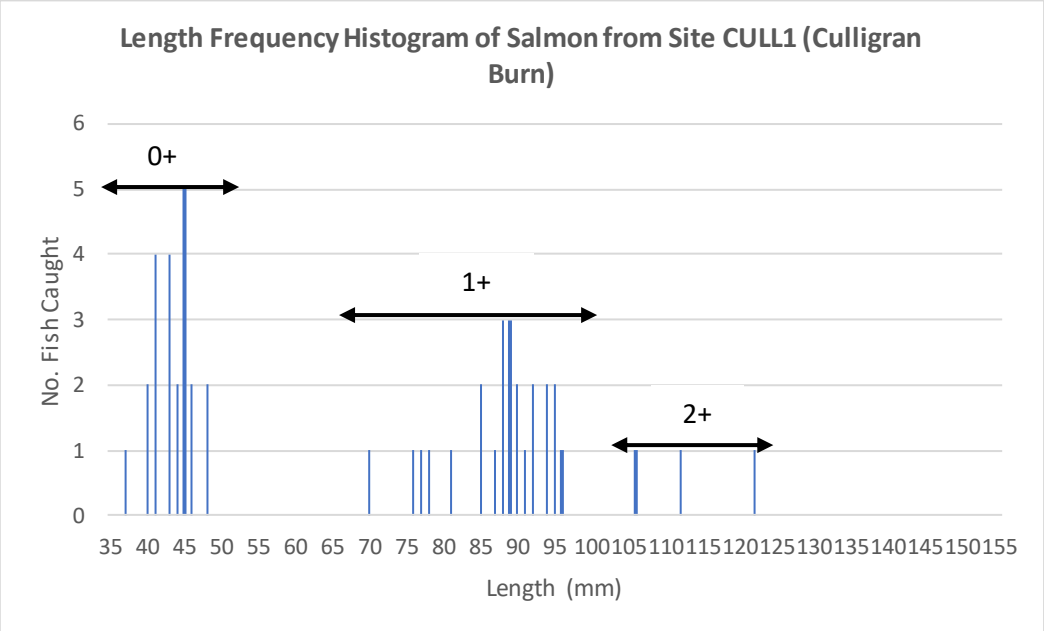
Density of juvenile trout remains consistent in low numbers. No other fish species were captured in 2017.

Figure 1 – Density of Juvenile Salmon and Trout from Site CULL1 (Culligran Burn)



Three year classes of salmon were present during the 2017 survey: 0+, 1+ and 2+. 0+ and 1+ salmon were seen in equal numbers whilst the 2+ cohort was represented by three fish. These results suggest that the majority of salmon will smolt at two-years old from the Culligran Burn. These results are in line with previous surveys from the Culligran Burn and the Farrar Catchment in general.

Figure 2 – Length Frequency Histogram of Salmon from Site CULL1

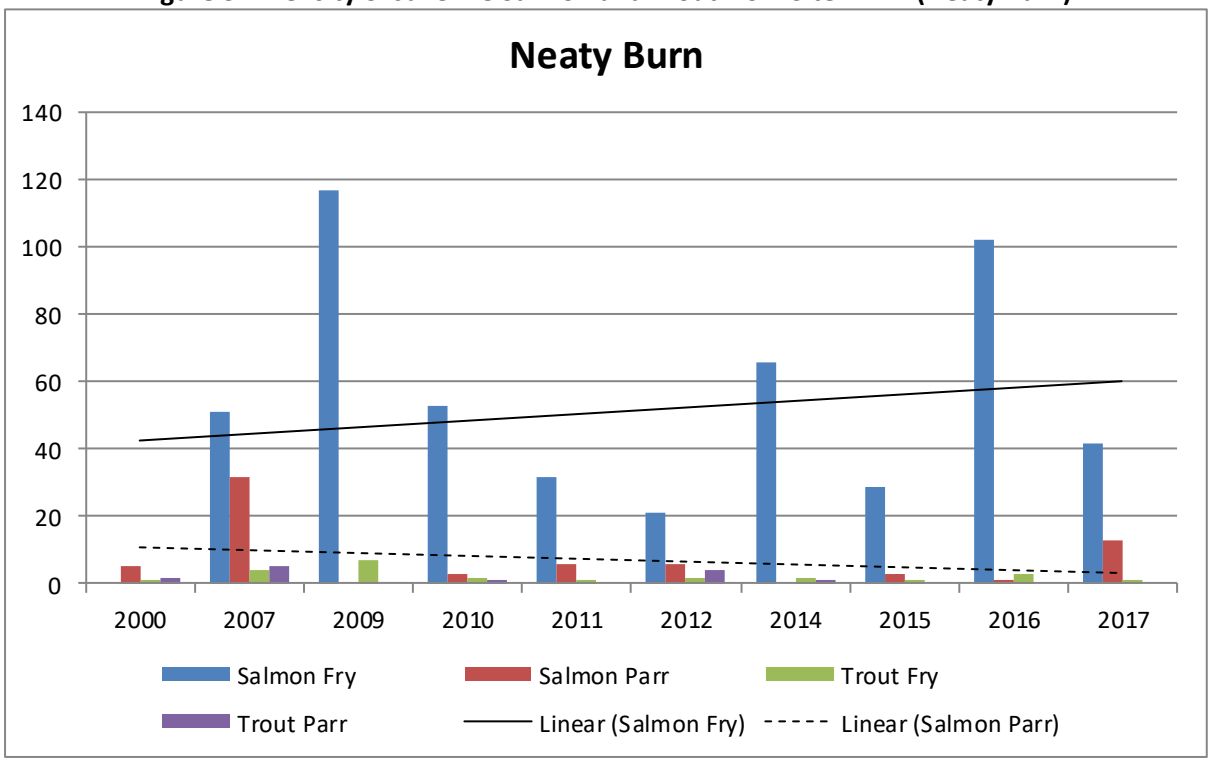


4.1.2 Neaty Burn (NEA1)

The Neaty Burn is heavily impacted by hydro power generation through abstraction and the provision of no compensation flow. This has obvious consequences in terms of low flows and natural sediment transport. Despite this, salmon appear to spawn in the burn's lower reaches every year (**Figure 3**).

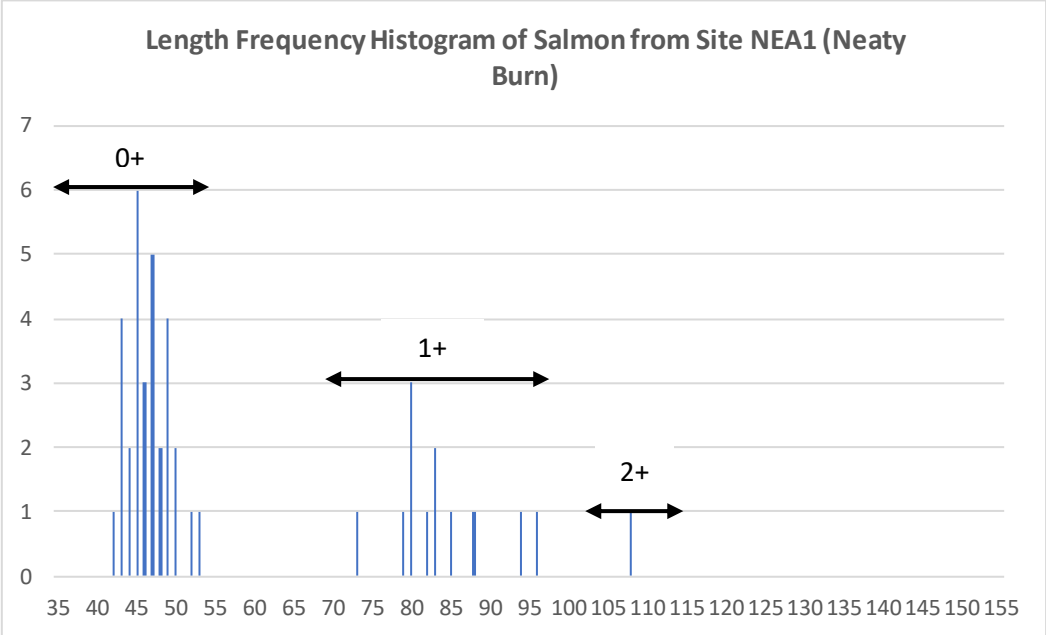
The 2017 salmon fry density was 42/100m^2 and would be classed as 'moderate'. This result should be viewed against the mean density of 51/100m^2 and the historical range of 0/100m^2 and 117/100m^2. Conversely, density of salmon parr (1++) was the highest since 2007. The 2017 salmon parr density was 13/100m^2 and would be classed as 'moderate'. This is against a mean density of 7/100m^2 and the historical range of 0/100m^2 and 32/100m^2. The 'moderate' density of salmon parr observed in 2017 is likely to be an artefact of the 'excellent' density of salmon fry generated from the 2016 survey.

Figure 3 – Density of Juvenile Salmon and Trout from Site NEA1 (Neaty Burn)



Three year classes of juvenile salmon were present in 2017: 0+, 1+ and 2+. Young of the year are clearly the most abundant (**Figure 4**) whilst older year classes are dominated by the 1+ cohort. The 2+ cohort is represented by a single fish. Again, these results are in line with previous findings.

Figure 4 – Length Frequency Histogram of Salmon from Site NEA1.



4.1.3 River Farrar Mainstem (FAR1)

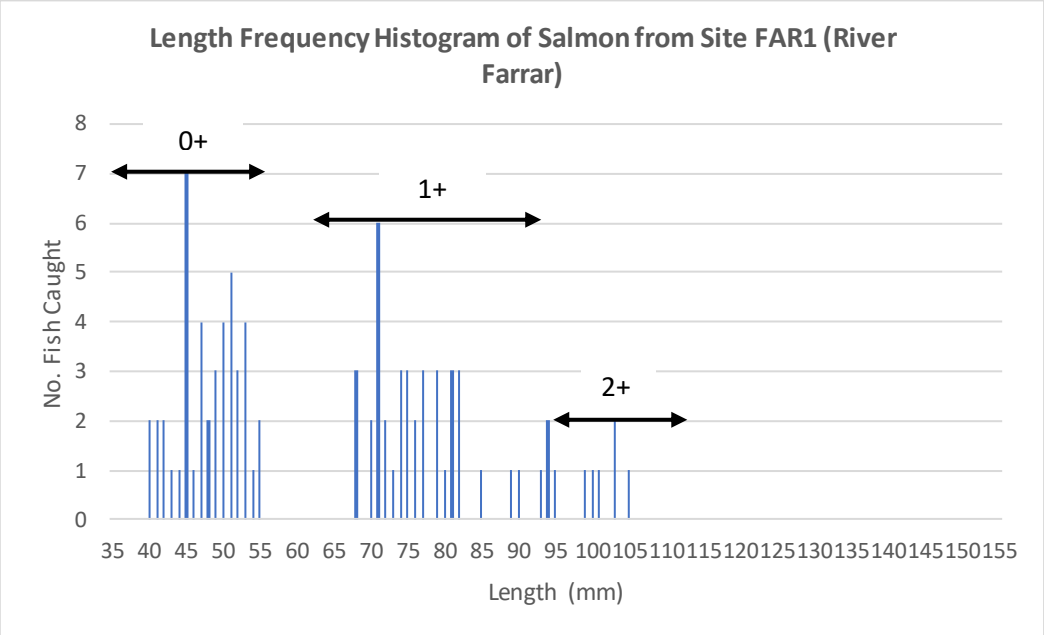
Site FAR1 was added to the suite of routine monitoring sites due to concerns with mainstem habitat utilisation of juvenile salmon following five years of poor/moderate densities of salmon fry from Site FAR2. The instream habitat at FAR1 should be regarded as mixed juvenile habitat, with areas suitable for all year classes of salmon.

Density of salmon was 48/100m^2 and would be classed as 'moderate' whilst salmon parr (1++) were observed at an 'excellent' density of 57/100m^2: one of the highest salmon parr densities ever recorded from the River Farrar catchment.

Juvenile trout were absent from FAR1; almost certainly an artefact of site selection which favours juvenile salmon over trout. Two eels were also captured generating a minimum density estimate of 2/100m^2.

Three year classes of salmon were seen to be present from FAR1: 0+, 1+ and 2+. 1+ salmon parr was the most abundant cohort. 2+ salmon parr were present although length analysis was inconclusive in determining the exact 'breakpoint' between 1+ and 2+. The data presented in **Figure 5** should therefore be treated with a degree of caution.

Figure 5 – Length Frequency Histogram of Salmon from Site FAR1



4.1.4 River Farrar Mainstem (FAR2)

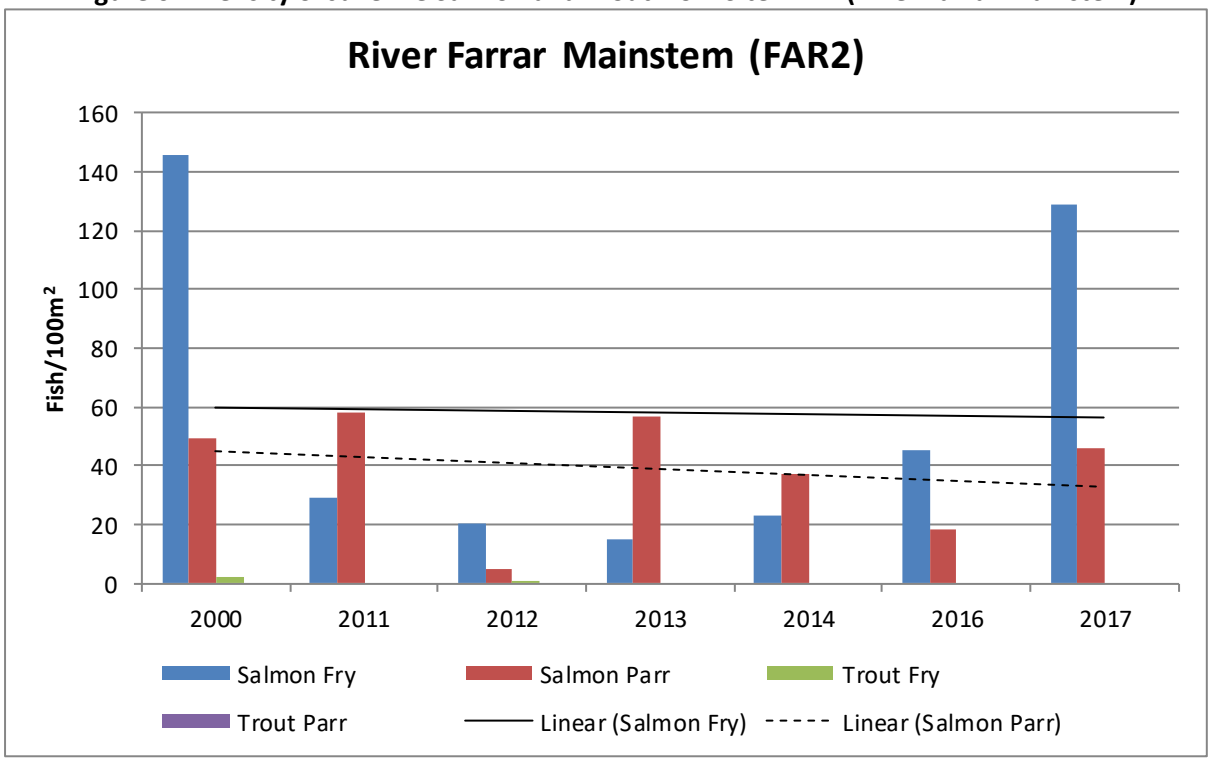
NBFT added Site FAR2 to its suite of routine electro-fishing sites in 2011. Since that point, salmon fry density has only exceeded 40/100m^2 on one occasion (**Figure 6**) despite a good area of spawning media in the vicintity of the Site.

The 2017 salmon fry density was 129/100^2 and would be classed as 'excellent'. This is more than double the mean density of 58/100m^2 and towards the upper end of the historical range of 15/100m^2 and 146/100m^2. It would appear that the spawning media in the vicinity of FAR2 was well utilised in the winter of 2016.

Density of salmon parr (1++) was equally encouraging in 2017 with a recorded density of 46/100m^2 and would be classed as 'excellent'. Again, this above the mean density of 39/100m^2 and towards the upper end of the historical range of 5/100m^2 and 58/100m^2.

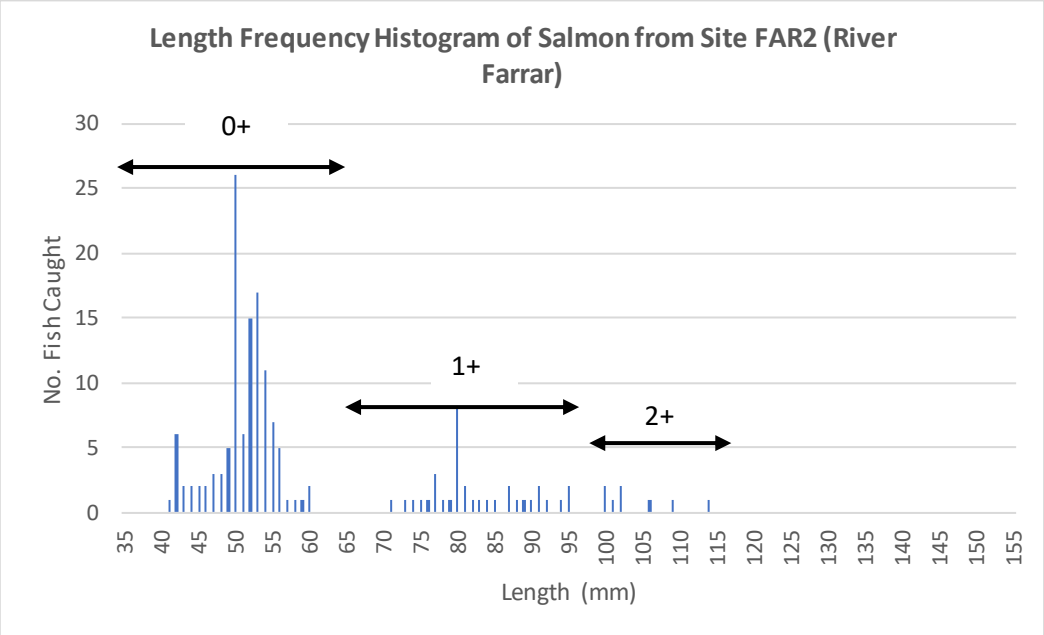
Juvenile trout were absent in 2017. As with Site FAR1, the instream habitat is more suited to juvenile salmon with its fast flows and lack of bankside cover. No other fish species were captured in 2017.

Figure 6 – Density of Juvenile Salmon and Trout from Site FAR2 (River Farrar Mainstem)



Three year classes of salmon were present in 2017 (**Figure 7**): 0+, 1+ and 2+. 0+ salmon fry were clearly the most abundant whilst older year classes of salmon parr were dominated by 1+. 2+ parr were also present, albeit in low numbers.

Figure 7 – Length Frequency Histogram of Salmon from Site FAR2.



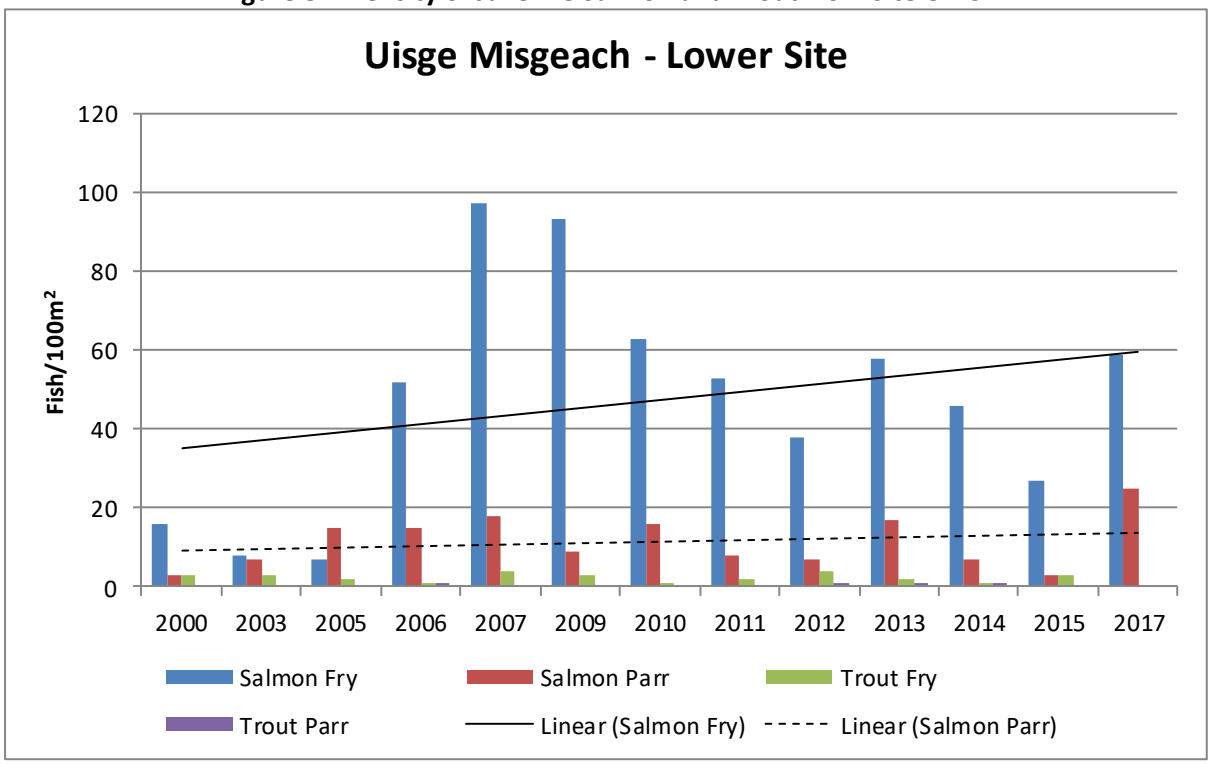
4.1.5 Uisge Misgeach (UM5)

Site UM5 is situated in the upper reaches of the Uisge Misgeach and represents one of the main spawning areas in the upper river.

Density of salmon fry was 59/100m^2 in 2017 (**Figure 8**) and would be classed as 'good'. The 2017 result is above the mean density of 47/100m^2 and mid-way in terms of the historical range of 7/100m^2 and 97/100m^2.

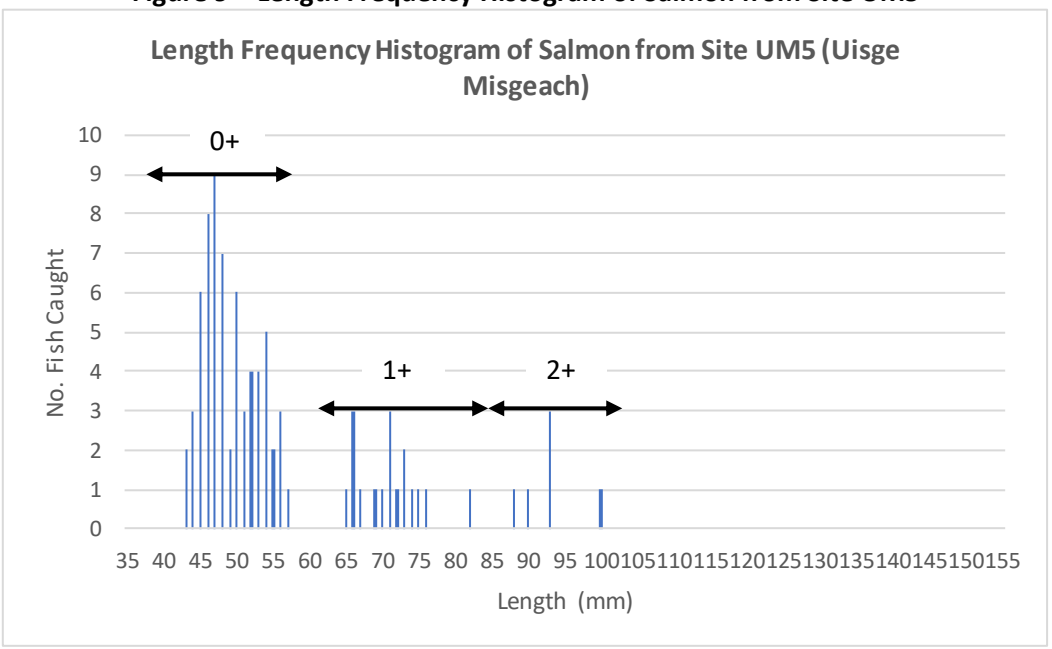
The instream habitat at UM5 has remained stable since 2006 with little to no change in the substrate matrix. It is therefore interesting to note the 'good' density of salmon parr (1++) in 2017. The result of 25/100m^2 is double the mean density of 12/100m^2 and is the highest density of salmon parr ever recorded at the Site. No other fish species were captured in 2017.

Figure 8 – Density of Juvenile Salmon and Trout from Site UM5.



Examination of length distribution and scales taken from a selection of the fish captured from UM5 in 2017 revealed three year classes of juvenile salmon: 0+, 1+ and 2+ (**Figure 9**). The most abundant year class are 0+ salmon whilst the parr cohort was dominated by 1+. 2+ parr were present in low numbers.

Figure 9 – Length Frequency Histogram of Salmon from Site UM5



4.2 LOWER RIVER BEAULY CATCHMENT

4.2.1 Bruiach Burn (BRU2)

Following a year of 'moderate' numbers of salmon fry in 2014 (**Figure 10**), density of 0+ appears to have stabilised. The 2017 salmon fry density was 84/100m^2 and would be classed as 'good'. However, this figure is still marginally below the mean density of 99/100m^2 and towards the lower end of the historical range. Instream habitat remained extremely stable between 2016 and 2017.

The below average density of salmon fry seen in 2015 and 2016 does not appear to have adversely affected number of salmon parr (1++) with the most recent survey generating a density of 62/100m^2 that would be classed as 'excellent'. This is the highest density of salmon parr ever recorded from BRU2.

In terms of juvenile trout, densities for all year classes were extremely encouraging. The 2017 trout fry density was 108/100m^2 and would be classed as 'excellent'. This is the second highest density of trout fry ever recorded from the site. Such high numbers would suggest that this is an artefact of sea trout spawning and would suggest that a high proportion of the sea trout captured on the Lower River Beauly in 2017 spawned in the Bruiach Burn in the winter of 2016. Record numbers of trout parr were also observed in 2017 at a density of 22/100m^2 that would be classed as 'excellent'.

Figure 10 – Density of Juvenile Salmon and Trout from Site BRU2 (Bruiach Burn)

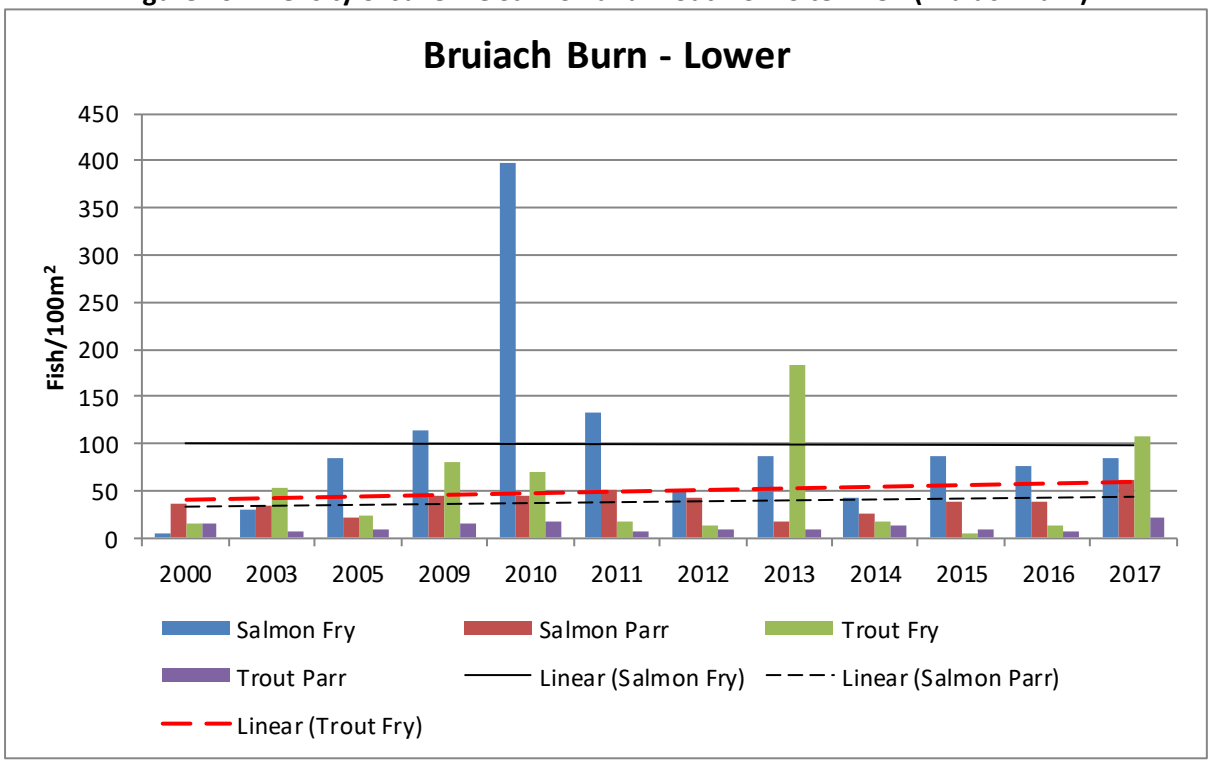
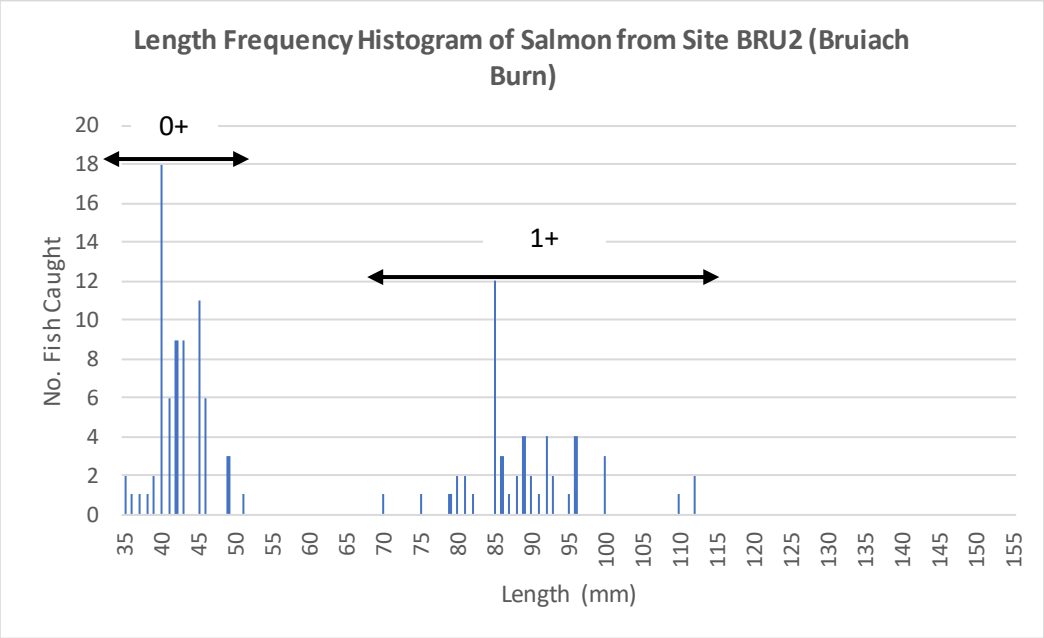


Figure 11 shows the presence of two year classes of salmon: 0+ and 1+. Young of the year are clearly the most abundant whilst older year classes are dominated by the 1+ cohort. 2+ salmon parr were absent from the 2017 survey. This is in line with previous findings and suggest that the majority of salmon of Bruiach Burn origin will smolt at two-years old.

Figure 11 – Length Frequency Histogram of Salmon from Site BRU2.



4.2.2 Bruiach Burn (BRU3)

Site BRU3 is situated in the upper reaches of the Bruiach Burn in Boblainy Forest. Surveys conducted between 2009 and 2011 showed that this area of the Burn was infrequently utilised by adult salmon as a spawning area despite the presence of excellent habitat and unhindered access.

Salmon were seen to be absent from the 2017 survey of BRU3.

The last quantitative survey of BRU3 was conducted in 2013 when trout fry were observed at a density of 205/100m^2 that would be classed as 'excellent'. Although vastly reduced; the 2017 trout fry density was 63/100m^2 and would also be classed as 'excellent'. Given these high numbers, it is likely that the fry observed in these years are the progeny of sea trout rather than resident brown trout.

Density of older year classes of trout (1++) have remained more stable. The 2013 survey generated a trout parr density of 20/100m^2 ('excellent') whilst the most recent survey saw a slightly reduced density of 15/100m^2 that would also be classed as 'excellent'. No other fish species were captured in 2017.

4.2.3 Belladrum Burn (BEL2)

The data presented in **Figure 12** suggest that the spawning media at Site BEL2 was well utilised in in the winter of 2016. The salmon fry density of 153/100m^2 is the highest ever recorded from BEL2 and would be classed as 'excellent'.

Whilst numbers of salmon fry fluctuate quite widely at BEL2, density of salmon parr (1++) stay remarkably consistent. The 2017 salmon parr density was 29/100m^2 and would be classed as 'good'; marginally higher than the mean density of 28/100m^2 and mid-way in terms of the historical range of 20/100m^2 and 56/100m^2.

Of particular note is the exceptionally high density of trout fry from the 2017 survey. The density of 314/100m^2 is the highest ever recorded from the Beauly catchment and would be classed as 'excellent'. These numbers are almost certainly the result of a very successful spawning season for sea trout as opposed to resident brown trout. Density of older year classes has remained more consistent in recent years. The 2017 trout parr density of 12/100m^2 would be classed as 'excellent' and is mid-way in terms of the historical range of 2/100m^2 and 28/100m^2.

Figure 12 – Density of Juvenile Salmon and Trout from Site BEL2 (Belladrum Burn)

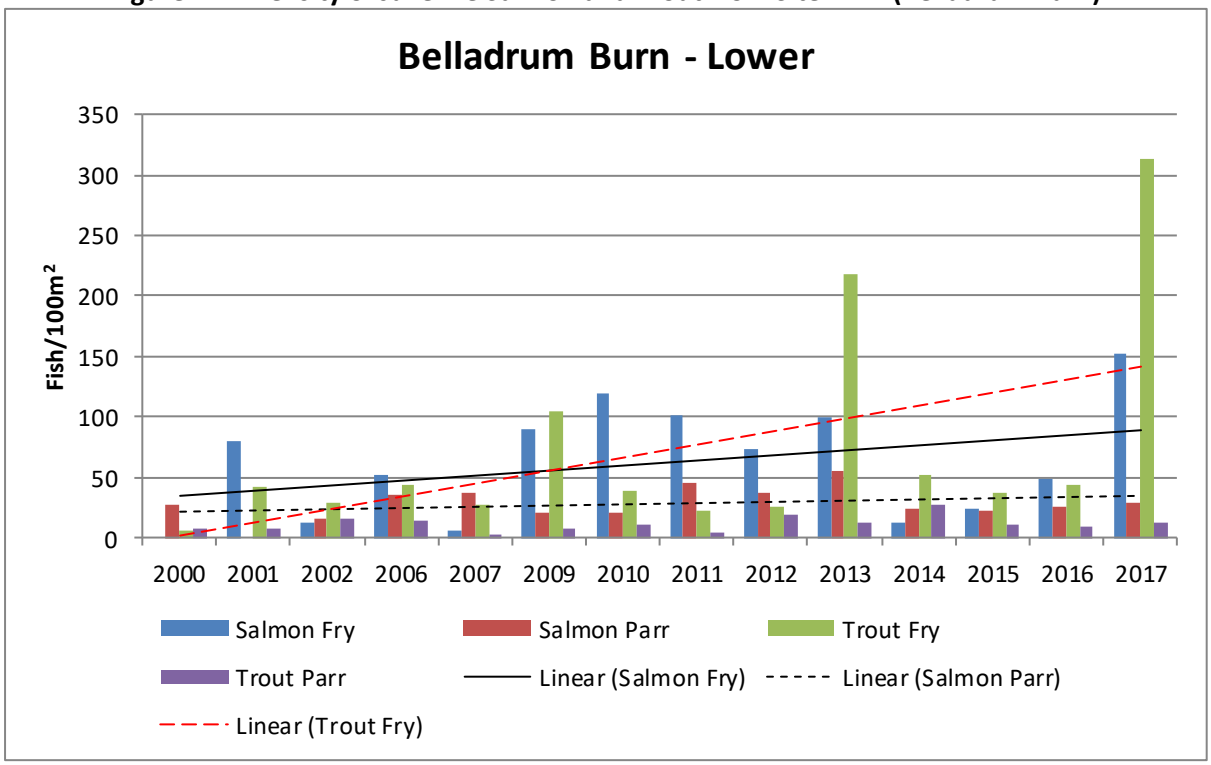
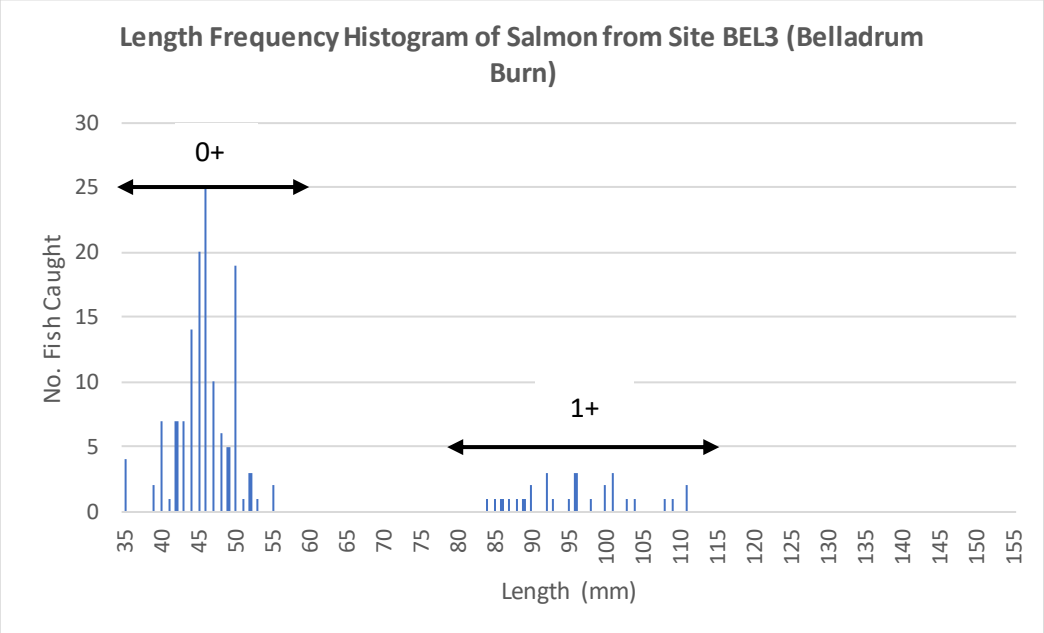


Figure 13 shows the presence of two year classes of salmon from the 2017 survey: 0+ and 1+. Young of the year are clearly the most abundant whilst older year classes are dominated by 1+ parr. 2+ salmon parr were absent from the 2017 survey. This is in line with previous results and suggests that the majority of salmon of Belladrum Burn origin will smolt at two-years old.

Three eels were also captured in 2017 generating a minimum density estimate of 3/100m^2.

Figure 13 – Length Frequency Histogram of Salmon from Site BEL3



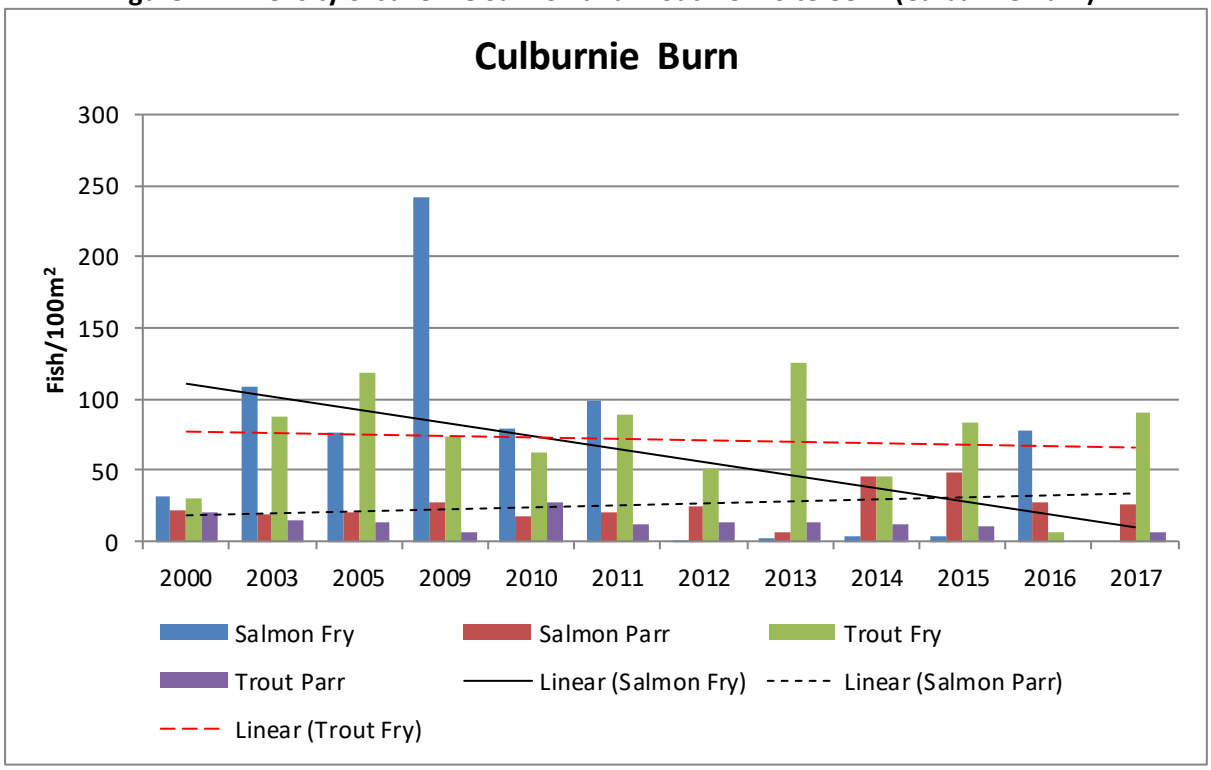
4.2.4 Culburnie Burn (CUL1)

Figure 14 indicates a long-term decline in salmon fry abundance at CUL1 on the Culburnie Burn. The burn was historically stocked by the Lower Beauly Fishing Syndicate although this ceased in 2009. Since that point, the trend has been for a greater production of trout suggesting the burn is primarily used by sea trout as a spawning tributary. Salmon fry were absent from the 2017 survey whilst older year classes (1++) were observed at a density of 26/100m^2 that would be classed as 'good'.

The 2017 survey generated 'excellent' numbers of trout fry. The density of 90/100m^2 would suggest the fry are the progeny of sea trout rather than resident brown trout. This is against the mean density of 72/100m^2 and lies towards the upper end of the historical range of 6/100m^2 and 125/100m^2. Older year classes were less abundant at a density of 6/100m^2 that would be classed as 'good'. This is below the mean density of 12/100m^2 and towards the lower end of the historical range of 7/100m^2 and

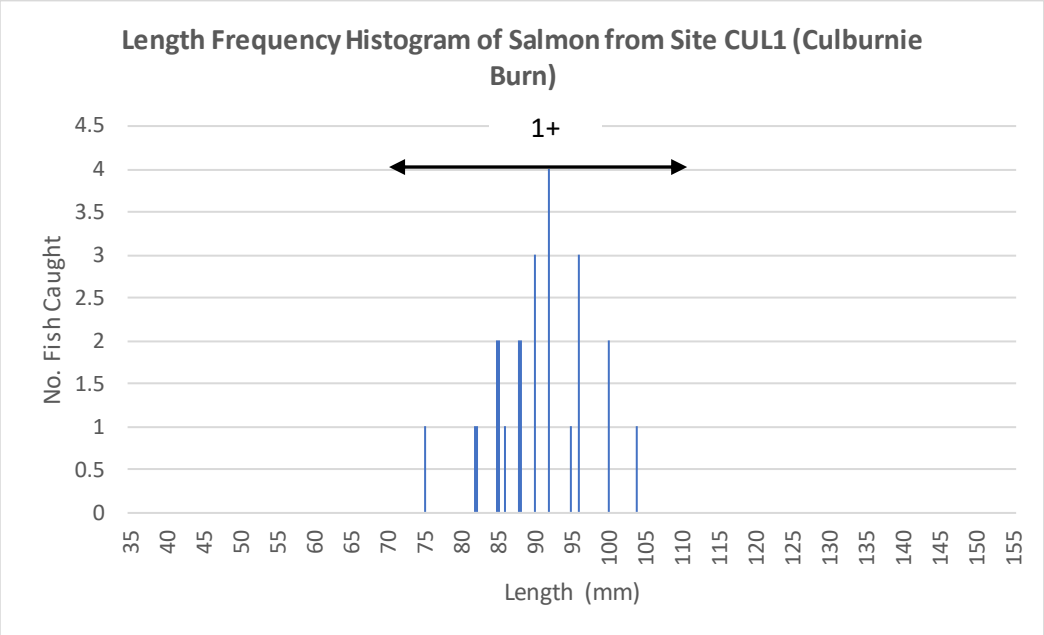
27/100m^2.

Figure 14 – Density of Juvenile Salmon and Trout from Site CUL1 (Culburnie Burn).



A single year class of salmon was present in 2017: 1+ salmon parr (**Figure 15**). This would suggest that salmon from this part of the catchment will smolt at two years old.

Figure 15 – Length Frequency Histogram of Salmon from Site CUL1.



4.2.5 Culburnie Burn (CUL5/TIMED, CUL6/TIMED, CUL9/TIMED)

Since the easing of the Culburnie Bridge apron in 2014, time delineated surveys have been carried out upstream of the former structure to investigate temporal changes in fish abundance and assemblage.

Surveys conducted in 2015, 2016 and 2017 have shown an absence of salmon fry upstream of the former structure. Between 2015 and 2016, mean CPUE of salmon parr (1++) remained static. Between 2016 and 2017, mean CPUE of salmon parr rose from 0.1 to 0.2 although this difference was not statistically significant (tTest, $p>0.05$).

In terms of juvenile trout, there was an increase in the mean CPUE of trout fry from 1.5 in 2016 to 3.5 in 2017. Again, this increase was not statistically significant (tTest, $p>0.05$). Interestingly however, the increase in mean CPUE of trout fry of 1.4 to 3.5 between 2015 and 2017 was significant (tTest, $P<0.05$). These results would suggest that a greater number of trout (presumably sea trout) are ascending the former structure.

4.3 MIDDLE RIVER BEAULY CATCHMENT

4.3.1 Breakachy Burn (BRE1)

The Breakachy Burn is notable for its consistent high densities of salmon fry (**Figure 16**). The 2017 salmon fry density was 234/100m^2 and would be classed as 'excellent'. This is against a mean density of 162/100m^2 with the most recent density being towards the upper end of the historical range.

Despite consistent high densities of fry, salmon parr (1++) densities do not necessarily reflect this with the last three surveys generating parr densities that would be classed as 'moderate'. The 2017 salmon parr density was 20/100m^2; below the mean density of 21/100m^2 and mid-way in terms of the historical range of 2/100m^2 and 48/100m^2.

In terms of juvenile trout, densities of both fry and parr have remained stable in low numbers.

Figure 16 – Density of Juvenile Salmon and Trout from Site BRE1 (Breakachy Burn)

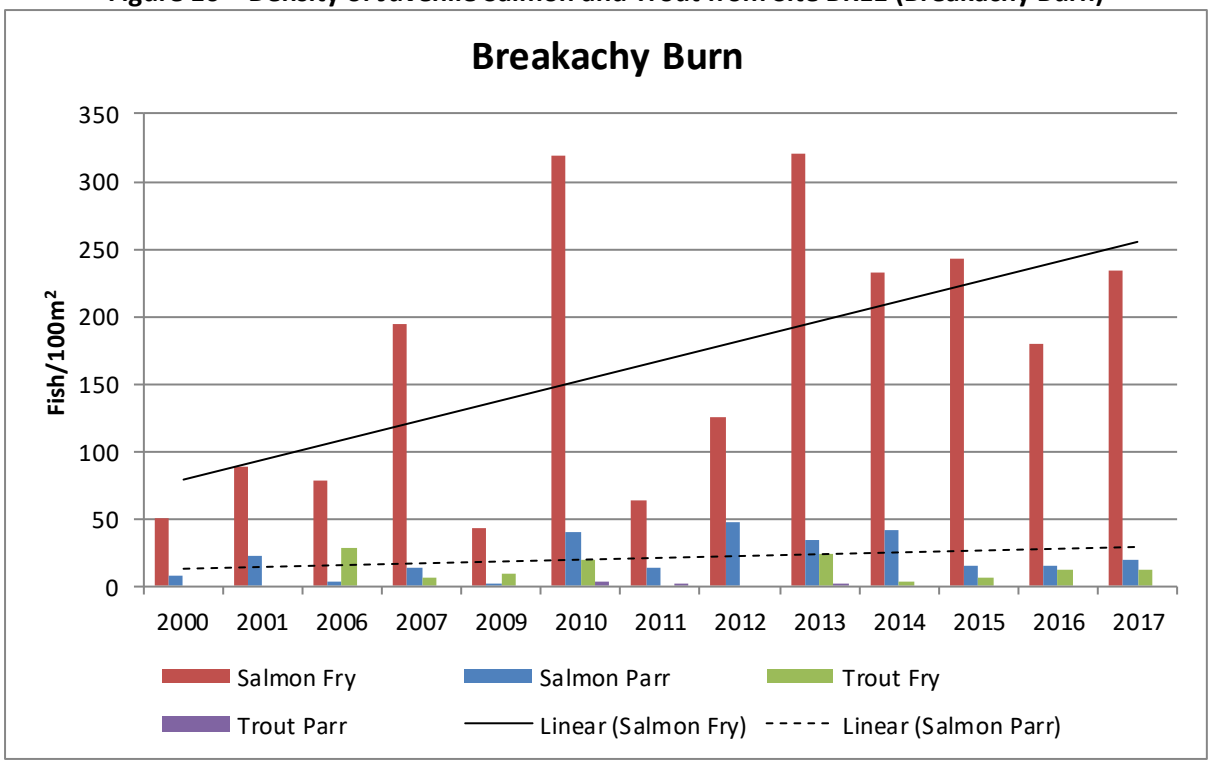
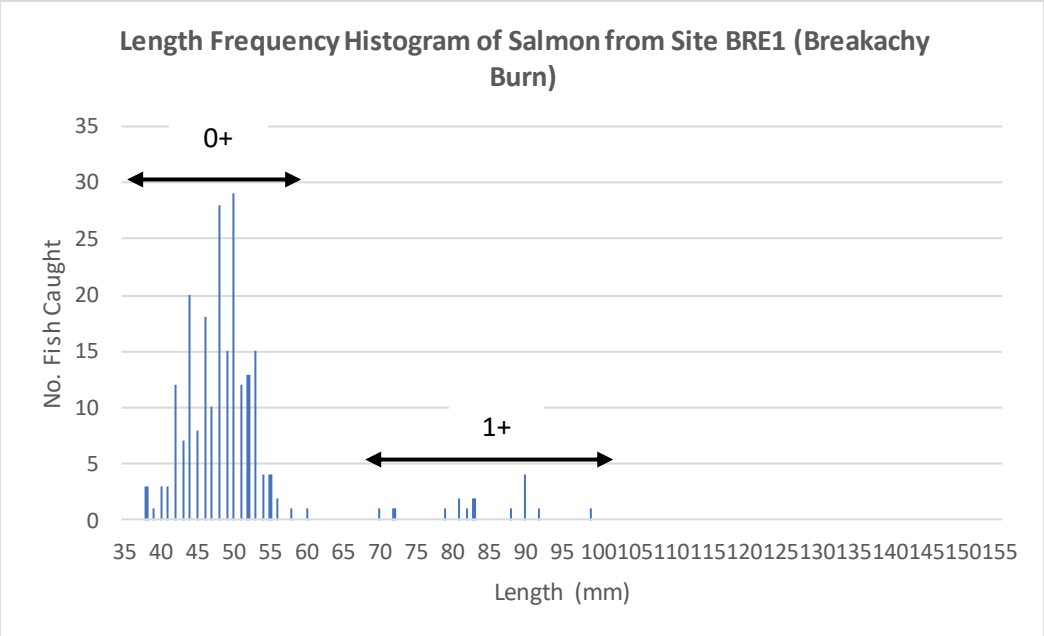


Figure 17 shows the presence of two year classes of salmon from the 2017 survey: 0+ and 1+. Young of the year are the most abundant cohort whilst older year classes are dominated by 1+. 2+ salmon

were absent from BRE1 in 2017.

Figure 17 – Length Frequency Histogram of Salmon from Site BRE1.



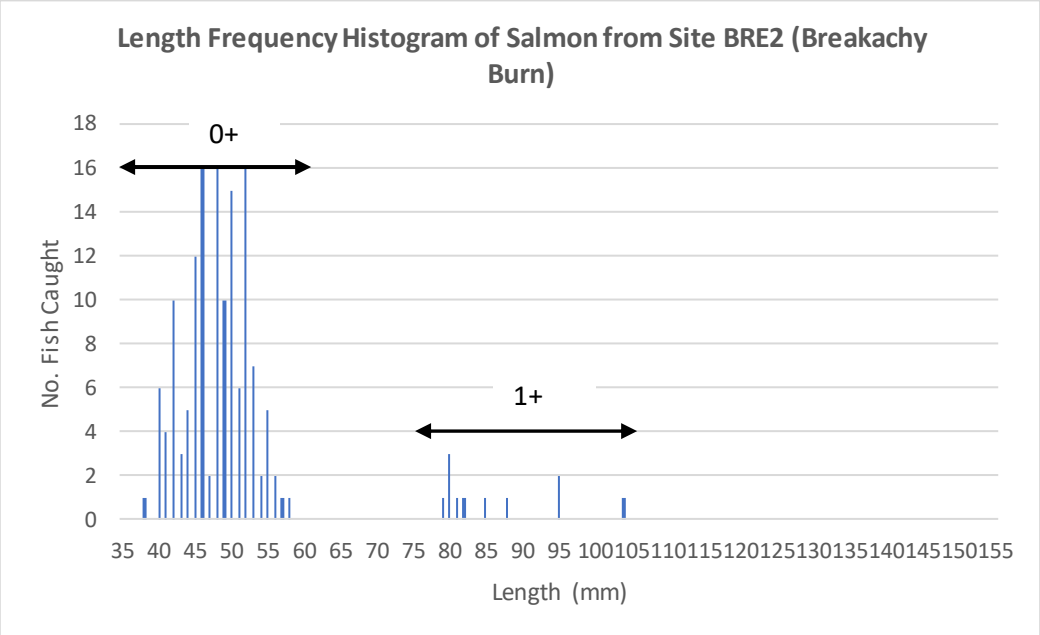
4.3.2 Breakachy Burn (BRE2)

BRE2 was added to the suite of monitoring suites to investigate if the modest density of salmon parr (1++) observed at BRE1 in the past four years was a site-specific issue. BRE2 is similar to BRE1 in terms of instream habitat with moderate/fast flows and a good mix of substrates.

As with BRE1, salmon fry were observed in good numbers at a density of 134/100m^2 that would be classed as 'excellent'. Density of salmon parr (1++) was less encouraging at 11/100m^2 that would be classed as 'poor'. Given the similarities between BRE1 and BRE2 in terms of instream habitat, the 'poor' density of salmon parr would suggest that this section of the Breakachy Burn is underutilised by older year classes of salmon.

Two year classes of salmon were present during the survey of BRE2: 0+ and 1+. Young of the year were the most abundant (**Figure 18**) whilst older year classes were dominated by the 1+ cohort. These results are in line with previous findings and suggest that most fish of Breakachy Burn origin will smolt at two-years old.

Figure 18 – Length Frequency Histogram of Salmon from Site BRE2.



4.4 UPPER BEAULY CATCHMENT

4.4.1 Eskadale Burn (ESK1)

The long-term data set for the routine monitoring site on the Eskadale Burn (**Figure 19**) shows that density of salmon fry is extremely variable. The 2017 salmon fry density was 42/100m^2 and would be classed as 'moderate'. This is the highest density since 2014 and is above the mean density of 29/100m^2. The 2017 salmon fry density was mid-way in terms of the historical range of 0/100m^2 and 105/100m^2.

Periodic low densities of salmon fry do not appear to have impacted on salmon parr density with relatively stable numbers in the last eight years. The 2017 salmon parr (1++) density was 39/100m^2 and would be classed as 'excellent'. This is above the mean density of 32/100m^2 and towards the upper end of the historical range of 4/100m^2 and 51/100m^2. It is highly likely that some of the salmon parr captured in the Eskadale Burn are of mainstem origin; migrating in to the burn towards the end of their first year.

The Eskadale Burn is also relatively productive in terms of juvenile trout. The 2017 trout fry density was 11/100m^2 and would be classed as 'good'. However, this is below the mean density of 13/100m^2. Density of older year classes remains stable in low numbers. No other fish species were captured in

2017.

Figure 19 – Density of Juvenile Salmon and Trout from Site ESK1 (Eskadale Burn)

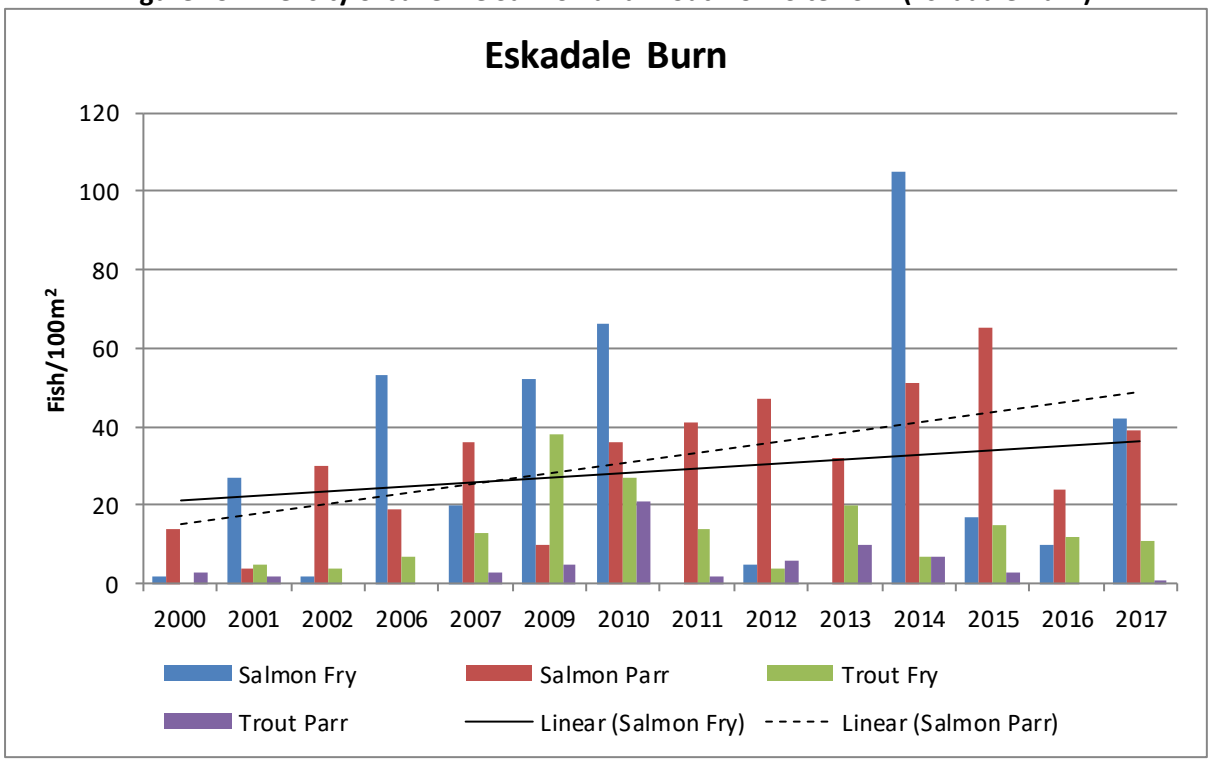
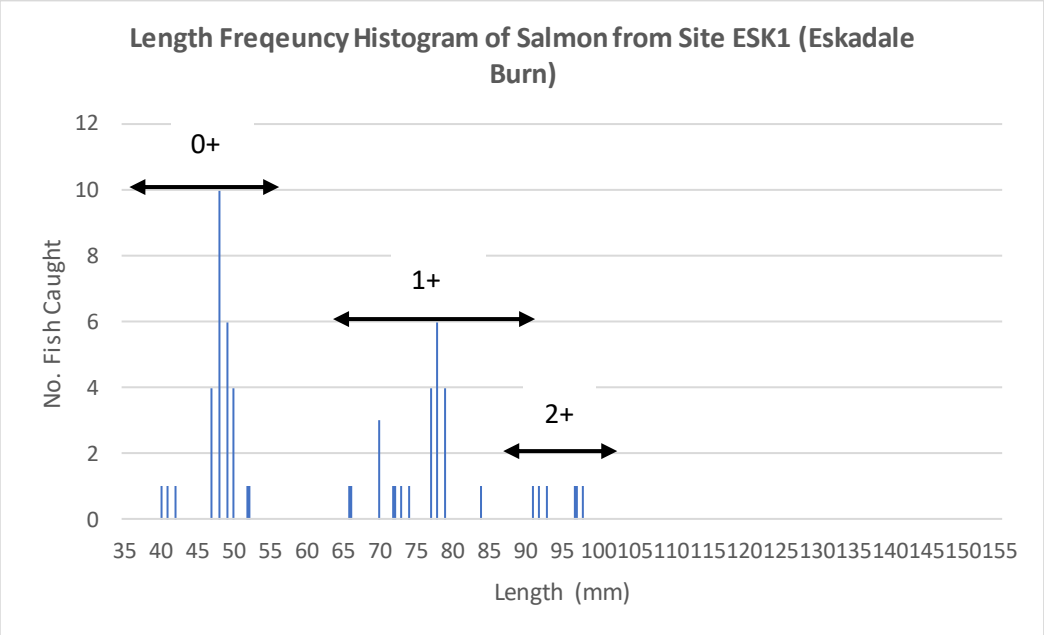


Figure 20 shows the presence of two year classes of three year classes of juvenile salmon: 0+, 1+ and 2+. Young of the year were the most abundant whilst older year classes were dominated by the 1+ cohort. 2+ were present in low numbers, although the data presented in **Figure 20** should be treated with a degree of caution as analysis of fish lengths was inconclusive in determining the 'breakpoint' between 1+ and 2+ salmon parr.

Figure 20 – Length Frequency Histogram of Salmon from Site ESK1.



5 CONCLUSIONS

Results from the Culligran Burn would suggest a low number of returning adults in recent years. The long-term data set for the routine monitoring site on the Culligran would suggest a decline in salmon fry density. The 2017 salmon fry density was well below the mean for the site. Conversely, the overall trend for older year classes of salmon parr (1++) is increasing despite the apparent lack of fry since 2013. The 2017 salmon parr density was marginally below the long-term mean density.

Although the Neaty Burn is heavily impacted by abstraction in its headwaters, it still appears to act as a spawning location for salmon. The 2017 salmon fry density was below the mean value. However, the long-term data set suggest an overall increase in fry density. The opposite is true for older year classes of salmon parr with the data set suggesting a long-term decline. As previously reported, the Neaty Burn suffers from extremely low flows and it is possible that a number of parr of Neaty Burn origin will depart the burn in favour of the relative sanctuary of the mainstem.

Site FAR1 was added to the suite of monitoring sites in 2017 to increase coverage of the mainstem and to investigate habitat utilisation of juveniles. Whilst a 'moderate' density of salmon fry was observed in 2017, density of salmon parr was high and was classed as 'excellent'. FAR2 revealed its highest density of salmon fry since 2000. Spawning habitat is plentiful in this section of the Farrar and the 2017 salmon fry density would suggest that it was well utilised. However, it should be pointed out that the long-term data set would suggest an overall decline in 0+ salmon. There was a return to 'excellent' density of salmon parr in 2017. The density was the highest observed since 2013. Again though, the long-term trend is for an overall decline.

It was heartening to note a return to 'good' numbers of salmon fry on the Lower Site of Uisge Misegach (UM5). The site is placed in one of the main spawning areas of the upper river and the most recent result would suggest that the spawning media was relatively well utilised by adult salmon. Previous reports have highlighted the lack of salmon parr at UM5 and this has been attributed to the instream habitat which is more suited to salmon fry with its fine substrate. The 2017 survey bucked the trend somewhat with the highest density of salmon parr ever recorded from the site despite the site staying relatively stable in terms of instream habitat.

The lower site on the Bruiach Burn (BRU2) saw a slight increase in salmon fry density between 2016 and 2017 although it should be pointed out that the 2017 salmon fry density is below the mean value for the site. Conversely, density of salmon parr (1++) was high and classed as 'excellent'. Indeed, the 2017 salmon parr density was the highest ever recorded from the site. The long-term data set for BRU2 would suggest that numbers of salmon fry and parr are stable. Juvenile trout were well represented in 2017 with density of both fry and parr being classed as 'excellent'. Density of both cohorts were well in advance of their long term mean values. BRU3 is situated in the upper reaches of the Bruiach Burn. Previous surveys suggest that adult salmon seldom venture to that section of the burn. Results from 2017 reinforce previous findings with an absence of salmon fry and parr whilst juvenile trout were well represented in 'excellent' densities. Given the high numbers of trout fry seen at BRU3, it is likely these fish are the progeny of anadromous trout rather than the smaller resident trout.

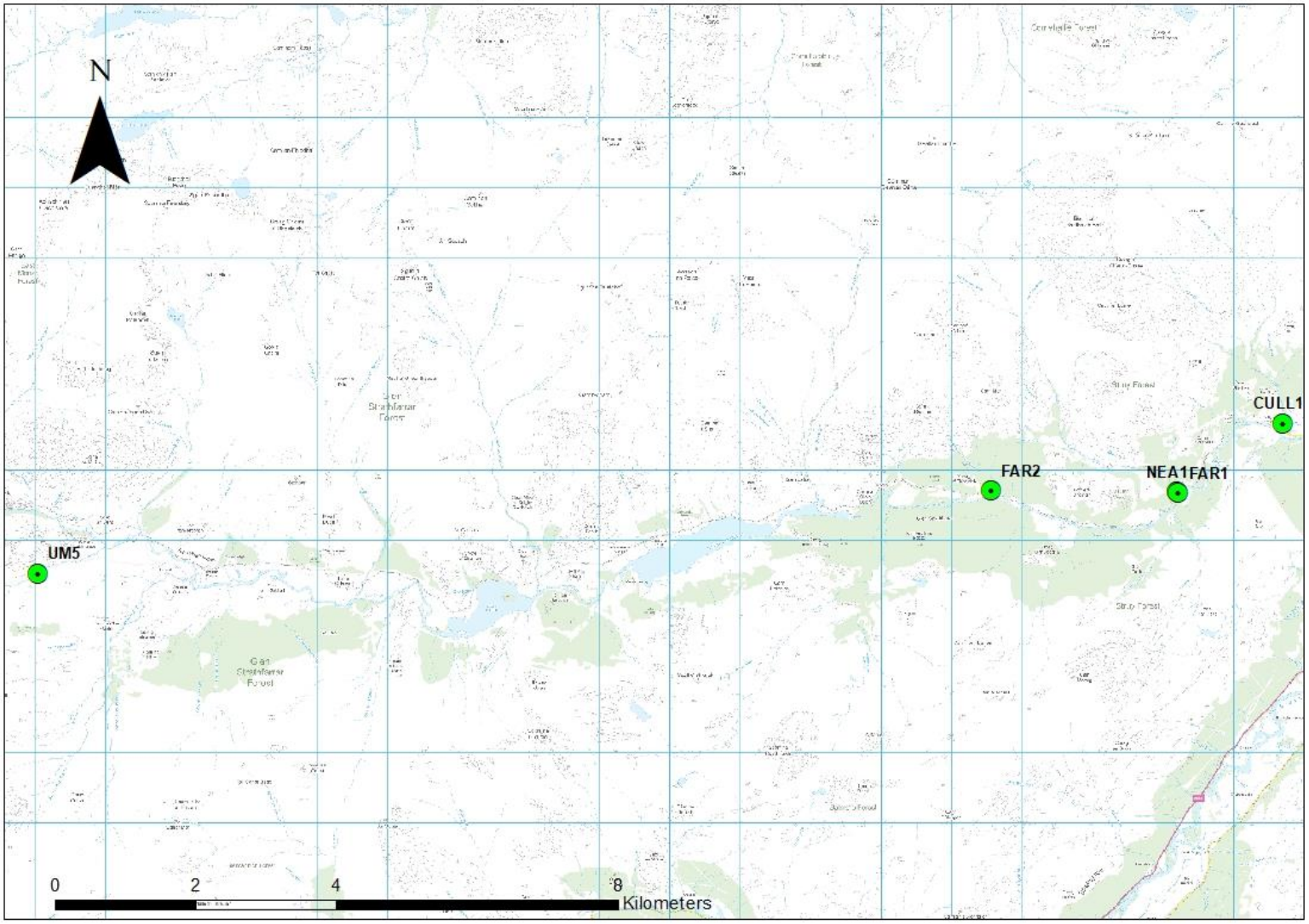
2017 saw a resurgence in salmon fry density at the routine monitoring site of the Belladrum Burn (BEL2). The 'excellent' density is the highest recorded for the site. Density of salmon parr (1++) was less encouraging although the 2017 density was marginally higher than the mean density for the site. As with the Bruiach Burn, there was an abundance of trout fry in 2017. The trout fry density was exceptionally high: the highest ever recorded in the Beauly catchment. There is no doubting these fish are the progeny of sea trout.

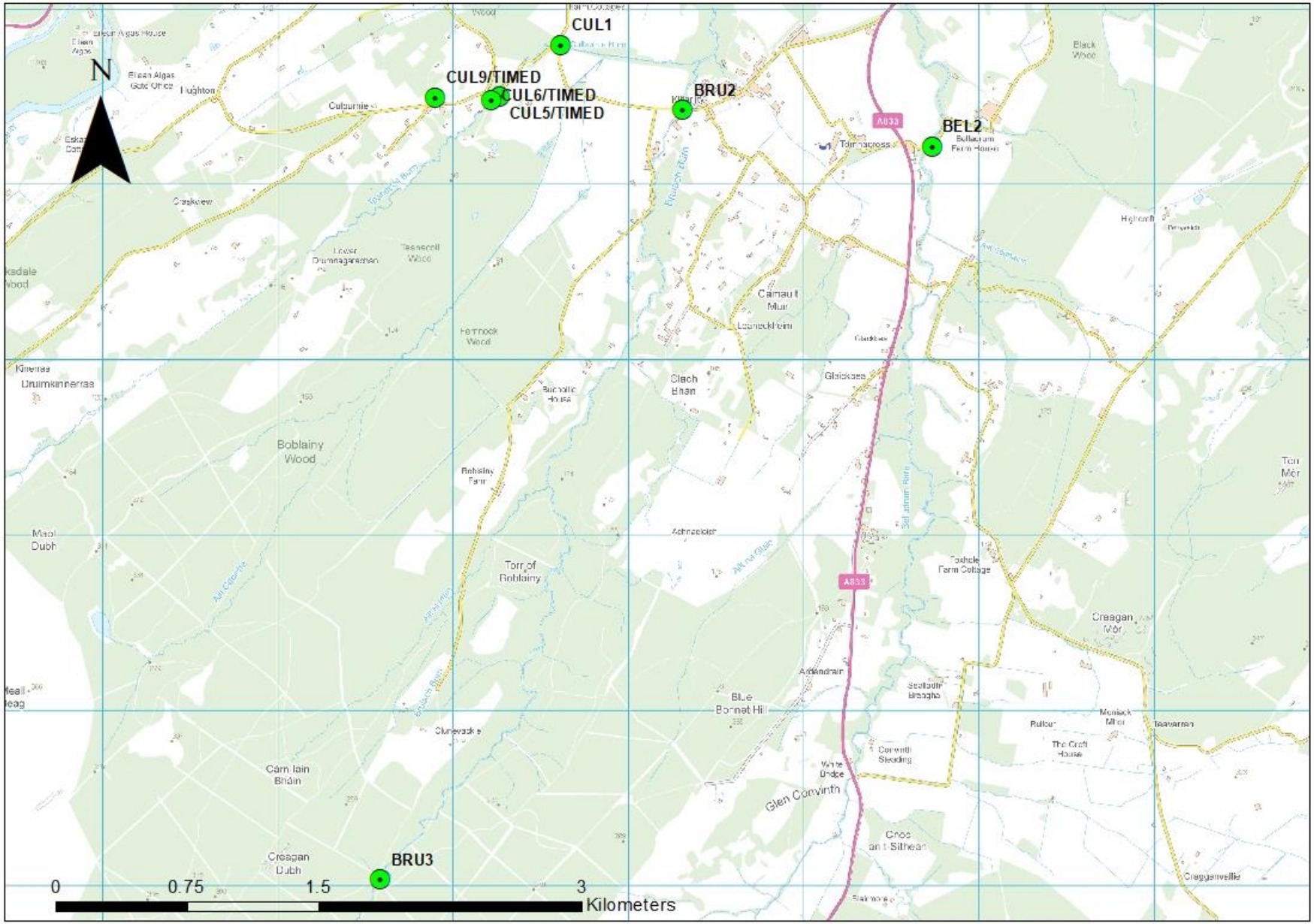
Since the stocking of salmon ceased in 2009 on the Culburnie Burn, density of salmon fry has decreased steadily. Salmon fry were absent from the 2017 survey whilst older year classes were observed in 'good' numbers: almost certainly an artefact of the 'good' density of salmon fry seen in 2016. As with the other major Lower Beauly Tributaries, juvenile trout were well represented in 2017. Time delineated surveys were conducted upstream of the former bridge apron to investigate temporal changes in fish abundance and assemblage since its easement in 2014. Salmon fry were recorded as absent from the sites upstream of the former bridge apron in 2017. Numbers of salmon parr (1++) rose slightly although the increase was not seen to be significantly different. Numbers of trout fry increased between 2016 and 2017 although again, the increase was not statistically significant. However, looking at numbers of trout between 2015 and 2017, there was a statistically significant increase.

Whilst density of salmon fry has stayed consistently high on the routine monitoring site on the Breakachy Burn (the 2017 survey was no exception), numbers of salmon parr (1++) have not reflected this. To investigate if this was a site-specific issue, a further survey was executed approximately 200m upstream of the routine site. Density of salmon fry was 'excellent' whilst parr density was classed as 'poor'. The precise reasons behind the apparent lack of salmon parr on the Breakachy Burn remain poorly understood.

The 2017 salmon fry density from the Eskadale Burn would suggest a more successful spawning in the winter of 2016 than in previous years although the density would still be classed as 'moderate'. Indeed, the long-term data set would suggest that spawning success on the Eskadale Burn is extremely variable. This does not appear to have impacted on salmon density which has stayed remarkably consistent since 2010. It is likely that a proportion of the salmon parr captured in the Eskadale Burn are of mainstem origin that migrate in to the burn at the end of their first year.

APPENDIX – MAPS SHOWING LOCATION OF SITES




CUL1
CUL9/TIMED
CUL6/TIMED
CUL5/TIMED
BRU2
BEL2
BRU3
N
A833
Boblainy Wood
Torr of Boblainy
Blue Bonnet Hill
Glen Convinth
Creagan Mòr
Creagan Dubh
Càm Iain Bhàin
0
0.75
1.5
3
Kilometers