

# **Electrofishing surveys, 2007**

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## 2007 juvenile surveys

### Introduction

Electrofishing surveys are designed to assess the juvenile fish populations within a system. The equipment operates by creating an electrical field within the water that at first attracts the fish and subsequently stuns them for a brief period. As the field is restricted in size, the best operating conditions are shallow water within smaller tributaries. While it is possible to sample main stream areas, and this has been done within this survey, the escape rate is higher than that found in the narrower streams. Similarly, a high escape rate is found in exceptionally shallow, stony or weedy areas, where fish can move into the substrate and thus are inaccessible to the nets.

This survey repeats many of the catchments surveyed previously. Where possible all sites were revisited, although some were not accessed due to time and flow constraints, while others were removed from the survey on the basis of the results from the previous survey. Additional sites were added in some instances.

This report summarises the data for each system. Maps giving the location of each site and the densities represented pictorially are available on request. Similarly, length-frequency data for each site are available, together with the length-frequency data for each system as a whole.

### Methods

Fish densities were assessed by electrofishing using a backpack supplying pulsed d.c. power over sites marked with string. Fish attracted to the hand-held anode were netted into a bucket and retained. The sites were fished systematically upstream.

All fish were anaesthetised using 2 Phenoxyethanol, identified to species and measured ( $\pm 1$  mm). Small samples of scales were removed from a proportion of each length range for age determination. The fish were then allowed to recover before returning to the electrofished section. Densities of fish were calculated as minimum estimates, such that a minimum number of fish present per 100 m<sup>2</sup> was determined. Water level was not used in the density estimates, although it must be realised that stream conditions will have an impact on the density determined and efficiency of the fishing technique.

Site characteristics were recorded at each site, including bed type, flow and bankside characteristics in accordance with the SFCC protocol.

### Results

#### 1. Loch Innis na Ba Buidhe catchment

Table 1.1 gives the grid reference, altitude and location of each site fished. The length, mean width and area fished are presented in Table 1.2, together with minimum estimates of density for salmon and trout fry (0+ years) and parr (>1 year) per 100 m<sup>2</sup>.

Table 1.1 Electrofishing site details

Code	Easting	Northing	Altitude	Situation
LI1	222200	957500	20	From 2nd meander through gate
LI2B	222600	956900	15	Near mouth of river
LI3	222600	957000	15	By track, just above loch

Table 1.2 A summary of the density of salmon and trout fry (0+ years) and parr (greater than 1 year) at each site per 100 m<sup>2</sup>

Site code	Length (m)	Average Width (m)	Area (m <sup>2</sup> )	Density (100 m <sup>2</sup> )			
				Salmon fry	Salmon parr	Trout fry	Trout parr
LI1	12.7	1.60	20.32	0.00	4.92	113.19	4.92
LI2B	19.4	2.73	53.03	0.00	0.00	11.32	0.00
LI3	13.7	1.92	26.26	0.00	0.00	19.04	0.00

The maximum, minimum and mean densities are given for all sites (Table 1.3). This summarises the data and allows comparisons within the system and with other systems within the west Sutherland area.

One year class (0+) is discernible within the salmon population, while the trout population appears to have 2 (0+ - 1+).

Eels were present in low numbers at only one site, LI1. There were no other species found within the survey.

Table 1.3 A summary of the densities determined for all sites surveyed

	Minimum	Maximum	Mean
Salmon fry	0.00	0.00	0.00
Salmon parr	0.00	4.92	1.64
Trout fry	11.32	113.19	47.85
Trout parr	0.00	4.92	1.64

## Discussion

While undertaking this survey it was noted that there were major changes to the burn LI2. This took the form of a large amount of bank erosion upstream of the site surveyed and a shift in the channel in the lower reaches of the burn. It is unknown when this happened, but is likely to have been in the heavy rains during October 2006, when it is known that other catchments within the area were affected by severe spates, erosion and gravel movement.

With the exception of trout fry, the average densities of salmon and trout within this survey are lower than those observed in previous years. The absence of salmon fry from the survey, a factor also observed in previous years, indicates that the salmon population within Loch Innis is transitory, possibly reliant on specific weather conditions in order for salmon to enter the system. The high densities of trout fry would, however, suggest that the resident trout population is healthy and stable. Again, with the exception of the trout fry, the densities observed within this survey were significantly lower than the average for the Sutherland area. Trout fry densities were, however, significantly greater than the average, reflecting the fact that this is primarily a trout system, with the habitat surveyed being more suitable for fry than parr.

## 2. Achriesgill catchment

Table 2.1 gives the grid reference, altitude and location of each site fished. The length, mean width and area fished are presented in Table 2.2, together with minimum estimates of density for salmon and trout fry (0+ years) and parr (>1 year) per 100 m<sup>2</sup>.

Table 2.1 Electrofishing site details

Code	Easting	Northing	Altitude	Situation
GL2	226600	953100	70	Down from water work, across from ruin
GL3	227100	953900	35	Down from double passing place, by boulder pile on bend of river

Table 2.2 A summary of the density of salmon and trout fry (0+ years) and parr (greater than 1 year) at each site per 100 m<sup>2</sup>

Site code	Length (m)	Average Width (m)	Area (m <sup>2</sup> )	Density (100 m <sup>2</sup> )			
				Salmon fry	Salmon parr	Trout fry	Trout parr
GL2	12.4	7.17	88.87	0.00	3.38	1.13	4.50
GL3	10	7.90	79.00	1.27	7.59	3.80	1.27

The maximum, minimum and mean densities are given for all sites (Table 2.3). This summarises the data and allows comparisons within the system and with other systems within the west Sutherland area.

Two year classes (0+ - 1+) are discernible within both the salmon and trout populations.

Eels were present in low numbers at both sites surveyed. There were no other species found within the survey.

Table 2.3 A summary of the densities determined for all sites surveyed

	Minimum	Maximum	Mean
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Salmon fry	0.00	1.27	0.64
Salmon parr	3.38	7.59	5.49
Trout fry	1.13	3.80	2.47
Trout parr	1.27	4.50	2.89

## Discussion

Only 2 sites were surveyed during 2007 as a result of high flows within the system. This was a problem throughout the area, with higher than average rainfall resulting in difficulties with the completion of electrofishing surveys. It is unfortunate that the lower reach could not be surveyed on this occasion, as it was found to be difficult to catch fish during a demonstration day with the local school children. This suggests that the increased silt and sand observed within the lower reaches of the burn continue to have an effect on the salmonid population, although a full survey would be required to confirm this.

The average densities of salmon and trout within this survey are lower than those observed in previous years, although densities of trout fry in GL3 have increased. The presence of salmon fry and parr within the survey is encouraging, indicating that salmon can continue through the system despite the removal of the dam in 2005. However, the continued decline in density would suggest that the population remains marginal, although this may be the result of habitat availability. As in previous years, parr dominate the samples, again reflecting the habitat present at the survey sites. The salmonid densities observed within this survey are, once again, significantly lower than the average for the Sutherland area.

## 3. Rhiconich catchment

Table 3.1 gives the grid reference, altitude and location of each site fished. The length, mean width and area fished are presented in Table 3.2, together with minimum estimates of density for salmon and trout fry (0+ years) and parr (>1 year) per 100 m<sup>2</sup>.

Table 3.1 Electrofishing site details

Code	Easting	Northing	Altitude	Situation
R1	225900	951600	25	On bend between cairn and outcrop. Just up from large boulder on right
R2	226300	950700	45	Before loch, after widening of the river
R3	227000	949400	45	Between the bends on the river between the lochs
R4	228000	947200	65	Alltan Riabhach, below first falls in burn

Table 3.2 A summary of the density of salmon and trout fry (0+ years) and parr (greater than 1 year) at each site per 100 m<sup>2</sup>

Site code	Length (m)	Average Width (m)	Area (m <sup>2</sup> )	Density (100 m <sup>2</sup> )			
				Salmon fry	Salmon parr	Trout fry	Trout parr
R1	28.5	2.00	57.00	1.75	0.00	0.00	0.00
R2	15.6	2.10	32.76	9.16	0.00	3.05	0.00
R3	15.5	3.50	54.25	22.12	12.90	1.84	0.00
R4	10.7	3.77	40.30	0.00	0.00	2.48	2.48

The maximum, minimum and mean densities are given for all sites (Table 3.3). This summarises the data and allows comparisons within the system and with other systems within the west Sutherland area.

Table 3.3 A summary of the densities determined for all sites surveyed

	Minimum	Maximum	Mean
Salmon fry	0.00	22.12	8.26
Salmon parr	0.00	12.90	3.23
Trout fry	0.00	3.05	1.84
Trout parr	0.00	2.48	0.62

Two year classes (0+ - 1+) are discernible within the salmon population, while two (0+ and 3+) can be seen within the trout population.

Eels were present in low numbers at R2 and R3 only. There were no other species taken within the survey.

## Discussion

The average density of both trout fry and parr are significantly lower than the Sutherland average. Trout densities are also lower than those found in previous surveys within the Rhiconich catchment. This is, however, likely to reflect the absence of sites R5 and R6 from the sampling rather than a decrease in trout populations *per se*. High water in the Garbh Allt tributary on the day of the survey precluded this tributary from the analysis, despite it having been found to be the main trout spawning tributary in previous surveys.

Salmon fry densities, by contrast, were slightly above the Sutherland average and also similar to values found in previous surveys. This signifies that the salmon population is relatively stable within the catchment, with the burn between the 2 lochs (R3) once again proving to be the main spawning burn for salmon. While parr densities are below the average, the recorded densities in the Rhiconich are more variable than fry over time, reflecting the mobility of the population and the sites surveyed. This is particularly true for sites within the Rhiconich River, for which the success of the survey method is extremely flow dependent.

The spate nature of the Rhiconich catchment, and the substrate within the river, make surveying this system difficult. The lack of a comprehensive survey over the past 8 years means that annual comparisons must be undertaken with caution. However, it is still possible to look at general population trends, which indicate a stable salmon population.

### 4. Loch na Thull catchment

Table 4.1 gives the grid reference, altitude and location of each site fished. The length, mean width and area fished are presented in Table 4.2, together with minimum estimates of density for salmon and trout fry (0+ years) and parr (>1 year) per 100 m<sup>2</sup>.

Table 4.1 Electrofishing site details

Code	Easting	Northing	Altitude	Situation
NT1	224700	951300	35	Above the road bridge, by trap location
NT2	224800	951100	45	Below Loch Na-Cailich, by large boulder
NT3	224500	951600	35	By telegraph poles, between two bends and next to small stream on right
NT7	224600	951400	30	Below road bridge

Table 4.2 A summary of the density of salmon and trout fry (0+ years) and parr (greater than 1 year) at each site per 100 m<sup>2</sup>

Site code	Length (m)	Average Width (m)	Area (m <sup>2</sup> )	Density (100 m <sup>2</sup> )			
				Salmon fry	Salmon parr	Trout fry	Trout parr
NT1	16.8	5.10	85.68	21.01	14.01	5.84	0.00
NT2	14.6	6.03	88.09	1.14	2.27	20.43	0.00
NT3	18.5	1.77	32.68	21.42	45.89	15.30	0.00
NT7	8.5	3.00	25.50	15.69	35.29	27.45	3.92

The maximum, minimum and mean densities are given for all sites (Table 4.3). This summarises the data and allows comparisons within the system and with other systems within the west Sutherland area.

Table 4.3 A summary of the densities determined for all sites surveyed

	Minimum	Maximum	Mean
Salmon fry	1.14	21.42	14.81
Salmon parr	2.27	45.89	24.37
Trout fry	5.84	27.45	17.25
Trout parr	0.00	3.92	0.98

Two year classes (0+ - 1+) are discernible within both the salmon and trout populations.

Eels were present at all sites. The greatest densities were found at NT1 and NT2. There were no other species found within the survey.

## Discussion

While lower than 2006, salmon fry densities were still greater than previous years. Parr densities, in contrast are significantly greater than previous years. This is likely to reflect the high fry densities observed in 2006. Both fry and parr densities are significantly higher than the Sutherland average.

Trout densities are more variable, with trout fry densities being slightly above the Sutherland average, while parr densities are significantly below average. While fry densities are greater than those recorded in 2006, this is still lower than previous years. The lower parr densities are likely to reflect the low fry recorded in 2006, but still demonstrate a significant decline in the trout population. This is probably a reflection on the increasing salmon population within the system, with salmon fry known to out-compete trout fry.

The genetic study undertaken into the potential source of the increasing juvenile salmon population has still to report, although it is hoped that results will be available during 2008. It is hoped that this will determine the status of the population and whether or not it is driven by fish farm escapes from the cages within Loch na Thull.

## 5. Laxford catchment

Table 5.1 gives the grid reference, altitude and location of each site fished. The length, mean width and area fished are presented in Table 5.2, together with minimum estimates of density for salmon and trout fry (0+ years) and parr (>1 year) per 100 m<sup>2</sup>.

Table 5.1 Electrofishing site details

Code	Easting	Northing	Altitude	Situation
L12	227600	943700	40	Maternity burn beside Stack Lodge.
L18A	230900	942200	40	Lone
L18B	231100	942300	50	300m from Lone bridge on Lone burn just below the row of trees.
L18C	231200	942400	55	Allt Horn, moorland below the woodland
L18D	231300	942600	55	All Horn, within conifer corridor (scots pine/rowan)
L19	230700	941700	40	Small tributary before the Lone.
L20	230700	941600	50	Allt a Chuilinn
L26A	229500	939700	50	Hatchery burn, below Ian's house in the gorse bushes.
L26B	227000	940700	70	Hatchery burn, upstream site located in the coniferous plantation.
L36	230900	938200	50	Downstream of bridge until first meander bend.
L53	234700	935900	40	Boathouse, below the rough track into Allt a Reinidh
L59A	234800	934800	50	Kinloch ,lower by the loch
L59B	234800	934300	60	Kinloch, 50m above the bridge
Lone B	234052	941887	195	Abhainn an Loin, after bend, by large rock and tree.
Lone C	235232	942029	215	Abhainn an Loin, within straight section, by boulders
Lone D	234814	942040	200	Tributary to Abhainn an Loin, in tributary, above culvert, in pool - riffle section

The maximum, minimum and mean densities are given for all sites (Table 5.3a), tributaries of Loch More (Table 5.3b), tributaries of Loch Stack (Table 5.3c) and the area currently being stocked (Table 5.3d). This summarises the data and allows comparisons within the system and with other systems within the west Sutherland area.

Table 5.2 A summary of the density of salmon and trout fry (0+ years) and parr (greater than 1 year) at each site per 100 m<sup>2</sup>

Site code	Length (m)	Average Width (m)	Area (m <sup>2</sup> )	Density (100 m <sup>2</sup> )			
				Salmon fry	Salmon parr	Trout fry	Trout parr
L12	39	2.67	104.00	0.00	0.00	2.88	2.88
L18A	12.9	9.33	120.40	18.27	18.27	6.64	0.83
L18B	7.5	10.07	75.50	14.57	17.22	1.32	1.32
L18C	11.4	2.47	28.12	35.56	14.22	3.56	0.00
L18D	10	5.50	55.00	1.82	12.73	1.82	1.82
L19	31	2.37	73.37	1.36	5.45	57.25	0.00
L20	16.7	5.67	94.63	20.08	4.23	5.28	0.00
L26A	17.8	7.63	135.87	12.51	8.83	5.89	0.00
L26B	20.9	3.10	64.79	4.63	7.72	0.00	1.54
L36	9	1.73	15.60	0.00	0.00	12.82	6.41
L53	25	1.38	34.58	2.89	0.00	69.40	2.89
L59A	11	3.53	38.87	7.72	2.57	15.44	2.57
L59B	11.8	7.37	86.93	6.90	5.75	5.75	0.00
Lone B	23.7	7.87	186.44	0.54	2.15	0.00	0.00
Lone C	9.9	4.97	49.17	4.07	10.17	0.00	0.00
Lone D	12.9	3.80	49.02	6.12	12.24	0.00	0.00

Table 5.3a A summary of the densities determined for all sites surveyed

	Minimum	Maximum	Mean
Salmon fry	0.00	35.56	8.57
Salmon parr	0.00	18.27	7.60
Trout fry	0.00	69.40	11.75
Trout parr	0.00	6.41	1.27

Table 5.3b A summary of the densities determined for tributaries of Loch More

	Minimum	Maximum	Mean
Salmon fry	0.00	7.72	5.78
Salmon parr	0.00	8.83	4.15
Trout fry	0.00	69.40	18.22
Trout parr	0.00	6.41	2.24

Table 5.3c A summary of the densities determined for tributaries of Loch Stack

	Minimum	Maximum	Mean
Salmon fry	0.00	35.56	13.09
Salmon parr	0.00	18.27	10.30
Trout fry	1.32	57.25	11.25
Trout parr	0.00	2.88	0.98

Table 5.3d A summary of the densities determined for the stocked area of Lone Burn

	Minimum	Maximum	Mean
Salmon fry	0.54	6.12	3.58
Salmon parr	2.15	12.24	24.56
Trout fry	0.00	0.00	0.00
Trout parr	0.00	0.00	0.00

Two year classes (0+ - 1+) are discernible within the salmon population, while the trout population appears to have 6 (0+ - 5+).

Eels were present in low densities at a number of sites, L12, L18A, L18B, L18C, L20, L26A, L26B and L36. While present at fewer sites, L12 and L18A only, minnows had a high density at L12.

Salmon found in Lone B – Lone D are the result of stocking undertaken by the Estate.

## Discussion

Overall densities of salmon and trout are lower than those found in previous surveys within the Laxford, although densities tend to show annual variations. The average densities of salmon within the system are higher than the Sutherland average, while that of trout is lower. While this may be a function of the method for calculating the averages, which include systems with no migratory populations, it could indicate that the Laxford is currently more a salmon than trout system.

Within the system, the salmon and trout populations show some separation, with salmon dominating the tributaries of Loch Stack while trout are more dominant around Loch More. This reflects the available habitat within the area, Loch More tributaries being smaller in size and sediment type. The level of decline between fry and parr densities between the two species, with a greater reduction in trout rather than salmon, also reflects the habitat, with trout in the smaller streams moving more readily into the adjoining lochs.

Salmon within the upper reaches of Lone Burn (Lone B – Lone D) are the result of stocking undertaken by the Estate. There appears to be good survival of the stocked fish within the area, although there was a reduction in fry numbers compared to previous years. This may be the result of spates in October 2006 which resulted in gravel movements and a change in habitat at the survey sites, possibly to one which favours parr. Of slight concern within this area is the lack of trout within the survey. Trout densities have been declining and their absence would suggest that they are being out-competed by the stocked salmon. This has been shown in other areas, and the level of this impact will only be determined when, and if, the stocking policy comes to an end.

## 6. Loch nam Brac catchment

Table 6.1 gives the grid reference, altitude and location of each site fished. The length, mean width and area fished are presented in Table 6.2, together with minimum estimates of density for salmon and trout fry (0+ years) and parr (>1 year) per 100 m<sup>2</sup>.

Table 6.1 Electrofishing site details

Code	Easting	Northing	Altitude	Situation
NB1	218300	947200	70	by lochside
NB2	218400	947150	70	upstream of road culvert
NBA1	218100	948700	70	between two riffles just below loch
NBA2	217400	948800	70	downstream of small waterfall
NBA3	218400	949300	50	below road culvert

Table 6.2 A summary of the density of salmon and trout fry (0+ years) and parr (greater than 1 year) at each site per 100 m<sup>2</sup>

Site code	Length (m)	Average Width (m)	Area (m <sup>2</sup> )	Density (100 m <sup>2</sup> )			
				Salmon fry	Salmon parr	Trout fry	Trout parr
NB1	18.9	1.70	32.13	0.00	0.00	43.57	9.34
NB2	19.3	1.53	29.59	0.00	0.00	10.14	10.14
NBA1	10.2	3.20	32.64	0.00	0.00	27.57	21.45
NBA2	12.5	3.73	46.67	0.00	0.00	23.57	10.71
NBA3	29.9	3.00	89.70	0.00	0.00	37.90	7.80

The maximum, minimum and mean densities are given for all sites (Table 6.3). This summarises the data and allows comparisons within the system and with other systems within the west Sutherland area.

Table 6.3 A summary of the densities determined for all sites surveyed

	Minimum	Maximum	Mean
Salmon fry	0.00	0.00	0.00
Salmon parr	0.00	0.00	0.00
Trout fry	10.14	43.57	28.55
Trout parr	7.80	21.45	11.89

Three year classes (0+ - 2+) are discernible within the trout population.

Eels were present in low numbers at NBA2 and NBA3 only. Minnows were present at NB1 and NBA2, the greatest densities being found at NB1.

## Discussion

The average density of both trout fry and parr is significantly higher than the Sutherland average. Fry densities are however, lower than those recorded in 2006, indicating a levelling of the population. Parr densities, in contrast, are slightly greater than those recorded in 2006, possibly reflecting the increased flow noted in 2007. Despite this, fry continue to dominate the samples, reflecting the habitat at the survey sites and the presence of a large loch and deep slow areas into which the parr could migrate.

Large numbers of fry were recorded at NB1, in contrast to previous years, despite the large number of minnows noted at the site. However, anecdotally, the minnows appear to be less frequent this year than in previous years of low fry density. The relationship between minnows and trout has been observed in other areas, and indicates the potential impact of non-native species within the river systems.

This monitoring programme followed on from the final clearing of a long-term toxic algal bloom and was established as a means of following the recovery of the loch from this incident. As such, it is encouraging to see that the population is comprised of a good age mix distributed well throughout the system, and that the population would appear to be healthy.

## 7. Bhadaidh Daraich catchment

Table 7.1 gives the grid reference, altitude and location of each site fished. The length, mean width and area fished are presented in Table 7.2, together with minimum estimates of density for salmon and trout fry (0+ years) and parr (>1 year) per 100 m<sup>2</sup>.

Table 7.1 Electrofishing site details

Code	Easting	Northing	Altitude	Situation
BD3	216500	944300	25	By the big boulder
BD4	216300	944200	35	Between small rocks and higher barrier (with heather in middle of barrier)
BD5	216300	944100	45	Just below loch

Table 7.2 A summary of the density of salmon and trout fry (0+ years) and parr (greater than 1 year) at each site per 100 m<sup>2</sup>

Site code	Length (m)	Average Width (m)	Area (m <sup>2</sup> )	Density (100 m <sup>2</sup> )			
				Salmon fry	Salmon parr	Trout fry	Trout parr
BD3	12.6	2.37	29.82	0.00	0.00	3.35	20.12
BD4	11.3	2.37	26.74	0.00	0.00	29.91	0.00
BD5	20.5	3.47	71.07	0.00	0.00	23.92	5.63

The maximum, minimum and mean densities are given for all sites (Table 7.3). This summarises the data and allows comparisons within the system and with other systems within the west Sutherland area.

Table 7.3 A summary of the densities determined for all sites surveyed

	Minimum	Maximum	Mean
Salmon fry	0.00	0.00	0.00
Salmon parr	0.00	0.00	0.00
Trout fry	3.35	29.91	19.06
Trout parr	0.00	20.12	8.58

Three year classes (0+ - 2+) are discernible within the trout populations.

Eels were present in low numbers at all sites. Minnows were only present in one site, BD5, although the density of minnows was high.

## Discussion

The average densities of trout fry within this survey are lower than those found in previous years, although some interannual variations are apparent. This may be the result of higher flows within the sites, which resulted in the inability to sample some sites and may have resulted in the spread of fish

within the system. Trout parr, however, do not demonstrate a similar reduction, indicating that a reduction in spawning success during 2006 is the main reason for the decline noted. Trout densities within the system are, however, above average for the Sutherland area.

The recorded conductivities remain exceptionally high for the area, with a high silt content in BD5. This is similar to the previous findings for the system, something that was previously attributed to the Council Yard. It is likely that this is still the cause of these findings, despite the closure of the yard several years ago, as there will be a high salt content remaining within the sediments. In addition, the physical nature of BD5 is such that silt deposition rather than removal will be encouraged.

No sea trout were encountered in sampling or observed within the burns. However, it is still hoped that sea trout can be encouraged to re-enter the system. Remedial works have been undertaken to the weir into the main tributary, and additional work can be undertaken over time. Stocking of the system with unfed fry is also recommended to re-establish the sea trout population.

## 8. Average for the West Sutherland Fisheries Trust area

The average densities of fish within each catchment are summarised (Table 8.1). This allows a comparison between the catchments, although it should be noted that the temporal changes in density, occasioned by sampling at different times of the year, and habitat differences between catchments are not considered in this table. The timing of sampling is important, with fish moving within the tributaries as a result of water height and temperature, food availability and size. Thus, sampling after a spate may give a low density as a result of washout, while drought may decrease density as fish move into deeper water to avoid predation or desiccation, or may increase density as a result of concentration in severe cases. Similarly, densities will be greater shortly after hatching, reducing with time as the fish grow and require a larger territory for survival.

Table 8.1 The average densities of salmon and trout per 100 m<sup>2</sup> within each catchment surveyed

Catchment	Density (100 m <sup>2</sup> )			
	Salmon fry	Salmon parr	Trout fry	Trout parr
Loch Innis na Ba Buidhe	0.00	1.64	47.85	1.64
Achriesgill	0.63	5.49	2.46	2.88
Rhiconich	8.26	3.23	1.84	0.62
Loch na Thull	14.81	24.37	17.25	0.98
Laxford	8.73	7.29	12.54	1.35
Loch nam Brac	0.00	0.00	28.55	11.89
Bhadaidh Daraich	0.00	0.00	19.06	8.58

From Fig 8.1 it can be seen that the length distribution for trout and salmon is similar throughout the area. As expected, there was a greater spread in the length of trout caught compared to salmon. Salmon also appeared to be slightly smaller than trout, although this difference is not significant.

The West Sutherland area would appear to be predominantly a trout area, although salmon occur in many of the systems examined (Fig 8.2). Eels are also common throughout the area, occurring in all of the systems examined. Minnow, in contrast, occurred with varying distributions in 3 out of the 7 systems, while 3-spined stickleback were not found during this survey.

## Discussion

The results from this survey indicate that salmon and trout populations are dispersed throughout the area. Only rivers with restricted access to the sea did not support a salmon population, however small. These systems supported healthy trout populations. Only in Loch Innis na Ba Buidhe were missing year classes observed, with fry absent from the sampling. This may reflect the habitat at the survey sites, but is more likely to be an indication of the fragile nature of the salmon population, where salmon require particular conditions to enter the system, and the disturbance of the main salmon spawning tributary by spate flows. All other systems had a range of age classes, with populations appeared to be healthy, if small.

When compared to the previous surveys within these systems, the fish densities did not show any discernible pattern, increasing in some systems while decreasing in others. Stocking does not form a major part in the management of systems monitored in 2007, with the exception of the Laxford. Here, the system is stocked with salmon, the monitoring of this being the undertaken by surveys in Lone B – Lone D. Other factors that may affect the results, compared to previous years, include water flow and

temperature, with a wet summer affecting sampling efficiency and the ability to reach and survey many of the original sites.

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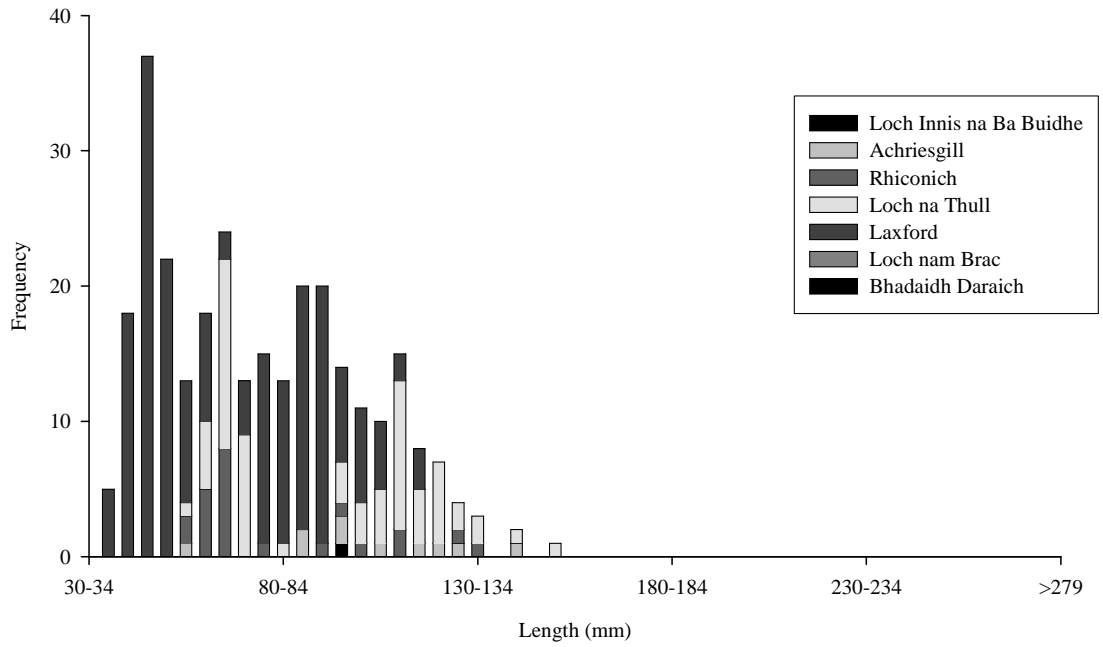


Fig. 8.1a The length - frequency distribution of salmon within the West Sutherland area

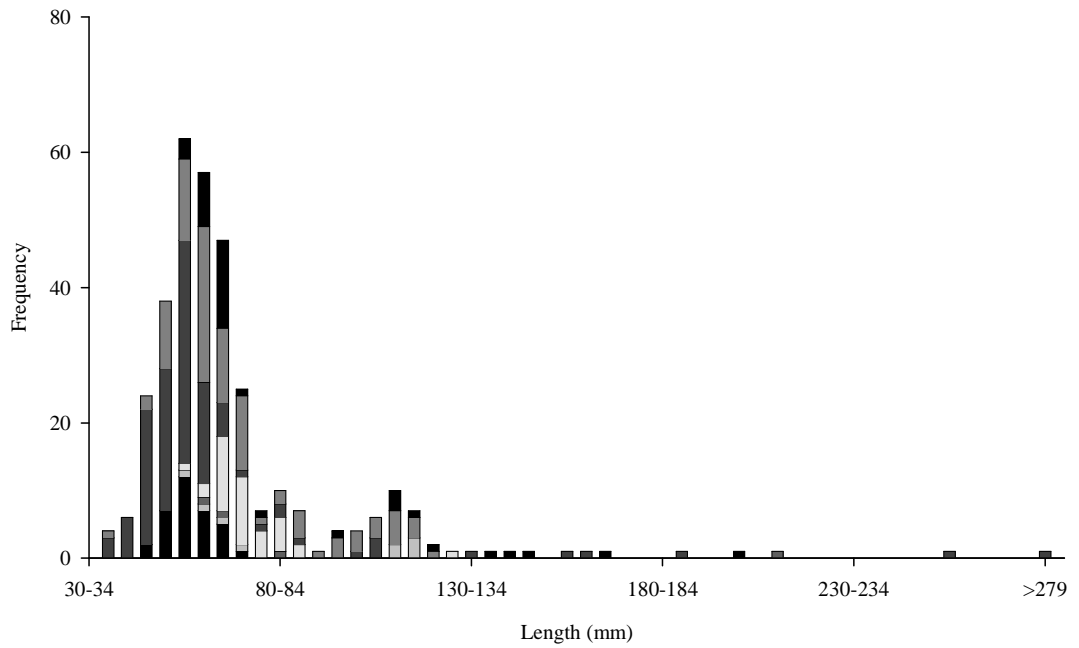


Fig.8.1b The length - frequency distribution of trout within the West Sutherland area

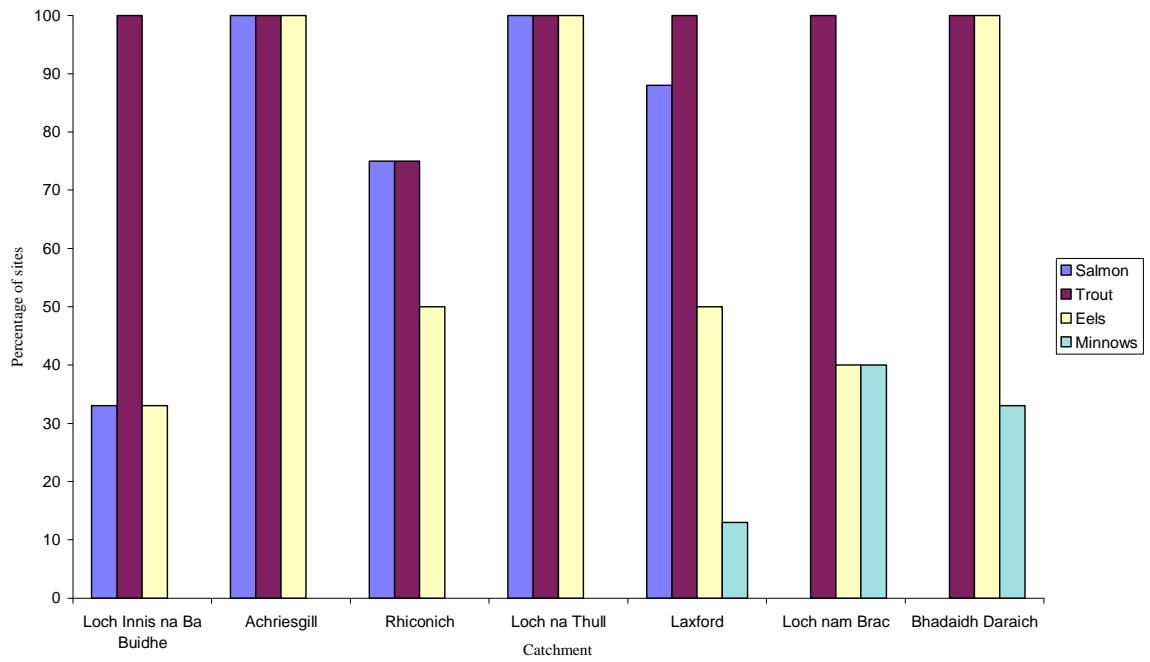


Fig. 8.2 Showing the occurrence of each species within the catchments, as a percentage of the sites surveyed