Rotary Screw Trap Data from the River Tromie 2011

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Spey Foundation Report 11/11

Prepared for

Dr Alastair Stephen
Scottish and Southern Energy
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CONTENTS

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SUMMARY

A 4ft rotary screw trap was installed on the lower River Tromie, an upper tributary of the Spey during Spring 2011. Data on the run time and age structure of salmon smolts and trout was determined along with the effects of environmental parameters such as water flow during the year. Estimates of salmon and trout run size are also determined through a mark and recapture approach and application of the Petersen method. Comparisons with previous years trapping studies and smolt estimation produced through electrofishing data and desk based studies are also included. Some data on other fish species was also collected.

1. OBJECTIVES

The aim of this study was to:

1. Continue the operation of a rotary screw trap in the River Tromie,
2. Provide estimates of salmon and sea trout smolt production for the River Tromie,
3. Collect baseline data on size, age and run time salmon and sea trout smolt runs,
4. Collect additional data on other species that may be obtained as a by-catch.

2. INTRODUCTION

The River Spey is a Special Area of Conservation (SAC) for four species: Atlantic salmon (*Salmo salar)*, otter (*Lutra lutra*), sea lamprey (*Petromyzon marinus*) and the freshwater pearl mussel (M*argaritifera margaritifera*). The Spey salmon population supports long-term average catches of around 9000 fish per annum and the sport fishery brings considerable economic benefits to the local and national economy. It is essential that every effort is made to protect and where possible enhance the numbers of juvenile salmon produced by the Spey and its tributaries. To facilitate this high quality data is required to monitor the status of the salmon stocks.

Smolt data is considered to be the best measure of the health of salmon stocks in the river, but is hard to come by and usually requires the construction of an instream trap. Although this has proved successful in many areas it often requires a considerable amount of costly river engineering and has high staffing costs. However the recent development of rotary screw traps offers a more cost-effective approach.

Traps of this kind have been used extensively in Canada and the USA and are now being utilised in a variety of rivers across Scotland and the UK. They offer several advantages; the trap requires little engineering other than suitable anchor points, it is relatively moveable from site to site and will also operate across a range of flows.

A rotary screw trap has already been successfully operated in the lower River Tromie during 2009 and 2010 (Laughton 2010b) and this report provides data from operation in 2011 and compares the results with previous years.

3. MATERIALS AND METHODS

3.1 Trap Installation

A 4ft rotary screw trap (RST) (Key Mill Construction Ltd, Ladysmith, BC, Canada) was installed in the lower River Tromie downstream close to the Scottish Environment Protect Agency (SEPA) river flow gauging station (278900, 799600).

The trap is constructed with two large floats supporting a rotating drum in the centre. The drum faces upstream and is turned by the river flow. An internal screw allows any smolts entering the drum to pass freely into a holding box at the rear of the trap without being removed from the water. The trap was anchored to the river bank by chain and rope attached to bankside trees.

The trap was inspected daily, generally in the morning, and captured fish were removed for analysis. The trap was also cleaned daily using brushes. During periods of high spates which carry high debris loads the drum of the trap would be lifted to protect the device and avoid it being washed away. During these periods accessing the trap also was unsafe and some sampling time was lost until safe operation conditions returned.

Captured fish were removed from the holding box by dip net. Fish were anaesthetised (benzocaine) and species identified. Fish length was measured for all fish captured and a small sample of scales for age determination was collected from every tenth salmon and trout captured. All salmon and trout were assessed visually for their condition and classed as smolt, parr, brown trout, silvery trout, etc.

A proportion of salmon and trout smolts were marked on their underside using a spot of Alcian Blue dye for mark re-capture estimates. These fish were then transported approximately 0.5 - 1km upstream before release back into the Tromie. Subsequent smolt catches were then examined for recaptures of marked fish so that the efficiency of the RST could be calculated and thus, the size of the overall smolt run to be estimated.

3.2 Environmental Data

River level data was provided by SEPA for their gauging station at Tromie Bridge (278900, 799600) which monitors flows in the tributary. River temperature data was recorded each day typically between 08:00 and 11:00 and a temperature logger (VEMCO minilogs) was also installed to provide a long term dataset of hourly temperature readings.

4. RESULTS

4.1 Site Selection

The monitoring site adjacent to the SEPA gauging station at Tromie Bridge (278900, 799600) proved successful in 2009 and 2010 (Laughton 2010b) and so the 4ft rotary screw trap was installed from 4th March 2011 to the 24th May 2011 a period of 81 days, of those it was actively fishing for 69 days with 12 days lost due to spates.

4.2 Fish Data 2011

Table 1: Number, age, and mean length of salmon and trout captured in the lower River Tromie RST during 2011.

Salmon		**Trout**	
Smolt	2139	Silvery	102
Parr	17	Brown	426
		Finnock	1

Scale Samples Collected						
Salmon Smolts				**Trout**		
Age	**Number**	**%**	**Mean Length (mm)**	**Number**	**%**	**Mean Length (mm)**
1	0	0.0		0	0.0	
2	79	36.6	116	13	23.2	120
3	117	54.2	130	26	46.4	166
4	2	0.9	117	7	12.50	214
5				1	1.79	297
6				4	7.14	333
7				0	0.00	
No Age Resolved	18	8.3		5	8.9	
Un Read	0	0.0		0	0.0	
Total	216	100		56	100	

Table 1 provides a summary of the salmon and trout captured descending the Tromie from 4th March 2011 to the 24th May 2011. Salmon were by far the most dominant fish type with 2156 captured, of these 2139 (99.2%) were identified as smolts. Seventeen (0.8%) salmon parr were also captured.

Trout were also caught and these were visually assessed for silvery appearance indicating the fish may be smolting and therefore likely to become a sea trout. Table

1 indicates that 529 trout were captured and of these 102 (19.3%) were considered to be showing signs of smoltification. The remaining 426 (80.5%) were brown trout. In addition a finnock was also captured (0.2%).

Scales were collected from 216 salmon smolts and scale readings indicated that 2 and 3 year olds dominated, 36.6% and 54.2% respectively. Two (0.9%) four year old smolts were also captured this year. Table 1 also indicates that three year old smolts a greater mean length than the two year olds and the four year olds. Indeed the four year olds were surprisingly small.

Table 1 indicates that trout showed a much wider range of ages from 2 through to 6 year olds, with 2 and 3 year olds giving the greatest percentages at 23.2% and 46.4% respectively. The silvery trout were 2 and 3 year olds. The mean lengths of trout increased with increasing age.

Table 2: Other fish species captured in the lower River Tromie RST during 2011.

Species	Total
Minnow	0
Eel	0
Brook Lamprey (Transformers)	0
Stickleback (3 Spine)	0

Table 2 indicates that no other species of fish was captured in the lower Tromie RST during 2011.

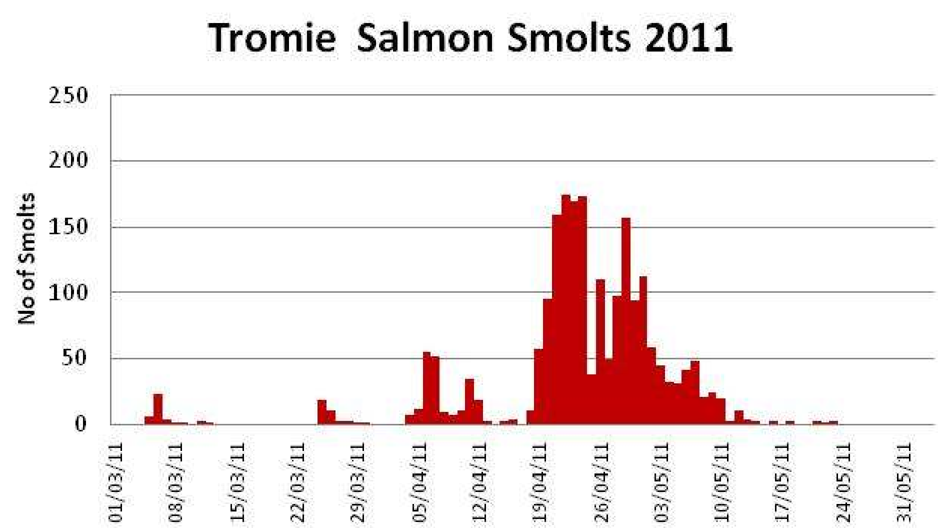

Figure 2: Daily salmon smolt capture in the River Tromie RST, 4th March 2011 to the 24th May 2011.

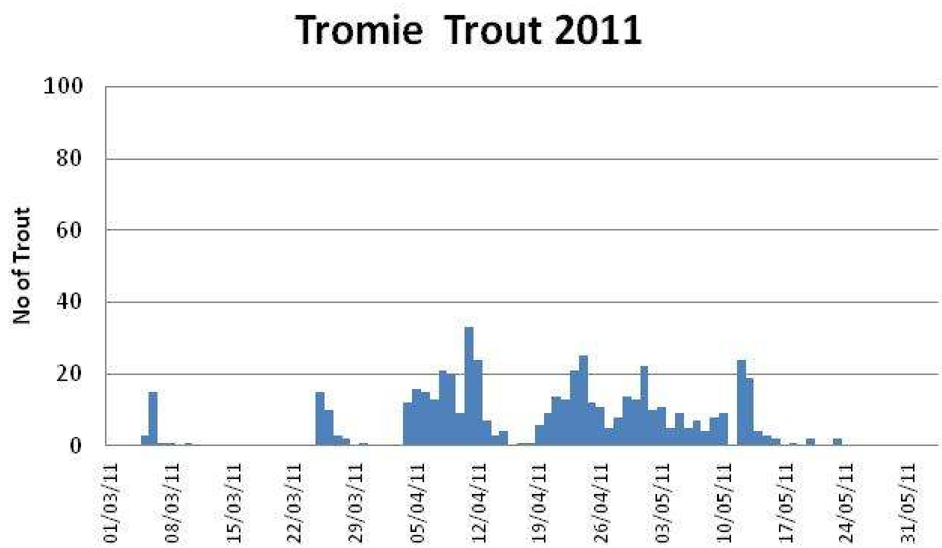

Figure 3: Daily trout capture in the River Tromie RST, 4th March 2011 to the 24th May 2011.

Figures 2 and 3 indicate the daily catches of salmon smolts and trout respectively. The trap was not operated from the 13th March to the 24th March due to high flow conditions but thereafter was operated continuously until removal on 24th May 2011. Salmon smolts were captured on most days with the highest catch of 174 on the 22nd April 2011. Trout were also caught on most days with 33 trout being the highest daily catch on the 11th April 2011.

4.3 Salmon and Trout Capture and Environmental Parameters

Smolt Capture and River Temperature

Temperature data for the Tromie was recorded hourly using a VEMCO minilogger and the mean daily temperatures for the period of smolt trap operation is plotted with the daily catches of salmon smolts and trout in Figures 4 and 5 respectively. Mean daily temperatures during March to May indicated a steady rise after a sudden drop in early March. This reflects the fairly mild and stable weather conditions throughout Spring 2011. The relationship between salmon smolt capture and river temperature is not clear although as temperatures approach 10^{O}C salmon smolt catches increased. Catches of trout were much lower (Figure 5) and no clear relationship is evident.

Smolt Capture and River Flow

River level data from the SEPA Tromie Bridge gauging station was obtained and is plotted with the salmon smolt catch data in Figures 6 and the trout catch data in Figure 7. It is evident from Figure 6 that river flow influences the salmon smolt catch. Flow levels during the spring 2011 were characterised by a series of spates in late March through to early April (4th-6th) followed by a steady decline in flows throughout April and May. A further large spate marked the end of the trapping season at the end of May. These March to April spates made operation of the trap difficult with the drum lifted for protection or the trap removed completely, thus a good sample of the smolt run was not achieved through this period. However, Figure 6 indicates that the increases in flow in early April did lead to increased salmon smolt numbers for the following few days and similarly catches of trout were generally higher after an increase in water level (Figure 7). The mild and dry conditions which prevailed through mid April and May did not allow the influence of spates on smolt movements to be examined any further.

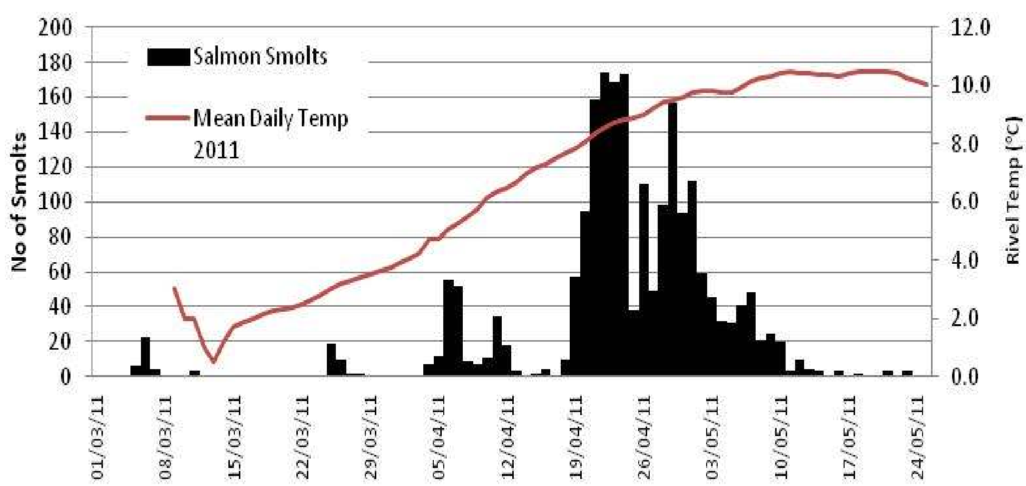

Figure 4: Salmon smolt capture and river temperature (°C) during March to June 2011 on the River Tromie.

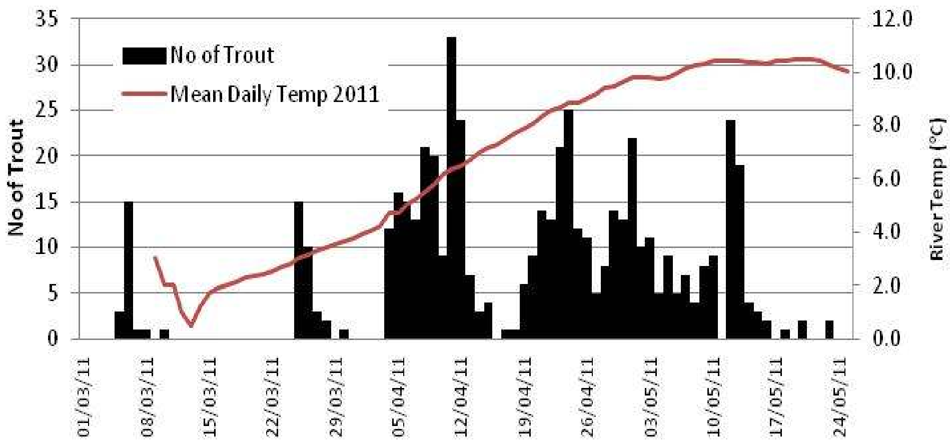

Figure 5: Trout smolt capture and river temperature (°C) during March to June 2011 on the River Tromie.

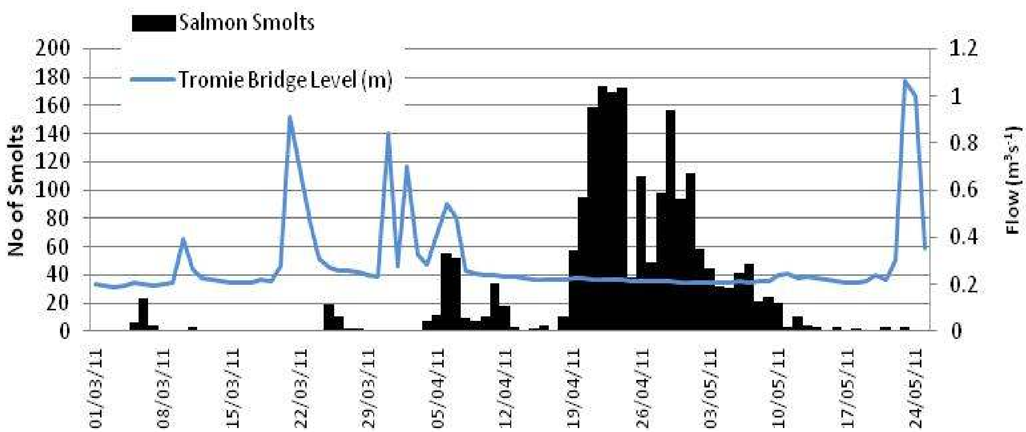

Figure 6: Salmon smolt capture and river level (m) at 12:00 each day during March to June 2011 on the River Tromie. River level data supplied by SEPA.

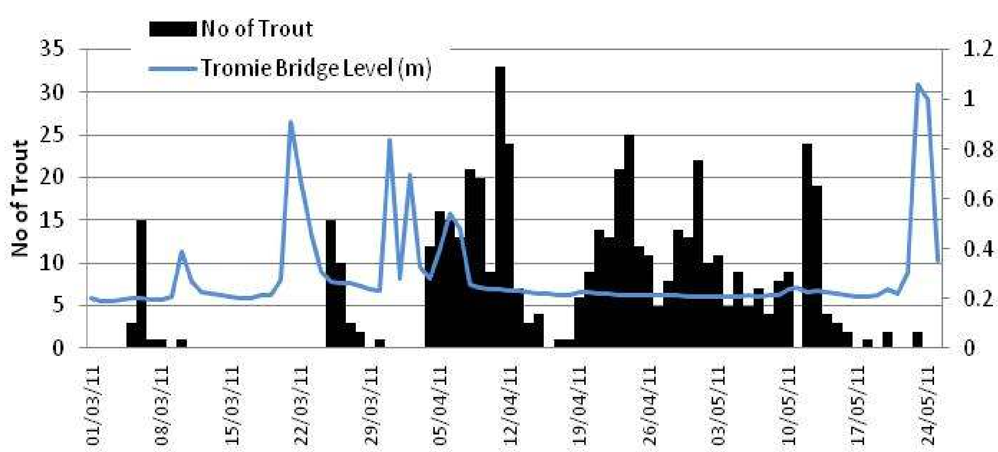

Figure 7: Trout capture and river level (m) at 12:00 each day during March to June 2011 on the River Tromie. River level data supplied by SEPA.

4.5 Cumulative Salmon Smolt Catch

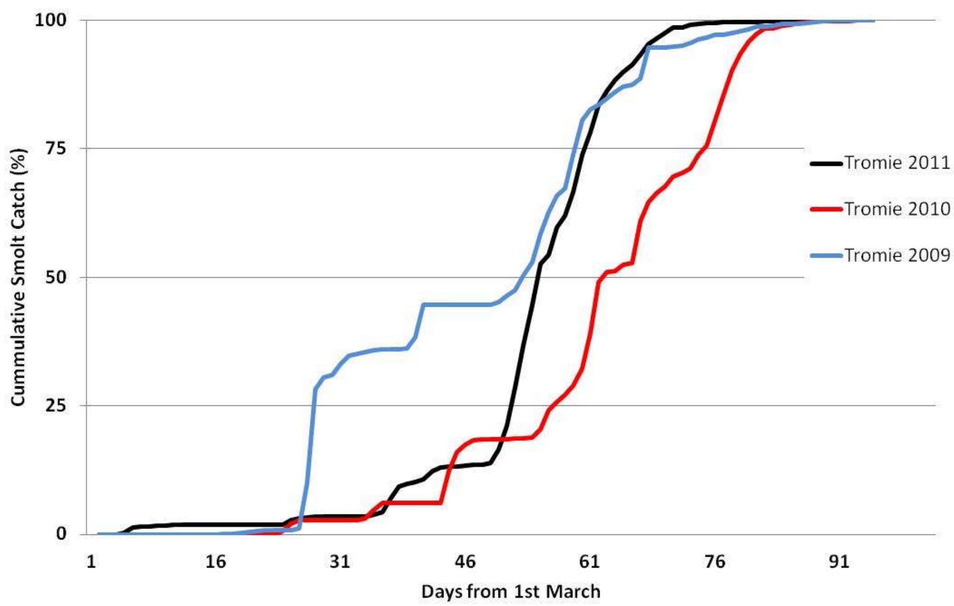

Figure 8: Cumulative salmon smolt catch (%) from 1st March during 2009, 2010 and 2011 on the River Tromie.

Figure 8 shows the cumulative smolt catch against the time from 1st March for each of the study years 2009, 2010 and 2011. It is evident that the timing of the smolt runs can vary widely from year to year. The 2010 and the 2011 smolt runs were later and slower than the run in 2009, 50% of the catch was reached on 22nd April 2009 while in 2010 this was only achieved by the 1st May. However, after the slow start the 2011 run reached its 50% point on the 24th April similar to the 2009 run. The smolt run was largely complete by 1st June in all years.

4.6 Estimating the Smolt Run for the Tromie

4.6.1 Using Electrofishing Data

One of the aims of this study was to estimate the numbers of salmon smolts originating from the Tromie. Using historical results from traps in the Spey catchment at Spey Dam, the Cally Burn and River Fiddich (Spey Fishery Board, 2005) it has been estimated that the maximum smolt output ranges between 2 and 5 smolts per 100m^2 of riverine habitat. Similar figures have been found by Marine Scotland on the Girnock Burn, Diver Dee, and by the Conon Fishery Board on the River Brahan (*Mckelvie, S. pers com.*).

The length of the Tromie utilised by salmon is approximately 18km while the mean wetted width is 10.5m (determined from electrofishing sites). So the area available for smolts is 189000m^2. Using the smolt output range of 2 and 5 smolts per 100m^2 we would predict the Tromie to produce between 3780 to 9450 smolts. This can be checked by using electrofishing survey data and the data from the rotary screw trap.

Table 3: Smolt estimation for the River Tromie using electrofishing data from 1990 to 2008.

Tromie Smolt Estimation from EF Data 1990-2008		
River Dimensions	Mean Width (m)	River Length (m)
	10.5	18000
Area (m^2)	**189000**	
Long term Mean Densities (m^{-2})	Salmon 1+	Salmon 2+
	0.107	0.033
Adjustment >90mm	Salmon 1+	Salmon 2+
	65%	100%
Adjusted Density (m^{-2})	**0.070**	**0.033**
Production	Salmon 1+	Salmon 2+
	13145	6237
Total	**19382**	
Over winter survival	50%	
Estimated Smolt Output	**9691**	

Table 3 illustrates how long term electrofishing data can be used to estimate salmon smolt output. The mean densities of salmon 1+ in the Tromie from 1990 to 2008 is $0.107m^{-2}$ while the mean density for salmon 2+ is lower at $0.03m^{-2}$. By examining length data from the electrofishing data, approximately 65% of the 1+ salmon are 90mm or above and so are likely to smolt the following spring. All the 2+ parr have reached 90mm and will potentially smolt. These figures are then multiplied by the tributary area to provide an estimate of production. Over winter mortality is also estimated at 50% and so using the electrofishing data we achieve an estimate of 9691 smolts (0.051 smolts per m^2) from the Tromie.

4.6.2 Using RST Smolt Data

To estimate the Tromie's salmon smolt run using the RST a mark-recapture scheme was initiated. Throughout the spring sampling periods a proportion of both salmon and trout smolts were marked using a simple Alcian Blue dye mark, transported approximately 1km upstream and released. The numbers of marked smolts recaptured were then recorded. Initially a simple Petersen mark-recapture equation (Volkhardt, *et al,* 2007) was used to estimate the overall population as follows,

$$N_i = n_i (M_i/m_i)$$

Where:

N_i = Estimated number of downstream migrants during period i

n_i = Number of fish capture during period i
m_i = Number of marked fish captured during period i
M_i = Number of fish marked and released during period i

This equation also provides a measure of trap efficiency e_i as follows,

$$e_i = (m_i/M_i)$$

Data from the 2009, 2010 and 2011 sampling season was used with the Petersen method to estimate the salmon smolt output for the Tromie (Table 4). Table 4 indicates that the percentage recapture rates were good for salmon, 57.5% in 2009 and 30.2% in 2010. The lower efficiency in 2010 reflects the change from a 6ft trap in 2009 to a 4ft one in 2010. Using the Petersen method an estimated run of 7852 salmon smolts (0.042smolts per m^2) from the Tromie in 2009, in 2010 the estimate was lower at 4283 smolts (0.023smolts per m^2) in 2010 and in 2011 the estimate was 8810 (0.047smolts per m^2).

Table 5 applies the same approach for trout and it is evident that the recapture rates of trout were lower than those of salmon, 19.4% in 2009 and 16.4% in 2010. The run size for trout was estimated at 3941 fish in 2009 and 3627 fish in 2010 and 3188 in 2011.

Table 4: Salmon smolt run estimates for the River Tromie for 2009 and 2010 using Petersen mark-recapture method (from Volkardt, *et al* 2007).

Simple Petersen Recapture Model					
Year	Total Salmon Smolts Captured (n_i)	Marked Smolts (M_i)	Marked Smolts Recaptured (m_i)	Estimate of Population Size (N_i)	Trap Efficiency (e_i)
2009	4513	2107	1211	7852	57.5
2010	1294	1208	365	4283	30.2
2011	2139	2014	489	8810	24.3

Table 5: Trout run estimates for the River Tromie 2009 and 2010 using Petersen mark-recapture method (from Volkhardt, *et al* 2007).

Simple Petersen Recapture Model					
Year	Total Trout Captured (n_i)	Marked Smolts (M_i)	Marked Smolts Recaptured (m_i)	Estimate of Population Size (N_i)	Trap Efficiency (e_i)
2009	764	521	101	3941	19.4
2010	595	506	83	3627	16.4
2011	528*	477	79	3188	16.6

* Finnock not included in estimate.

5. DISCUSSION

The use of rotary traps to estimate smolt outputs has increased considerably in the last few decades. The approach was initially developed in the USA and Canada (Volkhardt, *et al* 2007) and adopted in the UK during the 1990s. This report provides data for the third year of operation on the River Tromie, an upper tributary of the Spey.

Only salmon and trout were present in the trap this year but in previous years four other species have been caught, including minnow, eel, stickleback and Brook lamprey (Laughton 2010b).

Salmon were the most abundant fish captured during 2011 and the vast majority of the salmon emigrants were smolts. This year three age classes were recorded. Three year old smolts were more prevalent which was similar to 2009 while the pattern changed in 2010 with two year olds more abundant. A small number of 4year old smolts were also recorded this year. Output and age will vary from year to year and will be influenced by a range of environmental factors, and a longer data set will be required to examine this further. The mean length of salmon smolts increased from two year old to three year old smolts which is similar to data from other Highland Scottish tributaries such as the Water of Mark on the North Esk (McKay and Smith, 2007). The four year olds were shorter in mean length which was surprising but may reflect the small sample size or fish with very slow growth rates.

Similar to 2009 and 2010 (Laughton 2010b) good numbers of trout were captured during the study. The three large lochs within the Tromie catchment may contribute to the high number of trout emigrants. The mark-recapture approach was also used for trout and indicated that recaptures ie, trap efficiency, was much less for trout than salmon smolts which is similar to previous years. This is also the pattern on the Truim where trout recaptures were lower than salmon (Laughton 2010a, Laughton 2011). This may result from differences in behaviour between the species; the salmon are on a definite seaward migration so after re-release above the trap they will be highly likely to migrate downstream again. Trout may not be as committed to downstream migration and so could move upstream from the trap instead. In addition salmon smolts tend to migrate higher in the water column (Moore, Potter, Milner and Bamber, 1995) so may be more susceptible to capture. The large trout may also be strong enough swimmers to avoid the sampling drum.

All the trout were visually assessed for silvery colouration indicating potential development to a smolt. This year 19% of the trout were considered silvery in appearance compared to only 1% in 2009 and 33% in 2010. The majority of these silvery trout were 2 and 3 year olds but older brown trout, up to age 6, were also captured. Elliot (1994) indicated that sea trout smolts range from 140mm to 250mm for the British Isles and the size range observed for the Tromie during 2011 is within this.

Although the trout captured were silvery in appearance it is not clear whether they would have developed into sea trout smolts. Most trout populations will produce a proportion of sea trout and there are reports of occasional sea trout in the upper Spey. The capture of a finnock this year indicates that some of the population do progress to sea and then return to the river.

Brown trout also undergo migrations within the river and tagging studies have shown trout will travel from the upper tributaries downstream to the lower mainstem. For example, a brown trout (W1923) tagged on the Feshie in October 2005 was caught in June 2010 at Ballindalloch, over 50km downstream.

Smolt capture was during the night and on the occasions when the trap was inspected through the day no smolts were recorded. A number of studies have indicated that salmon smolts largely migrate during the night (Thorpe, Ross, Struthers and Watts, 1981; Moore, Ives, Mead and Talks, 1998) and the pattern of capture here supports this.

Environmental parameters such as flow (Allen,1944; Hvidsen, Jensen, Vivas, Bakke and Heggberget, 1995) and temperature (Kennedy and Crozier, 2010) are also known to influence the smolt migrations.

Larger spates continued to be problematic for the operation of the RST and after the loss of the RST in April 2010 (Laughton 2010b) a policy of lifting the rotating drum to protect the trap was adopted if larger rainfall/snowmelt events were forecast. While this protects the trap from loss and the drum is lowered back into position as soon as possible after the spate some smolts will be missed leading to a loss of data which in turn will affect estimates of run size and timing.

The Tromie is a regulated river with a dam, operated by Scottish and Southern Energy (SSE), situated in the headwaters controlling the flow regime. Flows in the Tromie are maintained at a constant compensation flow of Q63 so the tributary never drops to its natural low flows. In previous years, when spate events have been recorded above the Q63, smolt catches have generally been higher and in March 2012 there was again some evidence of this pattern. However, this season was characterised by a long dry April where flows remained constant. The majority of the smolts were captured during this period despite there being no discernible rises in flow.

Similar to previous years there is a slight suggestion that smolt capture rates were greater as the river temperatures increased. Temperature is an important factor in the development of smolts for example, Jonsson and Ruud-Hansen (1985) suggest that the start of the yearly smolt run was not triggered by a specific water temperature or a specific number of degree-days, but was controlled by a combination of temperature increase and temperature level in the river during spring. Zydlewski, Haro and McCormick, (2005) also suggest that temperature experience over time is more relevant to initiation and termination of downstream movement than a particular temperature threshold. Gurney, Bacon, Tyldesley and Youngson, (2008) also indicate that temperature is an important part of development but other factors such as density dependant mortality at earlier life stages also play an important part.

To examining the relationships between smolt output from the Tromie and environmental factors better long term data is required. The river has a water gauging station operated by SEPA and a Vemco minilogger has also been installed at the trap site to record year round data.

The output of salmon smolts from a tributary can be predicted by estimating the stream area and applying smolt estimates from other rivers. This was used to predict a range of smolt outputs for the Tromie of 3780 to 9450 smolts. This was then tested using electro-fishing data and RST data.

Electrofishing data provided estimates which were towards the upper end of this predicted range, 9691 smolts while the RST salmon smolt output estimates varied considerably between 2009 and 2011 (7852, 4283 and 8810 smolts respectively).

The low count in 2010 reflects the loss of the trap to a spate in early April and subsequent loss of smolt data. However, variations of this magnitude have been documented on other upland tributaries such as the Girnock Burn (Buck and Hay, 1984). The range of smolt outputs, $0.023m^{-2}$ to $0.047m^{-2}$, is lower than the $0.07m^{-2}$ documented in the Girnock (Buck and Hay, 1984) but similar to more recent data from the Water of Mark in the upper North Esk which produced 0.04smolts per m^2 in 2009 (G. Smith and F. Mackay, Marine Scotland Science, *pers com*), the Girnock Burn .

In general the smolt estimates were encouraging given the Tromie is affected by significant water abstraction for hydro-electric purposes. However, a number of problems are evident within this approach.

The simple Petersen mark-recapture model used here for smolt estimates depends on a number of assumptions including: the population is closed ie, there is no significant movement in or out of the population; all fish have the same probability of re-capture; all fish have an equal probability of capture in the first sample and similarly in the second sample; marking does not affect the catchability; fish don't lose their marks; and all recovered marked fish are reported. Not all these criteria are adequately met. It is debateable if a migratory smolt population can be considered as a closed population. Salmon are known to migrate as pre-smolts during the Autumn and data from the Girnock Burn indicate that this can be a significant portion of the population (Buck and Hay, 1984). Currently there is no data on this aspect of the smolt run available for the Tromie.

In general it is assumed that catchability remains the same between each sample and that that the dye marks used will remain on the fish for the short time period required. Trap operators were experienced in marking techniques and although some marked fish may have been missed, losses due to lack of observation is not thought to be significant. However other approaches to estimating smolt population such as installing paired traps and batch marking groups of fish are worth exploring as this would allow more sophisticated analysis models to be applied (see Bjorkstedt, 2000). However, to achieve this more resources and manpower would be required.

Trap efficiency will also vary throughout the sampling period (Schwarz and Dempson, 1994; Thedinga, Murphy, Johnson, Lorenz, and Koski, 1994) and can be related to environmental conditions such as water flow (Volkhardt, *et al* 2007). This provides a relationship which allows the prediction of catches to be developed and this can then be utilised when the trap is not operational due to debris jams etc. Inclusion of these estimates would further improve the overall population estimate. There is three years of data available for the Tromie but they have been largely characterised by periods of low stable flows so data from a year with more varied flows would helpful to develop a robust relationship.

The smolt prediction from electrofishing surveys was based on a long term dataset (1990-2008) and includes a range of survey sites across the length of the Tromie which are visited yearly. A whole range of factors affect electrofishing data such as habitat, flow rates, adult spawning success, operator efficiency, number of survey sites visited, etc, and further work to refine the smolt output prediction to account for some of the factors is required. Comparing the smolt output with the density of relevant age classes from the preceding year may also be more helpful than simply using averages. For example the smolts produced in 2010 should be compared with salmon parr densities from 2009. Nonetheless it is encouraging to report that both approaches are providing smolt estimates that are similar to the predicted range. As more data is collected from the RST this approach can be further developed and potentially a relationship between smolt output and elecrofishing densities developed for the Tromie. Collecting information on adult numbers and spawning in the Tromie would also be beneficial.

6. RECOMMENDATIONS

1. Continue sampling Tromie smolt runs using rotary screw trap (RST) at the SEPA Gauging Station 2012 onwards,
2. Further examine the effects of environmental parameters on the smolt run from the Tromie,
3. Explore and implement better population estimate techniques for the RST on the River Tromie,
4. Continue to develop area based estimates of smolt production from the Tromie using electrofishing data and compare with smolt trap estimates,
5. Explore the potential for installing a RST during Autumn on the River Tromie.

7. CONCLUSIONS

The rotary screw trap was successfully operated in the River Trome, an upper tributary of the Spey, during 2012. Further valuable data on the run time and age structure of salmon smolts was gathered along with the effects of environmental parameters such as water flow and temperature. Application of a simple mark and recapture approach allowed population estimates to be created and comparisons with predicted smolt outputs using desk-based estimates and electro-fishing data to be explored. The RSTs provided excellent data for salmon smolts and although trout were regularly caught the traps did not appear to be as good at trapping them. No other fish species were captured in 2012.

The Tromie is a known spawning area for the vulnerable spring run adult salmon and the river is also subjected to water abstraction for hydro-generating purposes. Thus the smolt data will prove very valuable for the future management of the Spey SAC salmon stocks.

8. ACKNOWLEDGEMENTS

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Thanks also to Ray Dingwall (Inveran Estate) for the use of the 4ft trap for the season. I am also grateful to Joe Glennie from SEPA for providing river level data for supplying flow data from the Tromie Bridge gauging station.

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