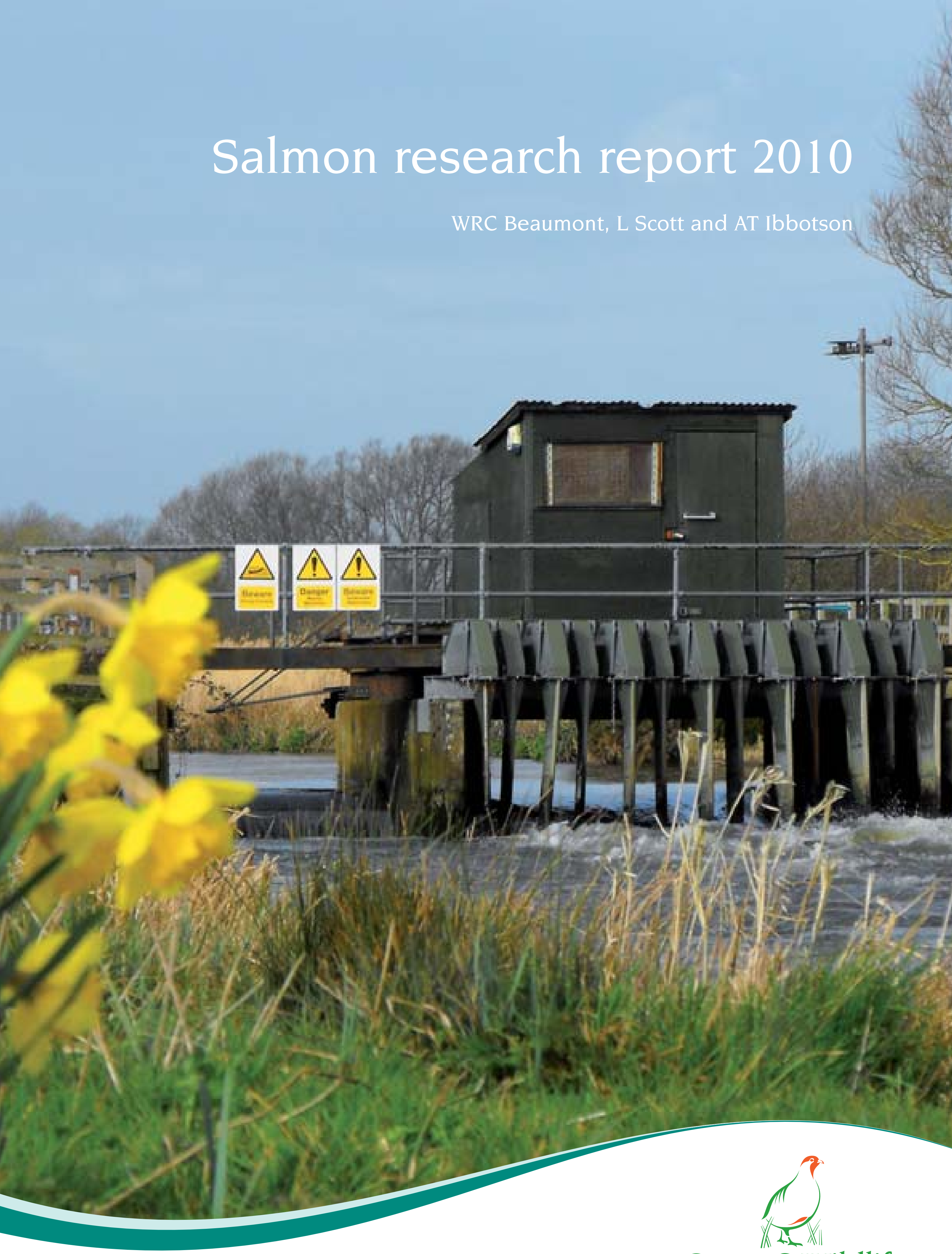
Salmon research report 2010

WRC Beaumont, L Scott and AT Ibbotson



www.gwct.org.uk/salmonreport

Game & Wildlife
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Contents

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1. Abstract

Welcome to the 2010 *Salmon research report* from the Salmon & Trout Research Centre on the River Frome, Dorset. This is the second annual report of research and salmon numbers produced by the Game & Wildlife Conservation Trust (GWCT).

Counts of salmon running upstream in the 12 months between 1 February 2010 and 31 January 2011 were 1,058 fish. This is the highest count since 1998 and well above the 10-year average.

In addition to the adult fish, parr are counted and we mark over 10,000 of them every year with Passive Integrated Transponder (PIT) tags. The high number of tags ensures that about 10-15% of the entire population are marked, therefore ensuring we get good survival data. Parr numbers in 2009 showed the highest count we have recorded in eight years of counting.

We also count smolts when they emigrate out to sea past our facility at East Stoke in April and May each year. We estimate that 13,265 smolts emigrated in 2010, again a high count.

We continue to monitor the migration of parr down the river in the autumn and are investigating what may be the cause of this phenomena, as well as assessing any impact on migrating smolts after they have been caught in a Rotary Screw trap.

We are grateful for all those who have helped secure the site and the valuable data collection on salmon into the future. Our next challenge is to understand what these data tell us about salmon in their freshwater phase, what might be going wrong, but most importantly, what we can do to put it right.

Professor Nick Sotherton
Director of Research

Front cover photograph: The GWCT Salmon & Trout Research Centre's salmon counter.
Below: Electro-fishing.

2. Introduction

The adult salmon count data in this report represents the 38th consecutive year of the East Stoke counter's operation recording the upstream movement of Atlantic salmon *(Salmo salar L.)* in the River Frome. As such, it is one of the most comprehensive, long-term records of salmon movement in England and Wales.

Since 2009 the counter has been managed by the Game & Wildlife Conservation Trust. However, the help and support of the Freshwater Biological Association (who own the site) in helping us continue this monitoring is gratefully acknowledged. Similarly we are grateful to the many land and fishery owners on the River Frome. Without their co-operation in accessing the river, much of this research would not be possible. Additional funding for the work is provided by the Environment Agency and Defra.

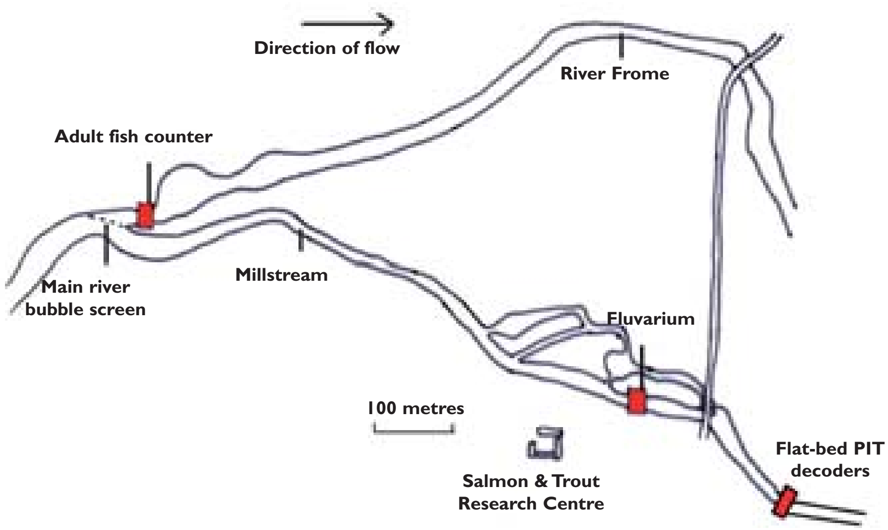


Figure 1
Site plan of the counting equipment at the Salmon & Trout Research Centre at East Stoke

The site at East Stoke has an unparalleled infrastructure in the river that enables us to monitor both the adult salmon migrating upstream and the juveniles going downstream. Equipment on site also allows the detection of small PIT tags that we use to individually mark the juvenile salmon. Figure 1 gives a schematic plan of the site.

This report gives a brief summary of the salmon research carried out over the past year and detailed information regarding the data from the adult salmon counter. Data from the research projects are helping to identify the critical mortality phases of salmon, enable us to determine river-site dependant factors that affect mortality and emigration, allow a better estimate of spawning targets required and enable intelligent management and the conservation of the stock.

Data are collected by a Scottish Hydro-Electric (formerly North of Scotland Hydro-electric Board (NSHEB)) Mk Xb resistivity counter. The counter is connected to three stainless steel electrodes mounted 450mm apart on the Environment Agency venturi gauging weir at East Stoke (NGR SY 867868). Data are verified by a combination of trace waveform analysis (see Beaumont *et al.* 1986), video frame-grab and videotape analysis. A full description of the history of the counter and preliminary long-term results is given in Beaumont *et al.* (2007).

PIT tag data are collected by detection vanes (Wyre Micro Design Ltd) mounted on the main river counter (see picture right) and (during the smolt run only) on detectors housed in the Fluvarium building on the millstream. Detectors are also situated at the Louds Mill fish pass at Dorchester, at the lower end of Tadnoll Brook and on the Millstream at East Stoke. 2011 will see the installation of further detectors at Bindon Abbey.

PIT tag data are collected by detection vanes mounted on the main river counter.

In conjunction with data on salmon movement, information on water temperature, air temperature, rainfall and light levels are also collected at 15 minute intervals from purpose built instrumentation and an on-site weather station. Hydrological (discharge) summaries are derived from Environment Agency data (© Environment Agency). All data are collated into hourly records.

Salmon run data are presented for the period February to January inclusive. Past data and personal observations indicate that the majority of the upstream movement in January is caused by the continued migration of fish from the previous calendar year migrating to spawn, not fish migrating to spawn in 11 months time.

In past reports numbers have been presented in both 'Gross' and 'Nett' formats. Gross number is the total number of fish moving upstream over the weir, with only coincident downstream counts (counts immediately preceding or following an upstream count) subtracted. Nett numbers are the total upstream number minus all the downstream counts. We present the two figures because between 1973 and 1984 only gross data were recorded and non-coincident downstream counts were not recorded. With the development of the computer verification system (Beaumont *et al.* 1986) it was discovered that about 40% of all downstream counts were caused by salmon; leading to an over-estimate of about 20% in gross upstream counts. Thus, since 1985, all downstream counts have been recorded. These data are individually verified (by waveform analysis and video) and this more accurate measure of the nett upstream movement determined.

The more accurate measure of nett upstream number averages out at ~80% of the gross number and is significantly correlated with the gross number (r^2=98%). This year, therefore, we have adjusted the early (pre-1985) gross run data for the downstream error and are only presenting nett data. This will give a single graph of the long-term data, prevent confusion between data-sets and enable a better visual comparison with past year's runs.

During January, February and March the downstream counts are not subtracted from the upstream counts as a high percentage are caused by downstream moving kelts (post-spawning salmon). Some kelts, however, carry out repeated up and down movement over the weir and if down-counts are not subtracted this can lead to over counting these fish. Therefore, where it is clear that up-counts have been caused by kelts, these counts are subtracted from the totals.

3. Salmon research report

Parr tagging

In September for the past six-years, we have electro-fished and tagged approximately 10,000 juvenile salmon (about 10-20% of the juvenile salmon population of the whole river) with PIT tags. These small tags (just 12mm long x 2mm wide) are inserted into parr and enable us to individually identify the fish when they swim past a reader. The passage of the PIT tagged fish out to sea is recorded by equipment mounted on the East Stoke smolt counter and the main river weir. The main river reader also detects the return of the PIT tagged adult fish. There are also detectors mounted at the Louds Mill fish pass at Dorchester and at Tadnoll Mill on the Tadnoll Brook. This year we will also be mounting additional detectors on the weir and fish-pass system at Bindon Abbey. Although this site is only about three kilometres upstream of East Stoke, information from the new system will improve our detection rate of the tags and give important information about speed of upstream and downstream passage. We are grateful for the generous support of the Weld Estate, the Salmon & Trout Association and the Environment Agency, which has enabled us to buy this new equipment.

Salmon parr and PIT tag (circled). Individual ID of the tag is shown on the label.

In 2010, up to November, we detected 17 PIT tagged adult. This is more than in 2009, but is still lower than we would hope. The new PIT tag detectors at Bindon Mill will help us resolve the cause of the low numbers of detections. The PIT tags reported from Louds Mill are still being verified.

The combination of the autumn tagging and the spring smolt counting also allows us to get an estimate of the total number of salmon parr in the river in the autumn. We need to know the number of tagged fish in the following year's smolt run to calculate these data so only data to 2009 can be shown (see Figure 2). These records, together with the records from the other PIT readers, are giving us uniquely valuable information about freshwater survival rates. The data will enable us to determine survival from individual reaches of the river and link the growth rates of the juvenile fish with the time of migration. During the 2010 parr tagging we also recorded detailed habitat characteristics of a selection of the sites that we fished. We are using these data (together with the more generalised data we collected last year) to try to understand factors that control the numbers of fish at each site. Information on freshwater survival, marine survival and life history strategy, from different tributaries, will also be gathered.

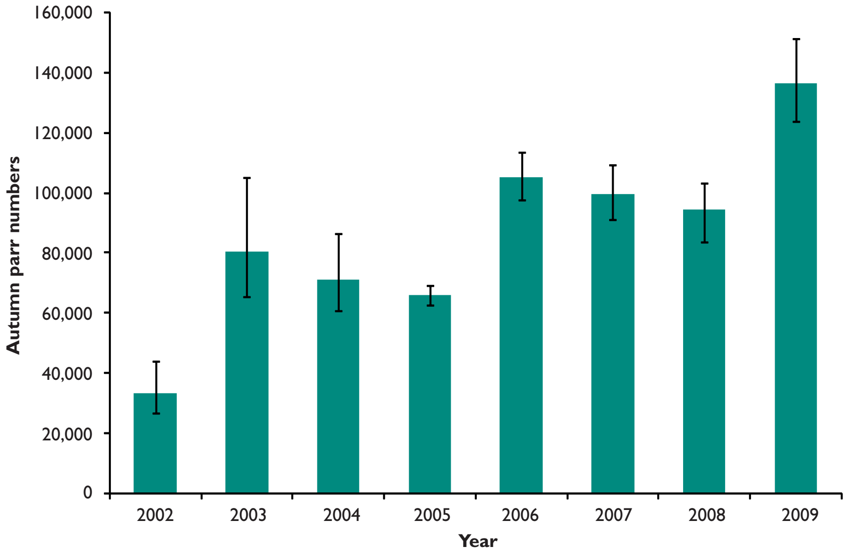


Figure 2

Estimated autumn parr numbers with confidence limits

Autumn migrants

The PIT tag detector vanes on the main weir also allow us to monitor the 'autumn' downstream run of parr in the river. This phenomenon, although reported before, has not yet been fully studied, quantified or explained. Our studies to date show that this movement is an active downstream migration ie. the fish are not just passively drifting downstream but, on the other hand, the fish are not able to tolerate salt water. We have found that many of these fish reside over winter in the lower river downstream of Wareham and we are working with Cefas to further study the biology and behaviour of these fish. We have recorded the first return of an adult fish that was an autumn migrant (Riley *et al.* 2009) and we will continue to examine returns from the adult fish to see if the survival of these early moving fish is better or worse than the fish that migrate in the spring, during the 'usual' migration time for the smolts. We are also looking at the additional dangers these 'autumn migrants' face in the lower river (see Figure 3).

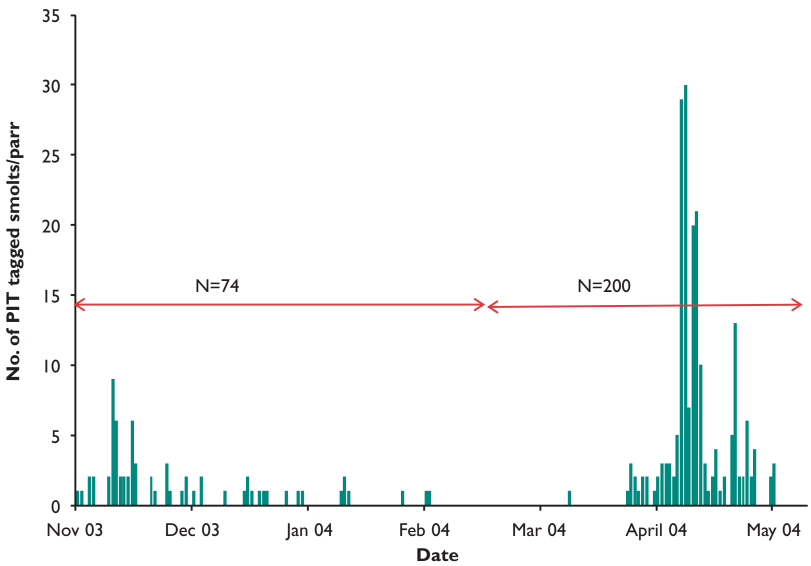


Figure 3

The autumn migrant run and the 'normal' spring smolt run 2003/2004

N= No of tags detected during period covered by arrows

Salmon smolts swim down the river and are diverted down the millstream by the acoustic bubble screen.

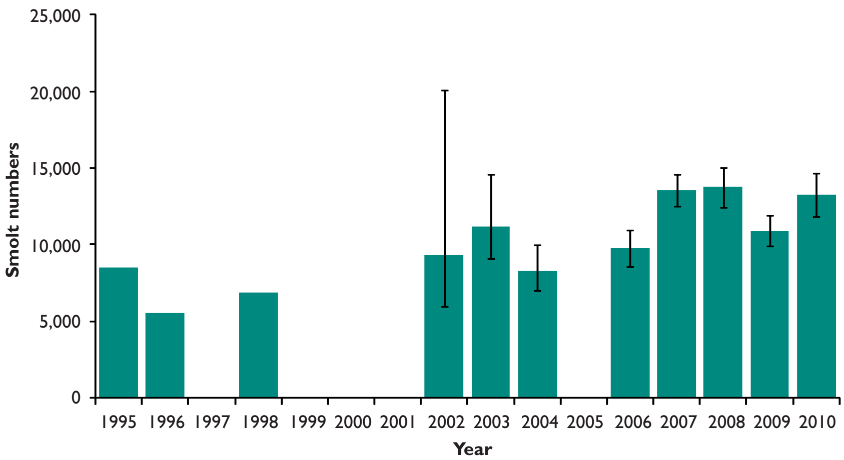
Smolt counting

Since 1995 we have been trying to count the number of smolts emigrating from the river. To do this we use a Bio-Acoustic Fish Fence (BAFF) to divert the fish into the millstream at East Stoke. The BAFF is simply a curtain of bubbles that also has sound entrained within the bubbles, thereby using both the visual impression of a barrier (the bubbles) with the sound to divert the fish. Provision is made for adult fish to be able to negotiate the apparatus and additional studies have shown that the system does not affect upstream adult movement. In the millstream the fish pass through the fluvarium tanks where (being a smaller volume of water) we can count them electronically. The data from the early years of the smolt counting are not good quality and in some years no estimate at all was possible. However, as equipment and methods have been perfected, better estimates have been possible. Figure 4 shows the annual numbers (including the years with poor data) and it can be seen that since 2002, the data quality (with the exception of 2005) has been improving over the years.

The combination of autumn parr numbers and smolt numbers has also allowed us to identify the over-winter mortality of the fish. This has been found to be very high. We are using the data on individual fish location and habitat that we collected during the autumn survey to try to understand the causes of this loss.

Figure 4

Annual smolt estimate and (where available) confidence limits



The daily smolt migration data from 2010 are presented in Figure 5. Data are a total of PIT records from all the various detectors at East Stoke and data from the Rotary Screw Trap. Analysis of the data, after adjusting for the numbers that were not diverted into our counting set-up, showed that a total run of 13,265 smolts emigrated from the river in spring 2010.

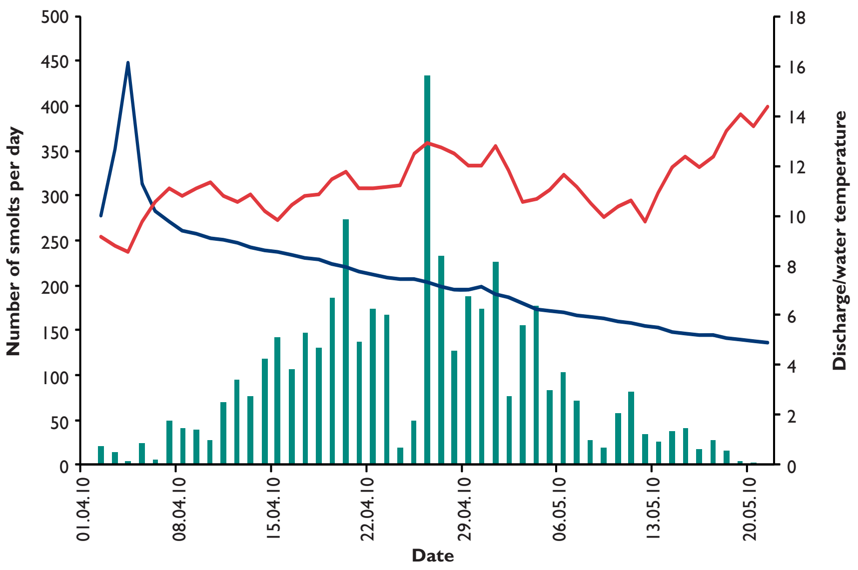


Figure 5

Daily count of smolts, mean discharge records and daily mean temperature

Total discharge

Water temperature

Rotary Screw trap experiment

We are continuing our joint study with Cefas on the effect of Rotary Screw traps (RSTs) on subsequent smolt survival. RSTs are widely used to trap and count migrating salmon smolts on other rivers. However, there have been concerns that the process may be detrimental to the fish. This project uses the information that we get from monitoring the PIT tagged fish to assess whether fish that have been trapped in the RST have higher marine mortality than those that have not.

There are concerns that Rotary Screw traps, used to trap and count migrating salmon smolts on rivers, may be detrimental to the fish.

A sea trout caught and released from the Poole Harbour net.

Poole Harbour netting

Under an agreement with the River Frome salmon net licence holder, the Environment Agency and the Frome, Piddle & West Dorset Fisheries Association, we are monitoring the salmon and sea-trout net catch from Poole Harbour. All the salmon and sea-trout caught, are tagged using a visible Floy tag and or a PIT tag implanted into the body cavity of the fish. The fish are then released and we see if they are caught by the rods or pass the East Stoke detecting equipment. Our staff accompanied the netsman on 23 netting occasions; this represents approximately 70% of the times when netting was carried out. A total of 13 sea trout and three salmon were captured. Nine of the sea trout were PIT tagged, two were only Floy tagged and two were not tagged. Most of the fish were retrieved from the net in good or moderate condition (see Table 1), however, two of the salmon died in the net. So far three of the PIT tagged fish have been logged at the East Stoke main river PIT tag reader. In addition, one fish was caught by an angler on the lower river (Frome). The netting location means that fish destined for both the River Piddle (where there are no PIT tag detection facilities) and the River Frome are likely to be captured, so therefore it is likely that some fish will not be detected.

Netting in Poole Harbour.

Scale samples were taken from all fish and these data are giving us valuable information at a time where catch and release angling is limiting the data we collect on fish ages etc. Full details of the net caught fish are shown in Table 1.

TABLE 1

Salmon and sea trout caught in Poole Harbour netting 2010

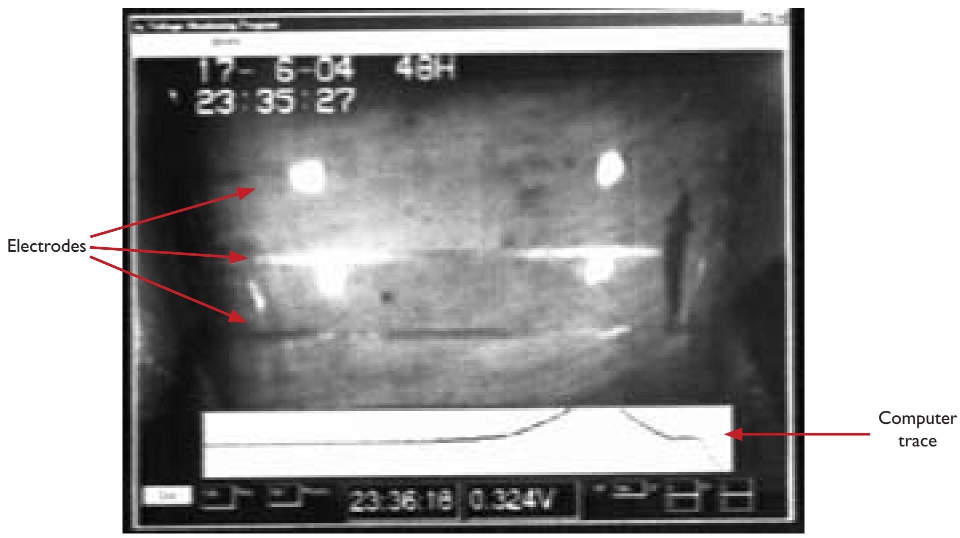
Date	Species	Length (cm)	Weight (kg)	Floy tag/ PIT tag no	Comments/ condition	Age*
7 June	Sea trout	45	1.3	Floy only	Sea lice - net marks	2.1SM+
10 June	Sea trout	56	2.9	No tag		SC.2SM+
14 June	Sea trout	56	2.9	Floy + DC003559C0	Ok	2.1SM+
14 June	Sea trout	51	2.0	Floy + DC00358594	Net marks and some bleeding from gills	2.1SM+
15 June	Sea trout	48	1.3	Floy + DC00358A9A	Good condition. Released in lower Frome Detected 26 June at East Stoke	2.1SM+
17 June	Sea trout	52	2.2	Floy + DC003562BD	Healed seal bite. Net marks but good general condition. Released in lower Frome	SC.1SM+
21 June	Sea trout	49	2.0	Floy only		2.1SM+
22 June	Sea trout	63	3.4	Floy + DC00355CA7		2.3SM+
28 June	Sea trout	44	1.3	Floy + DC00358DAE	Net marks and some bleeding from gills Ok on release in lower Frome	2.1SM+
28 June	Sea trout	61	3.9	Floy + DC00357622	Net marks on head, ulcers on caudal peduncle Released in lower Frome Detected 27 October at East Stoke	2.1.1SM+
2 July	Sea trout	50	3.7	Floy + DC00355928	Good condition. Released in lower Frome Detected 13 November at East Stoke	2.1.1SM+
5 July	Sea trout	47	1.5	Floy + DC00355B58	Net marks. Swam off strongly	2.1SM+
28 July	Sea trout	35	0.2	No tag		2+
21 July	Salmon	64	2.3	No tag	Dead in net	1.1SM+
26 July	Salmon	56	1.2	Floy only	Very poor condition	1.1+
26 July	Salmon	64	2.0	No tag	Dead in net	1.1+

** SC= scale scarred: SM= spawn mark*

A sea trout caught and released from the Poole Harbour net. Note the seal bite and Floy tags by the dorsal fin.

4. Adult counter data report 2010

A large part of the effort in running the East Stoke counter is focused on verifying and matching the various 'counts' from the monitoring equipment. Counts are verified by either video picture (when the water is clear) or the shape of the electrical waveform produced when an object goes across the weir or (more often) both. In addition, frame grabs can be taken from the computer screen and stored. So to some extent it is unnecessary to view the video data apart from assessing missed fish. Only rarely are raw, unverified data used. An example of the computer verification system's display is shown below. A salmon can be seen on the video picture and the electrical trace is shown on the bottom section of the screen. Text boxes along the bottom of the display record: number of records; number of frame grabs; input signal value; time of day; number of records registered by computer and counter.



Screen display from the computerised counting and evaluation system. The image shows a 75cm salmon ascending the weir

Data verification

Verification of the data entails identifying the cause of the upstream and downstream counter records plus many thousand (due to the number of false counts recorded) of computer waveform traces. For periods when the computer system was not operational, accuracy of the counter was assessed by direct examination of the video data. When the computer system was operational, accuracy of assessment was carried out by comparing identity assessed from computer traces with identity observed from video records (both tape and video frame grabs). Data from the actual counter could vary widely in accuracy and on a day-to-day basis could equal 0% if it missed fish. Raw data from the counter are rarely used in an unverified form, however, and the data for the run are compiled from a combination of counter, computer and video records ie. all computer trace records and counter records are checked on the video to identify the cause of the record. Raw fish counter data are only used when computer or video data are not available. Provided adequate water clarity, video records are 100% accurate and assessment of accuracy of interpretation of the computer records is made from comparing trace identity with the video records. Where water clarity is poor, just computer trace records are used to verify data. Accuracy of the computer records is checked by viewing complete time periods on video (approximately one 24-hour period every month) and comparing the numbers from the computer with the numbers of fish seen on the video. In 2010 average accuracy of waveform interpretation was 82% for upstream and 100% for downstream records. One tape used for verification only had one salmon present; this was missed by the pc and considerably biased the overall average. If this tape is removed, overall upstream accuracy was 95%. Data are not corrected for verification error.

We were again fortunate this year in having few mechanical and electrical problems in running the counter. Over the year the electronic counter worked continuously and there was no waveform verification for only three days. Due to turbid water there was either no video verification or images were too poor for video viewing for 97 days. There were only three days where no electronic count verification was possible from either waveform or video data.

As well as verifying the counts the video also shows some intriguing pictures below showing a 109cm salmon that was rod caught and released on the lower river on 9 May and then ascended the East Stoke weir on 6 June. Although we cannot be absolutely certain that they are the same fish, the probability of there being two fish of this size in the river is very remote. We also have footage of sea lampreys and swimmers on the weir.

(Right) A 109cm salmon being released after capture on the lower river on 9 May. (© Paul Bullimore)
(Below) Frame grab showing the same fish going over the weir.

This year we have installed another of the side-viewing cameras we are using to try and differentiate better between salmon and large sea trout (see photos below). We now have one on each side of the weir looking inward. Cloudy water and fish out of range of the camera meant that it was often still difficult to see or identify fish, but around 120 good images were obtained. The results show that on 109 occasions when a fish was identified as a salmon by the pc trace, on 25 occasions (23% error) it was a sea trout. For the overhead video picture, 82/84 (98%) of the fish were correctly identified as salmon and 17/25 (~70%) correctly identified as sea trout. Because we are improving at identifying sea trout our numbers are potentially lower than in previous years. To estimate the potential variation from past recording methods we noted all the sea trout (identified from overhead and side-view video) that would previously have been classified as salmon.

(L-R) Side-view images showing an 88cm salmon and a sea trout on the weir.

Adult data 2010

Figure 6 shows daily counts together with mean daily discharge data. Monthly data from the counter are presented for gross upstream and gross downstream counts as well as the nett upstream count and the number of ascending kelts not included in the upstream records (see earlier for a full description of how the data are presented).

Nett total for the year was 1,058

Figure 7 shows the annual nett run data (with pre-1985 data being corrected for down-counts) and shows that the total nett upstream count for the year was the highest since 1998 and the fourth highest since the 'crash' in 1991.

Figure 8 shows the cumulative nett numbers of fish migrating over the weir for each month. The graph also shows the average numbers for 1985-1990 (representing the start of the recording of nett numbers and before the 1991 crash in numbers), the years 1991 to 1998 (when the first sustained drop in numbers occurred), 1999 to 2009 (the second period of very low numbers) and the current year (2010). The figure shows the higher than recent average numbers that ascended the river after September. In particular higher numbers ascended in December and the run pattern, although much lower, was similar to the pre-1991 crash years.

Figure 9 shows the time of day of fish movement over the weir. The avoidance of daylight hours during the summer months and the preference for daylight in the October to December period can be clearly seen. As yet we are not sure of the reason for this variation in run pattern.

Fish size and sea-age

A total of 482 upstream migrating fish (46% of the nett run) were measured this year (see Figure 10) with the largest a fish of 109cm (see page 13). Length data includes data where only approximate length data are available. These data are from periods where there is some turbidity in the water and only approximate (± 5cm) length data can be obtained. In past years these data were not used leading to a loss of data that still has some value in assigning sea-age to the migrating fish. Data from fish below 50cm and fish that are obviously the same fish vacillating over the weir have been excluded from the data set.

The length data obtained from the video records can be used to calculate the proportion of grilse and multi-sea-winter (MSW) fish migrating each month. This proportion can then be used to calculate the numbers of grilse and MSW each month and for the whole year. Size limits for grilse have been calculated from the historic scale data from the Frome. However, these data may have inaccuracies due to changing sizes of the grilse (getting smaller) that have been reported since the size thresholds were calculated. As yet we do not have sufficient new data to recalculate these thresholds. There are also some inaccuracies caused by low numbers of measured fish unduly influencing the proportions. However, the data provide a starting point for examining the partition between grilse and MSW fish and its variation over the years. Figure 11a shows the estimated nett numbers of grilse and MSW fish for each month in 2010. Figure 11b shows the annual proportion of grilse and the numbers of grilse and MSW per month since 1996. These data may change as further refinement of the analysis is carried out.

River flows

Figure 12 shows mean monthly discharge data (in cubic metres per second (cumecs)) for 2010 together with mean (1966-2009) 5, 25(Q1), 75(Q3) and 95 percentile (%ile) discharge data. These data are collated and calculated from Environment Agency records. The river discharge started the year within the median range (between Q1 and Q3 level), but despite showing a steady decline, by May it was above the Q3 level. In June a sharp drop occurred and flows remained within or just below the inter-quartile range until November. A dry month in December resulted in flows going below the 5%ile value for this month. Figure 13 shows that overall the mean annual discharge data for the Frome was just below the long-term average.

Hourly database

Appendix I shows data from the hourly database for each month. As well as gross upstream salmon numbers in an hour, hourly averages (4x15 minute readings) of water discharge are also shown. Graphs of the hourly data clearly show the clarity of detail available with the hourly time-base.

Acknowledgements

We gratefully acknowledge the support of the following organisations and people: Freshwater Biological Association; Centre for Ecology & Hydrology; Environment Agency; Centre for Environment, Fisheries & Aquaculture Science; the Valentine Trust; the Ellen Cooper Dean Charitable Foundation; the Atlantic Salmon Trust; the Salmon & Trout Association; the Garfield Weston Foundation; the Frome, Piddle & West Dorset Fisheries Association; the Wessex Salmon & Rivers Trust.

Finally, and importantly, the many landowners and fishery owners that give their permission for us to fish their areas so that we can tag the juvenile salmon.

5. References

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	MONTH												
	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Total
Gross U/S	3	43	2	23	90	174	68	6	254	347	218	49	1277
Gross D/S	4	50	0	5	7	26	15	2	31	64	35	24	263
Kelts	0	26										8	34
Nett U/S	3	17	2	18	83	148	53	4	223	283	183	41	1058

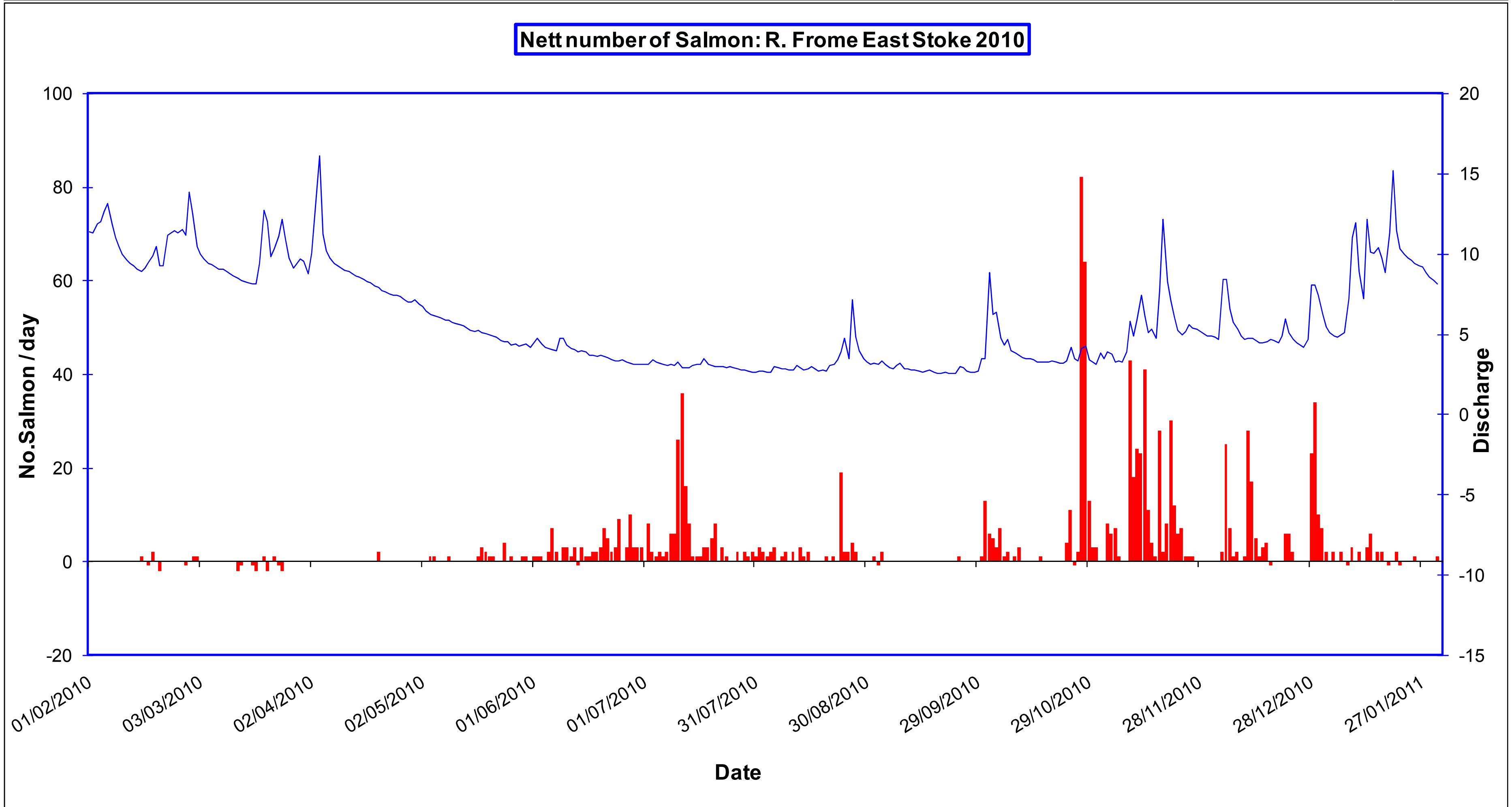


Figure 6 East Stoke Salmon Counter Data 2010

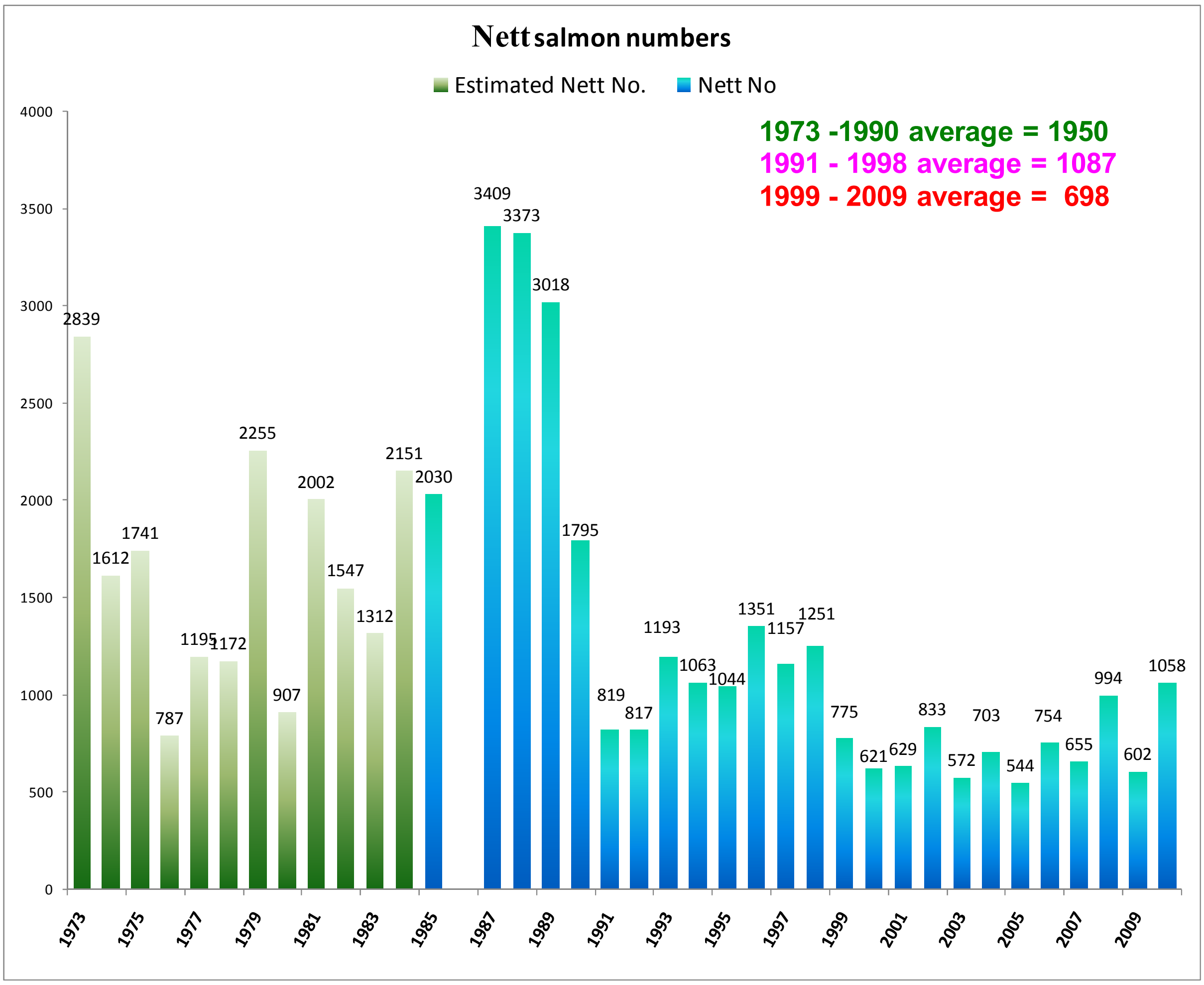


Figure 7 Annual numbers of salmon ascending the East Stoke weir

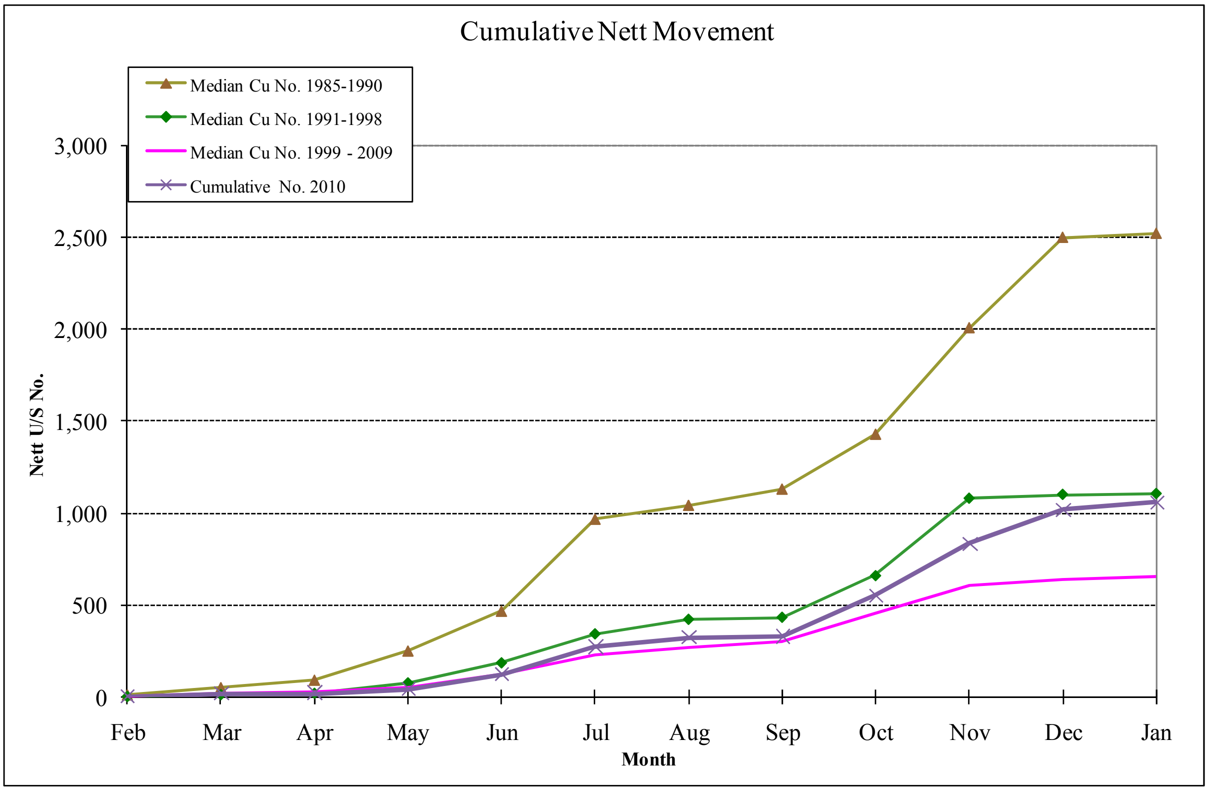


Figure 8 Comparison of Nett 2009 data with previous years.

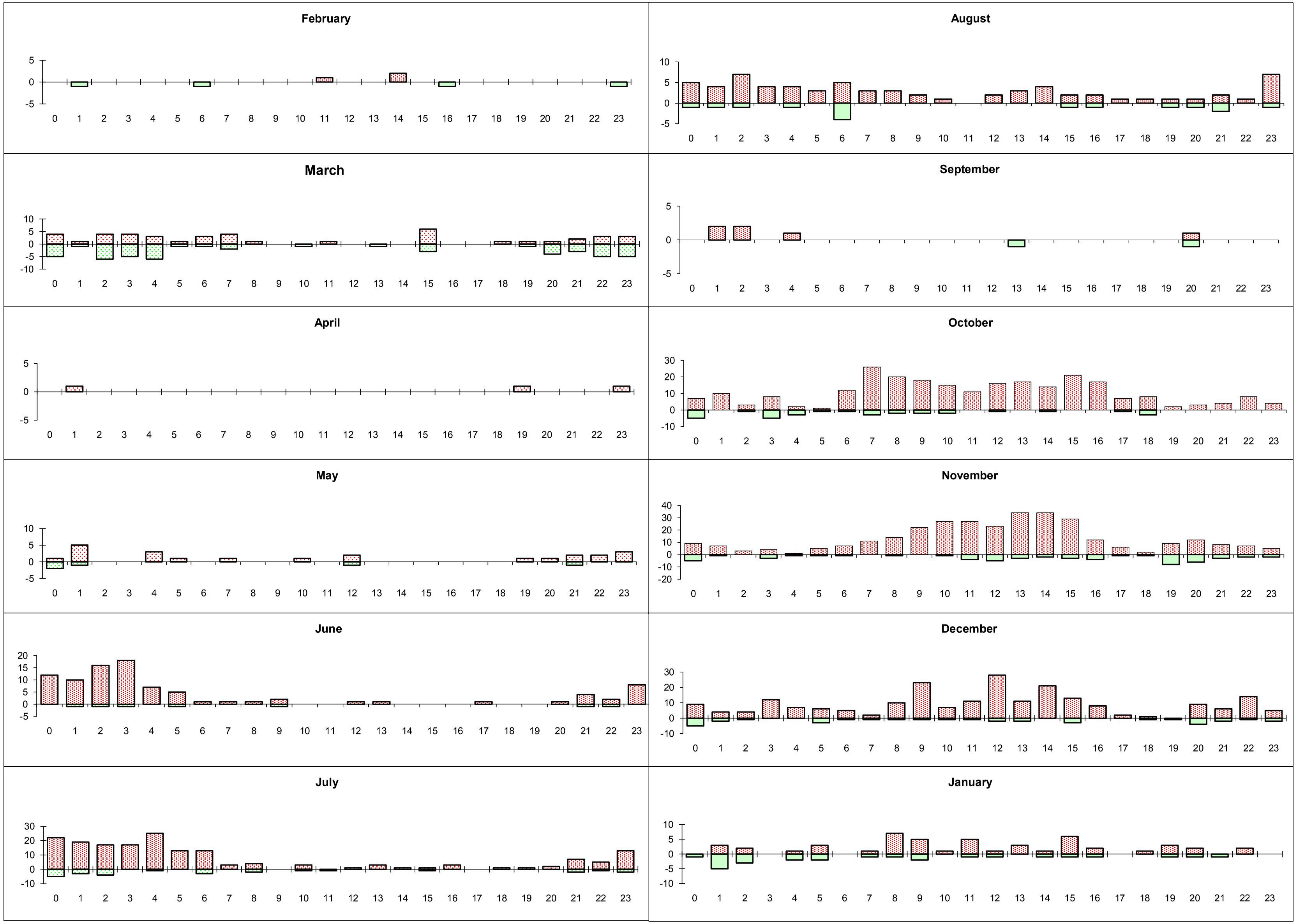


Figure 9 **Time of day of movement (Gross upstream and downstream count data)**

Observed Salmon Lengths 2010

Upstream migrating fish >45 cm only

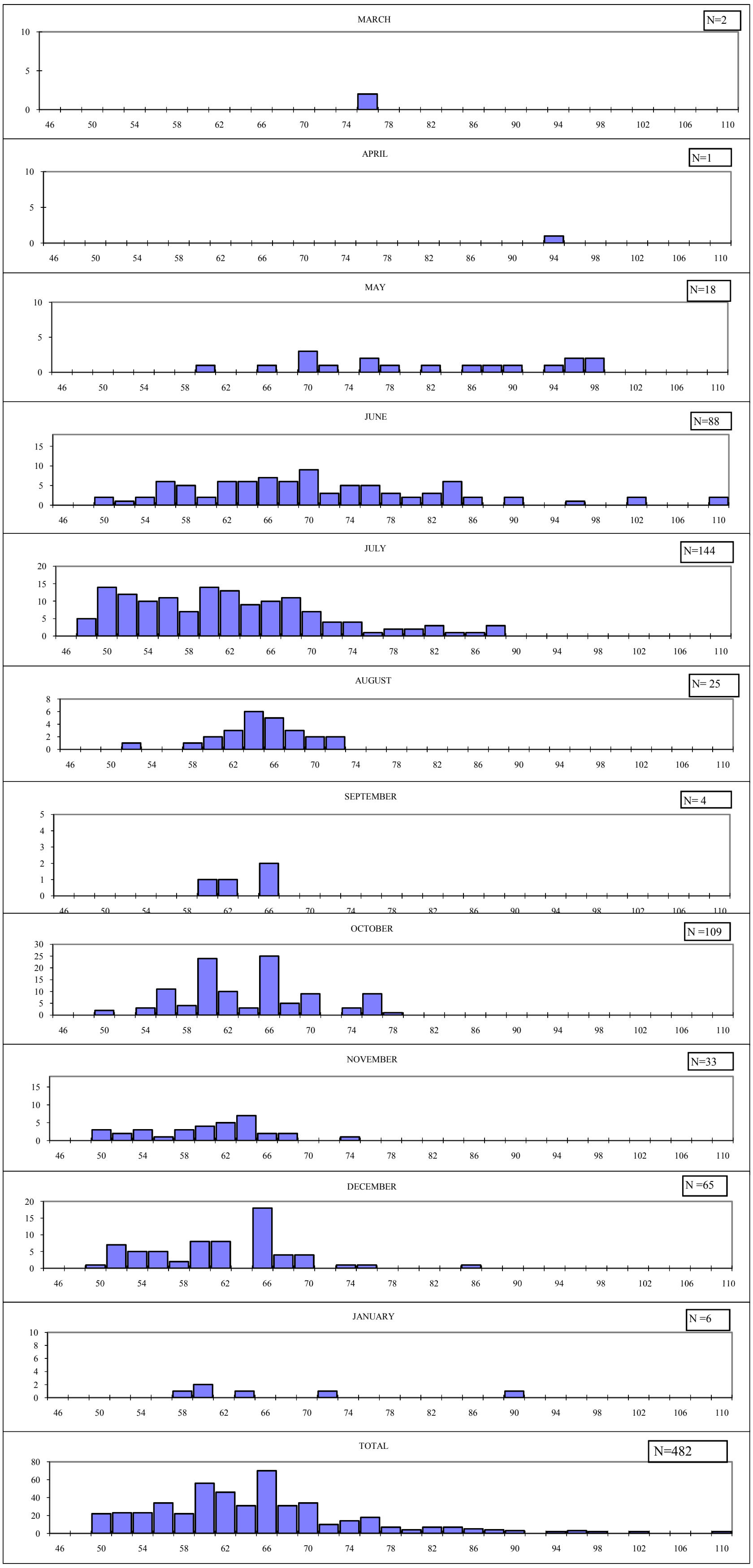
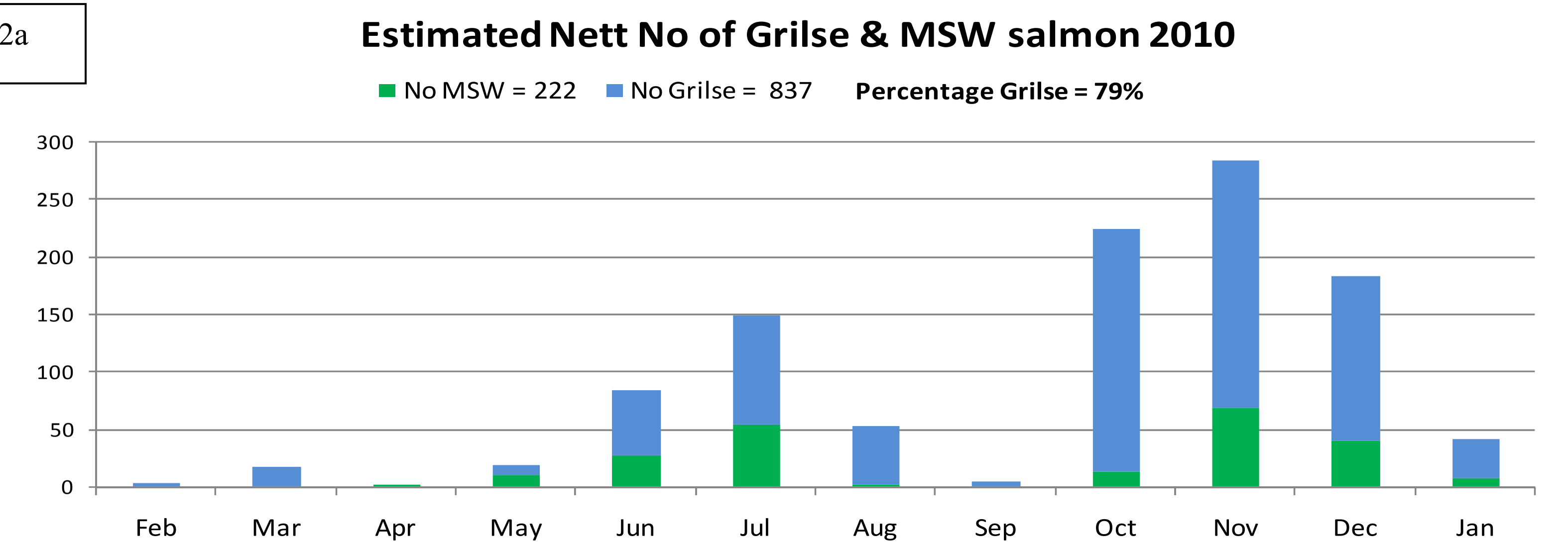


Figure 10 Length of upstream migrating fish each month (Length in cm)

12a



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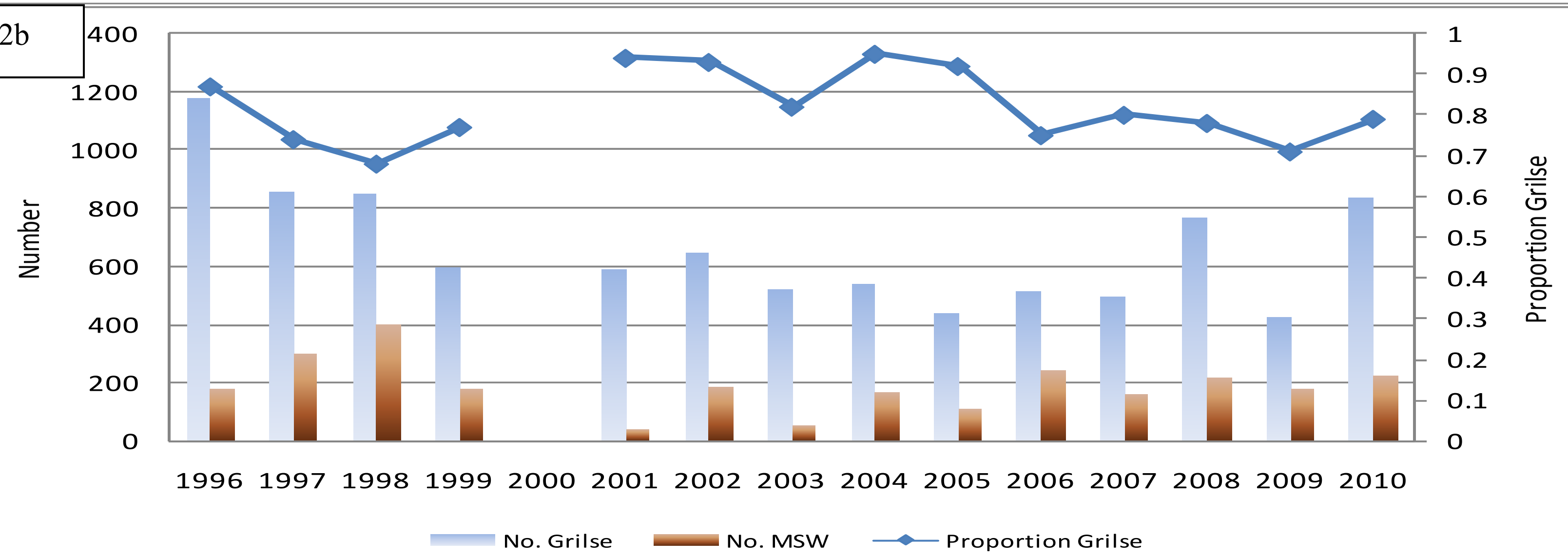


Figure 11a Estimated monthly number of Grilse and MSW fish 2009

Figure 11b Annual proportion and number of Grilse and MSW

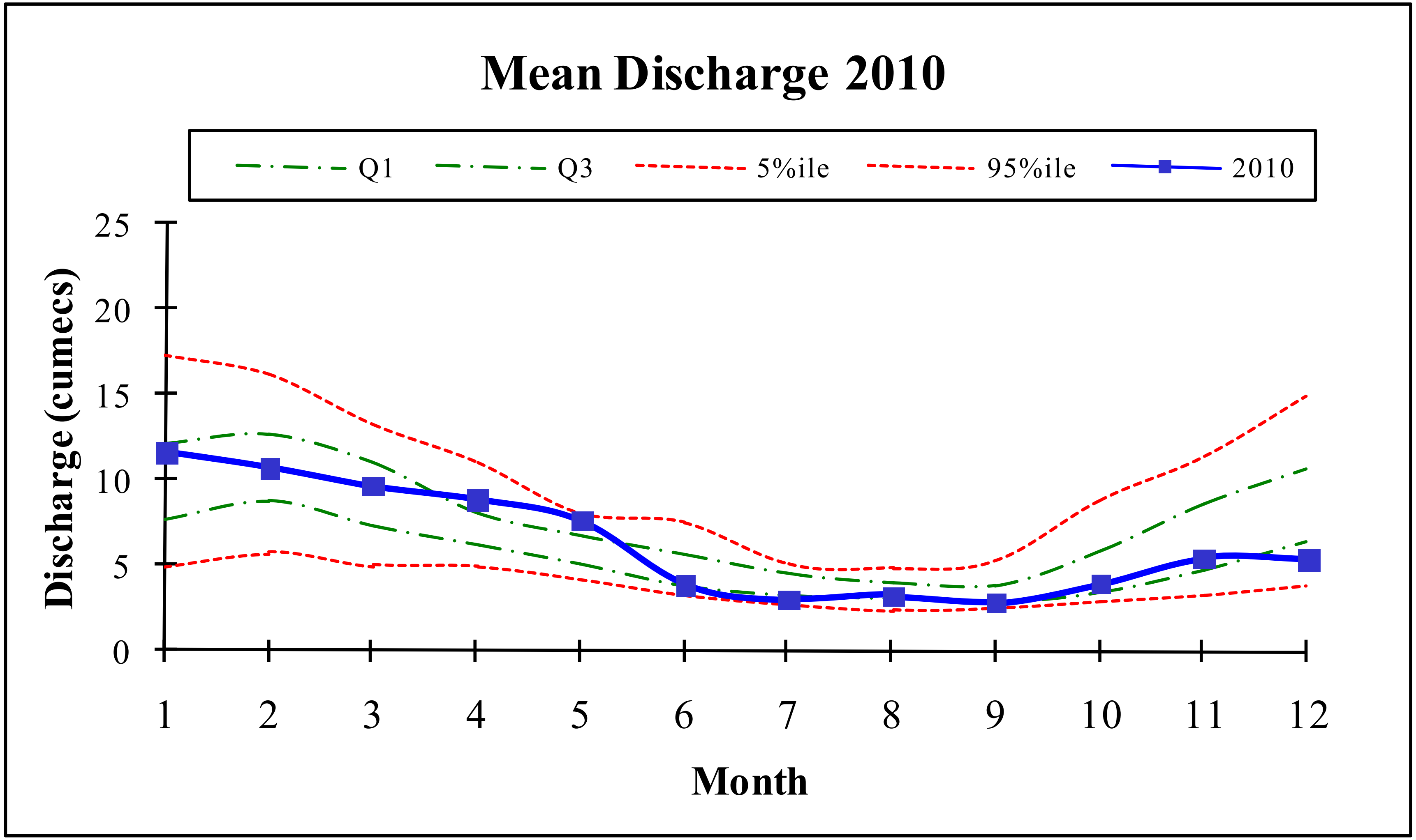


Figure 12 **Monthly mean discharge and long-term percentile data (Jan – Dec data)**

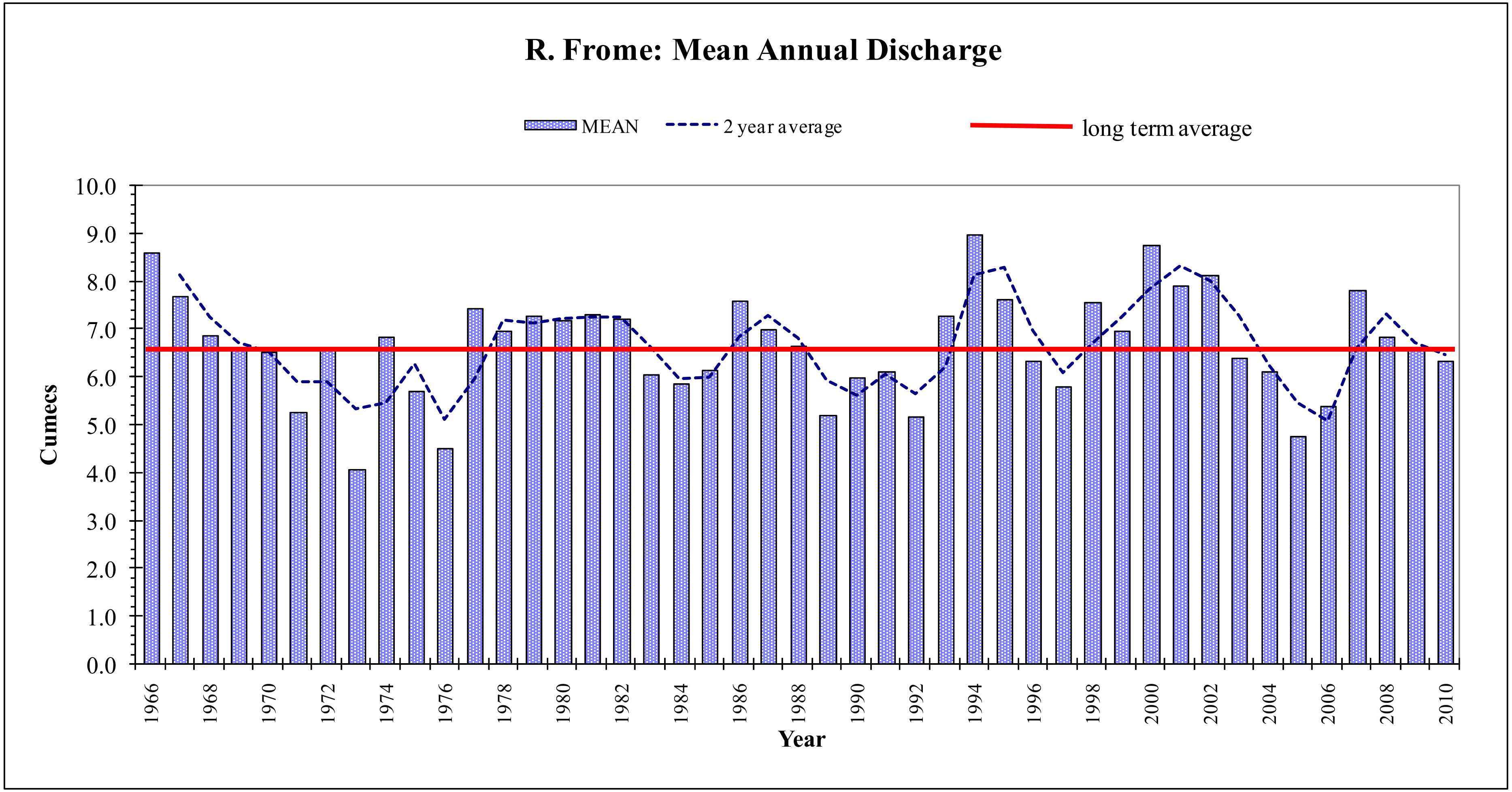
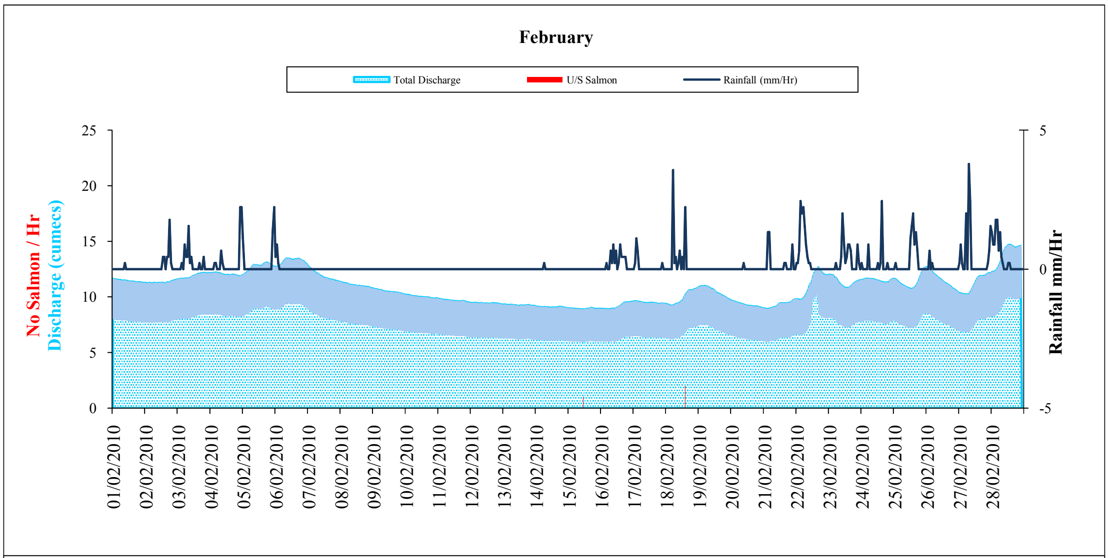
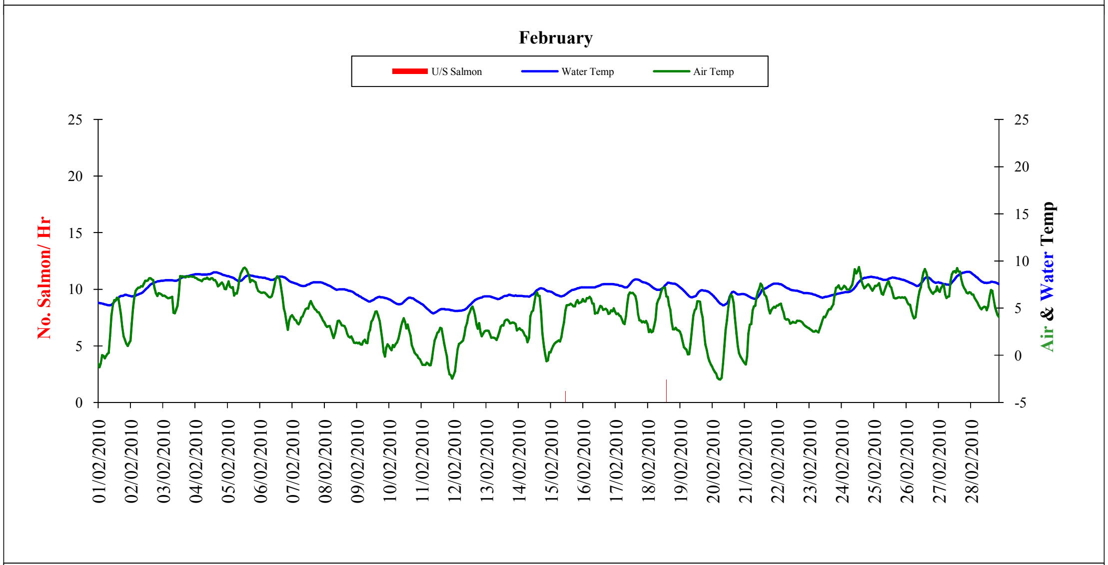
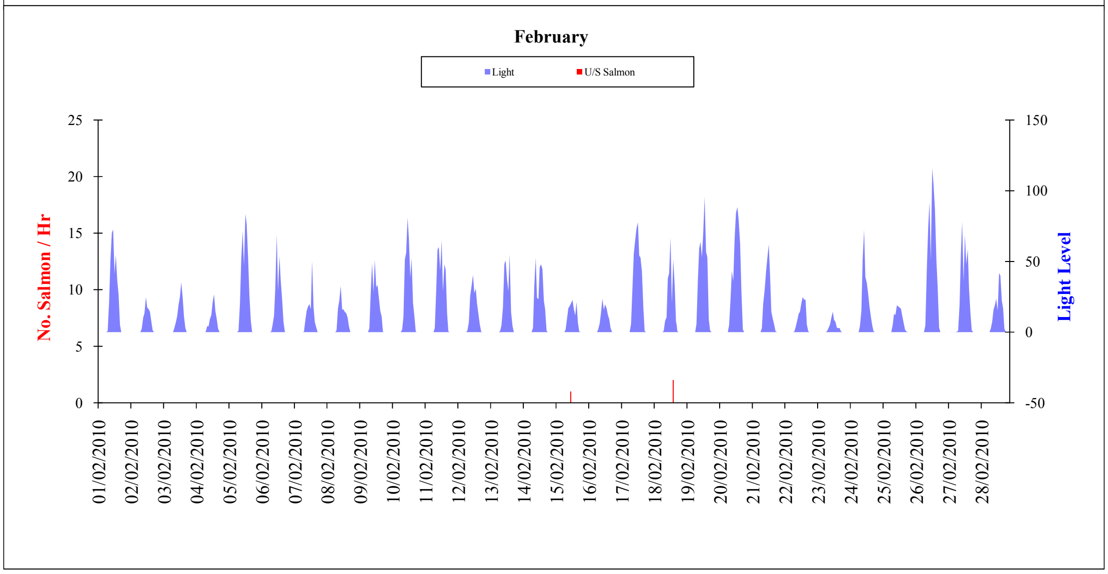


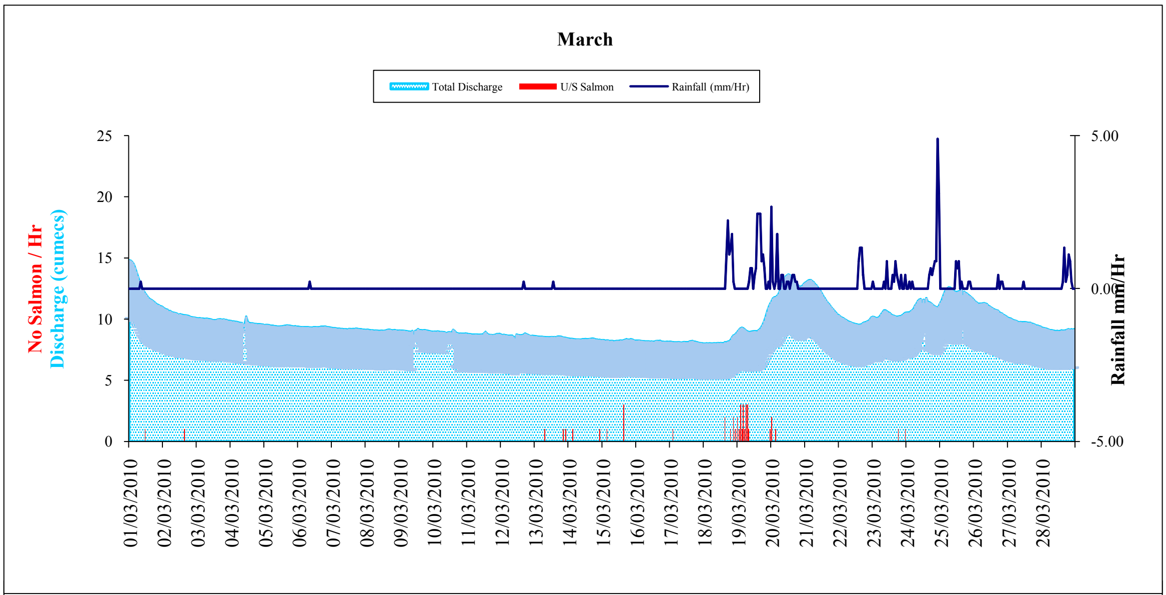
Figure 13 River Frome long-term annual discharge

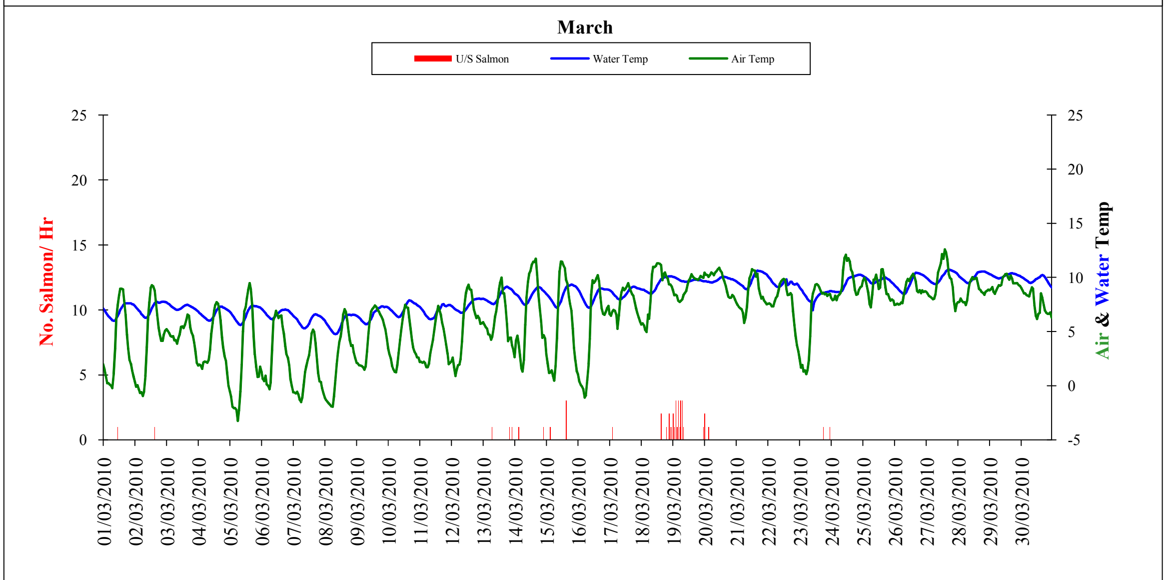


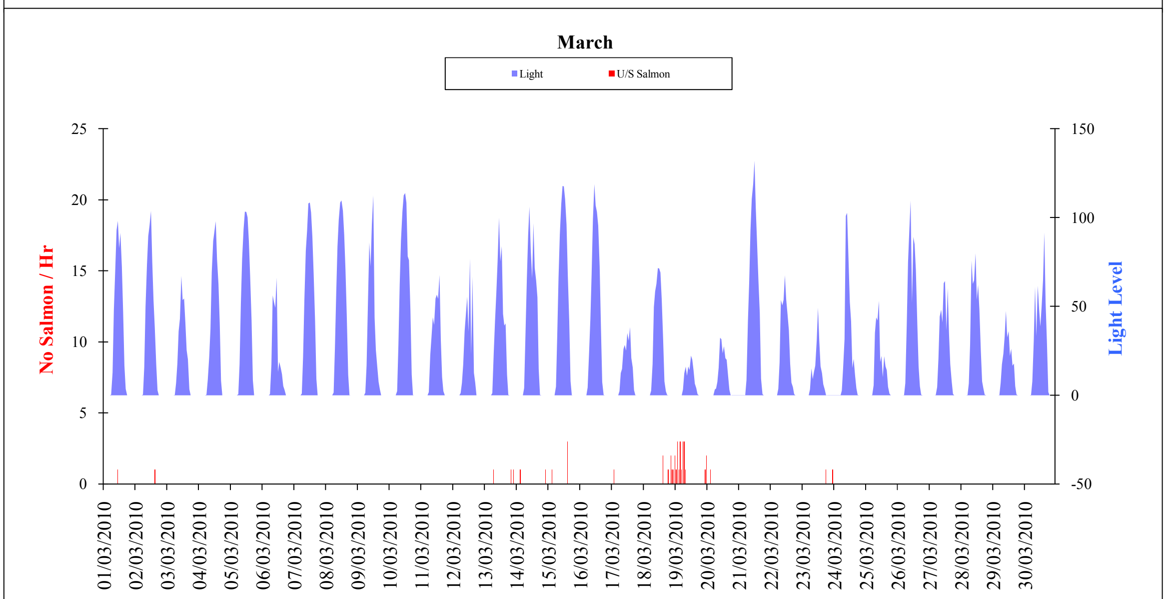




Appendix I Hourly data







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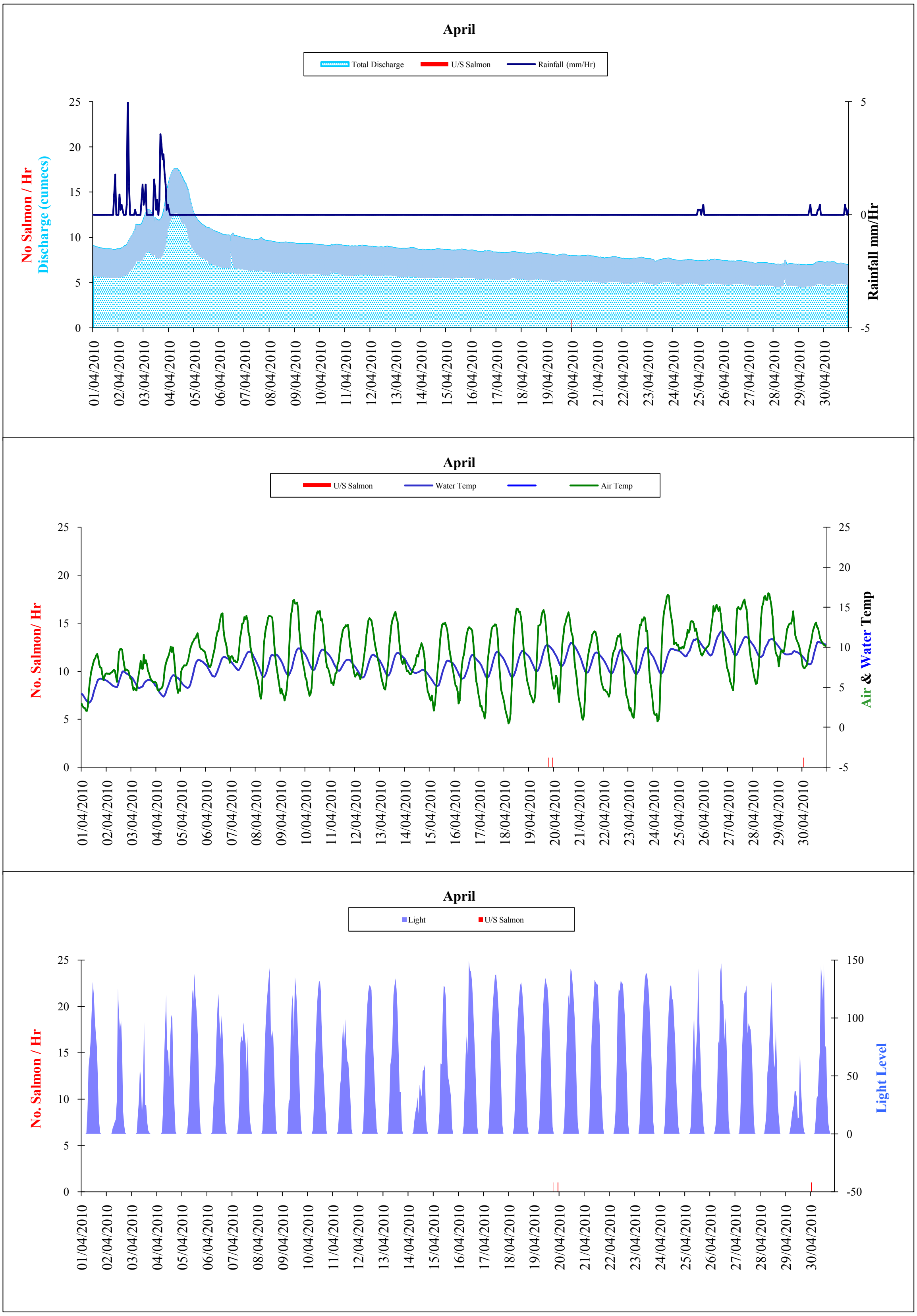

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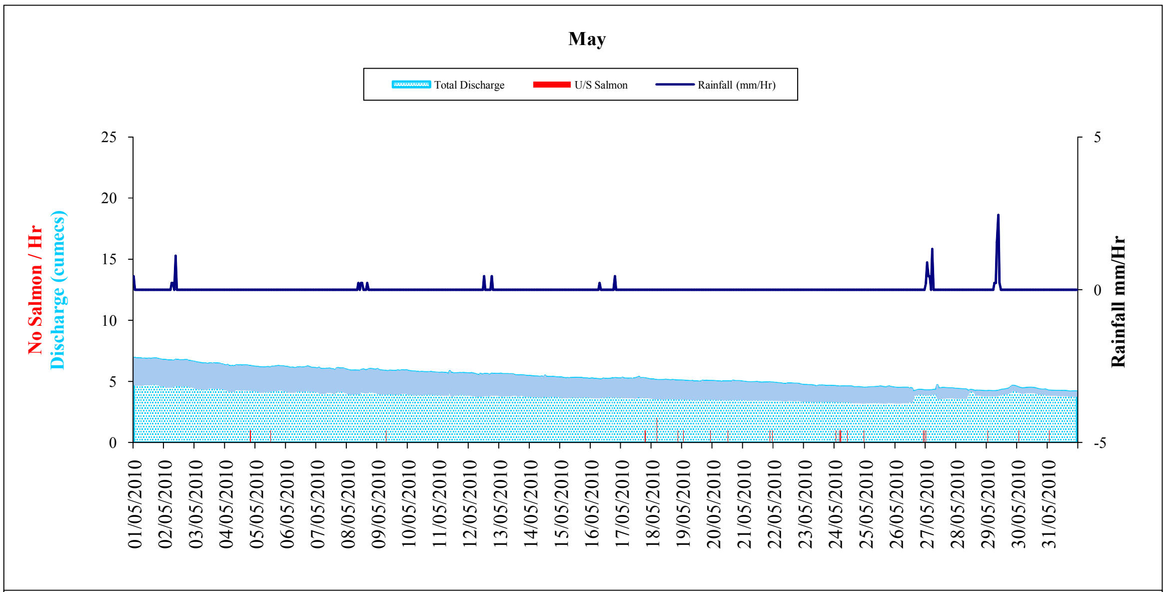

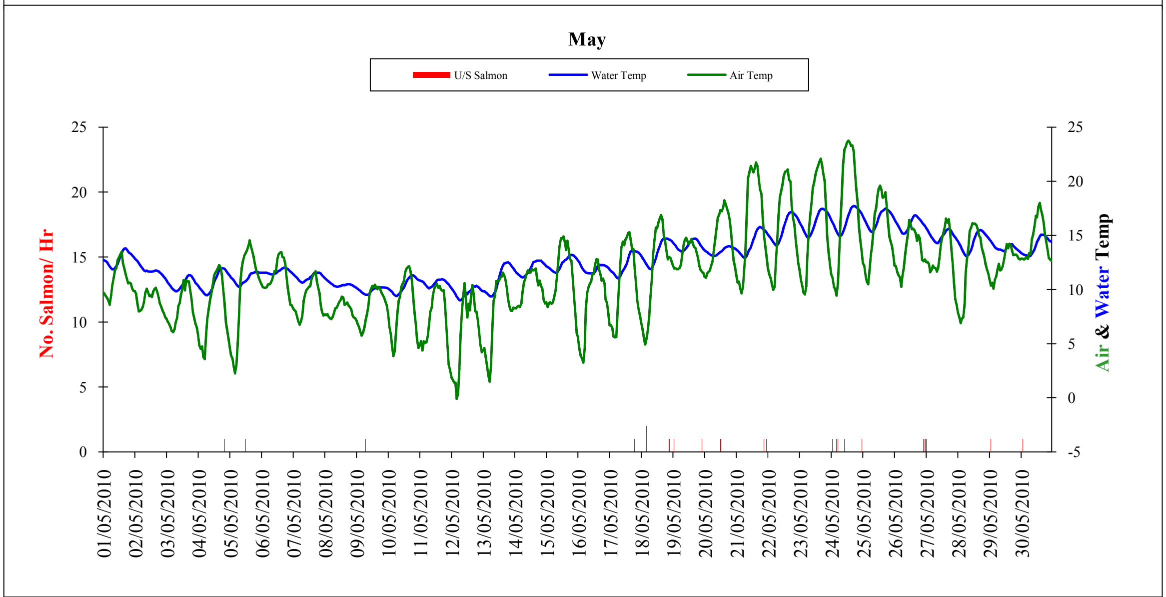

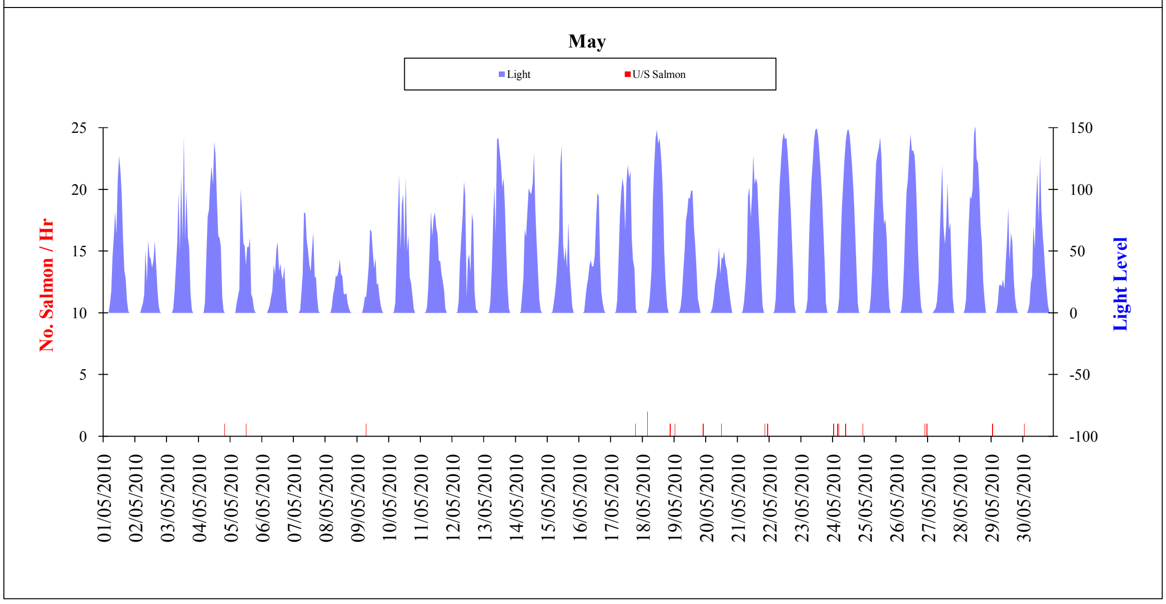

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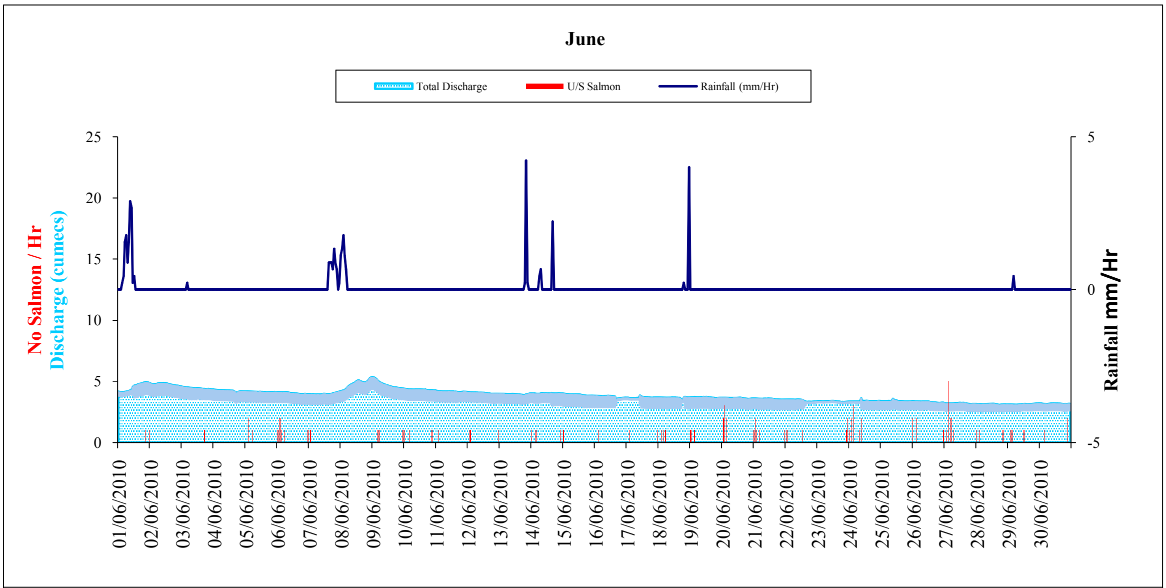

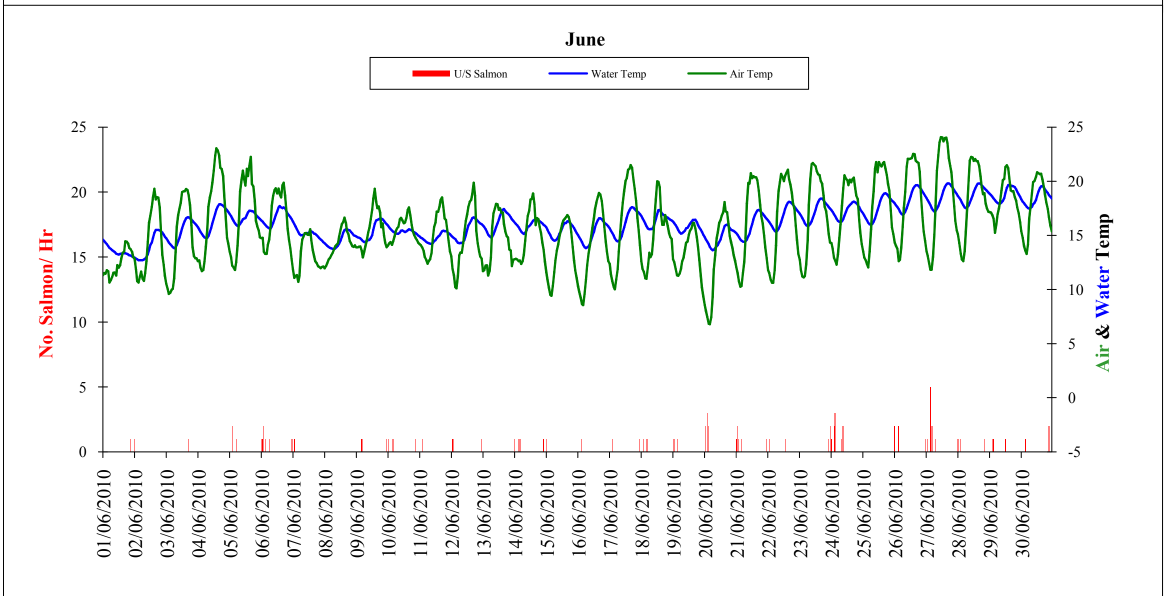

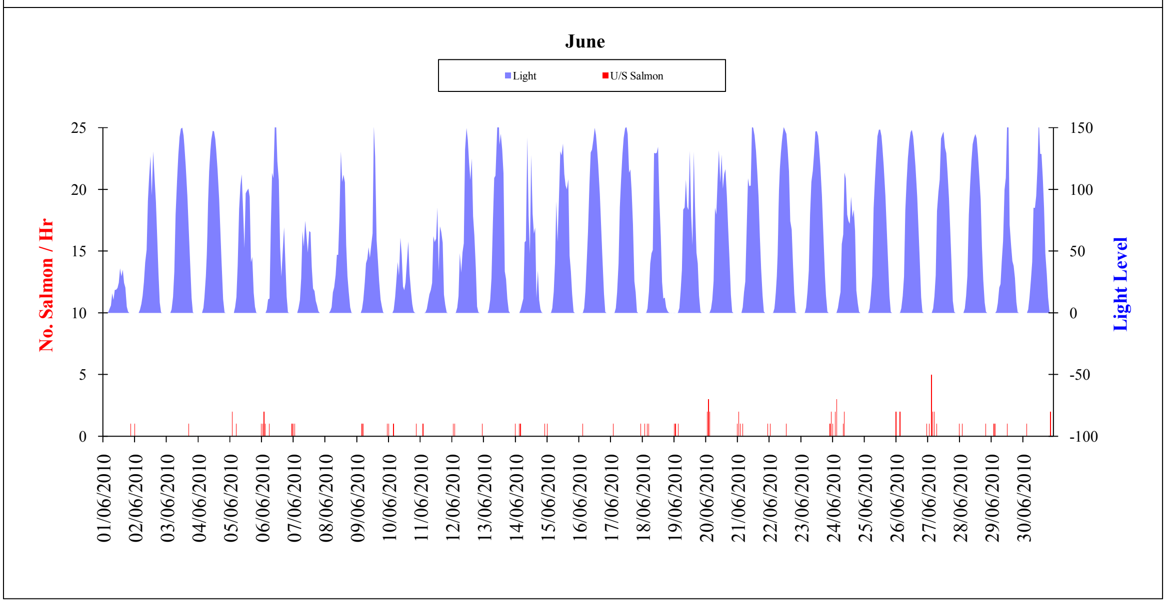

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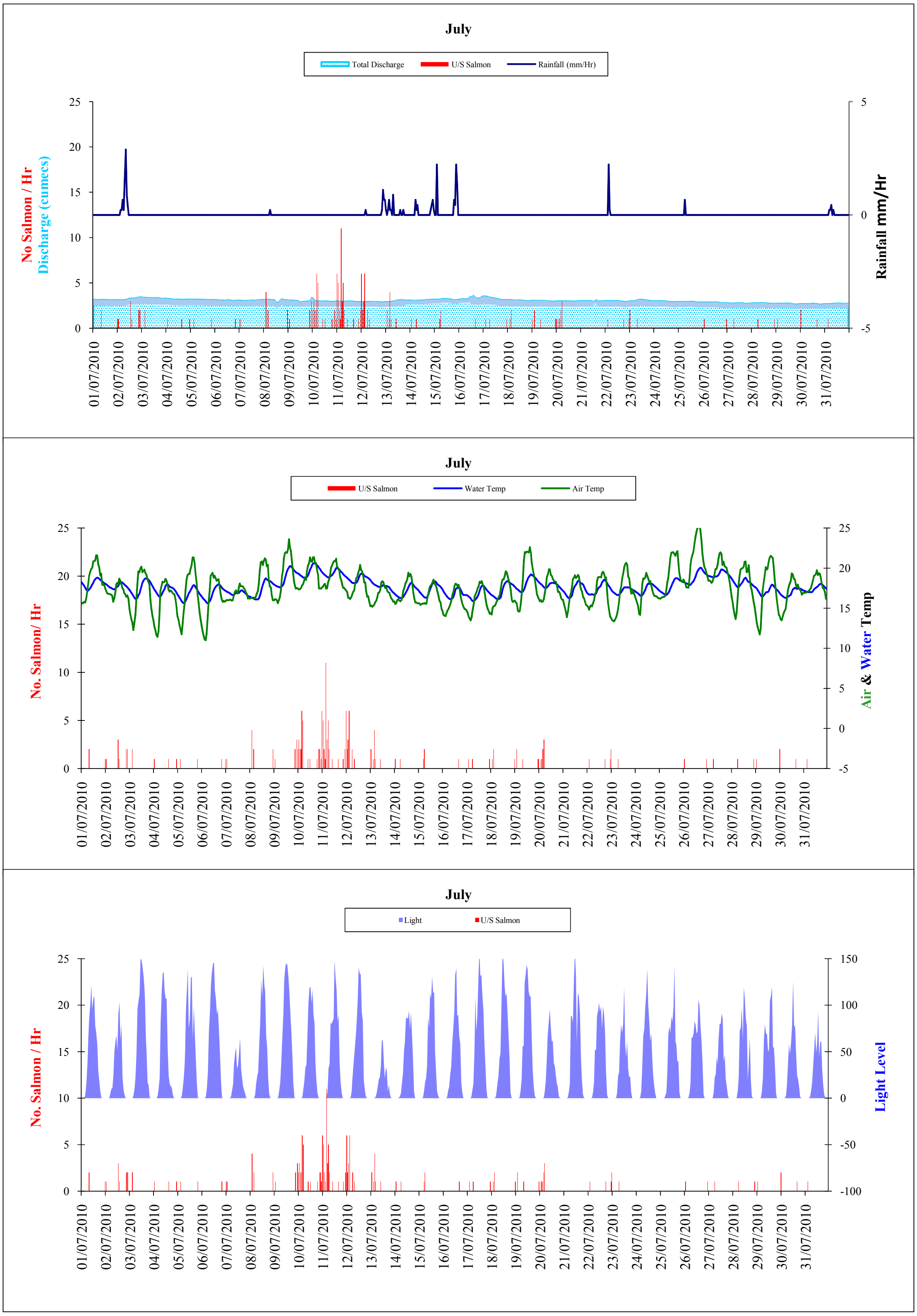

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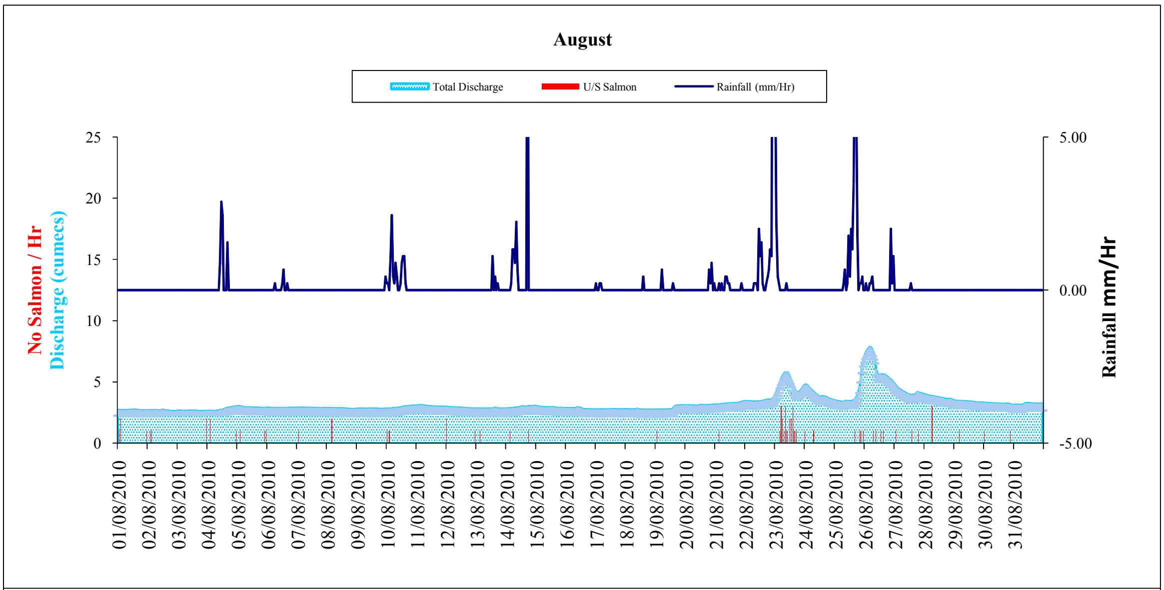

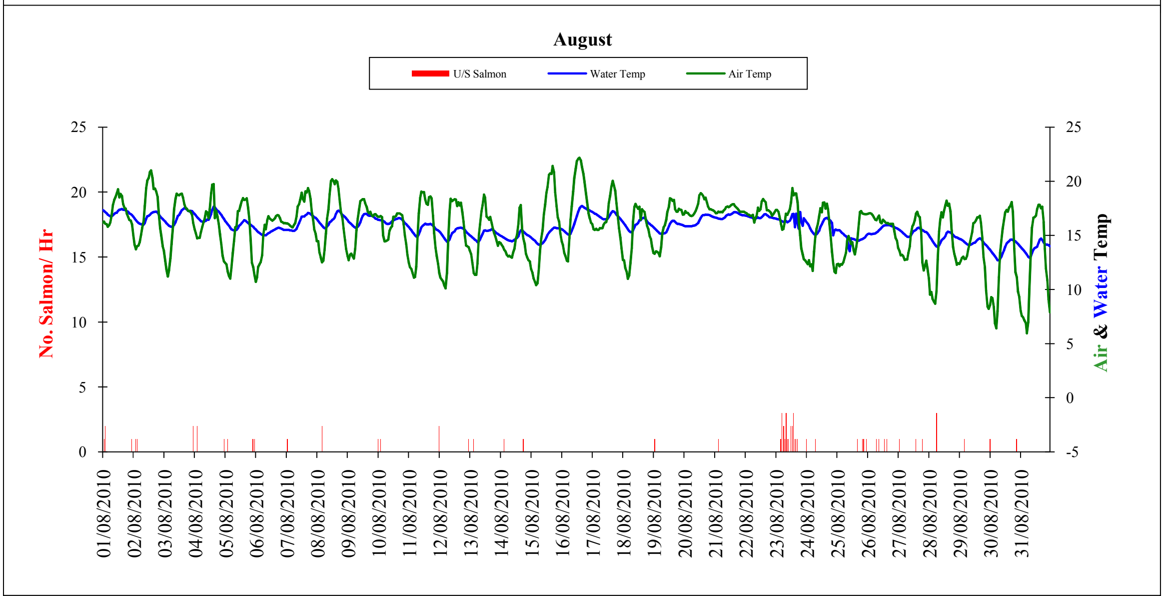

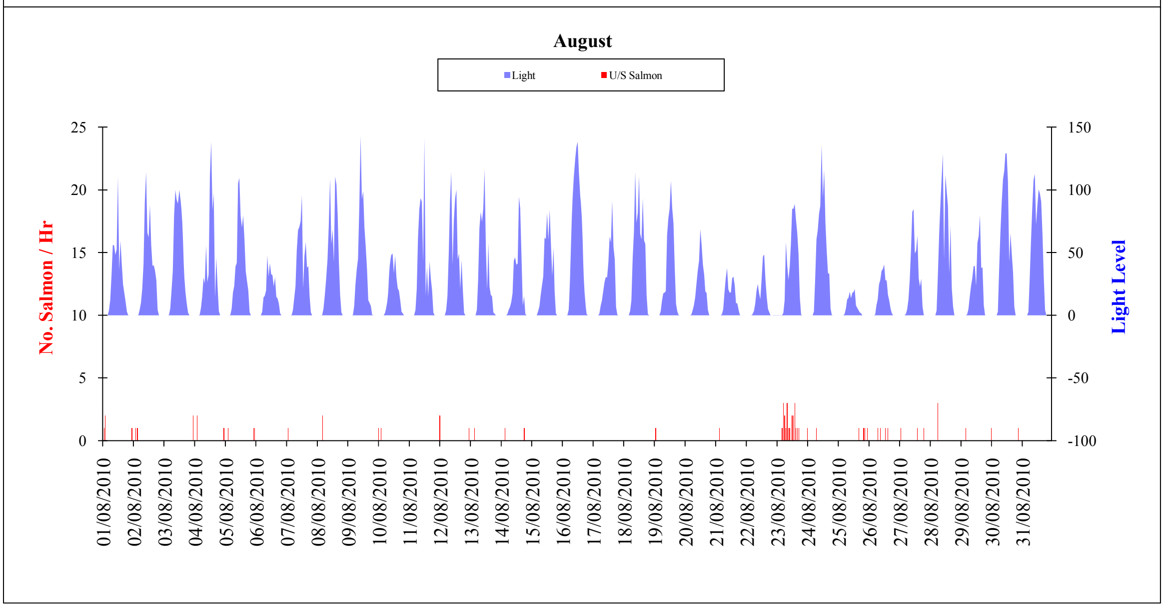

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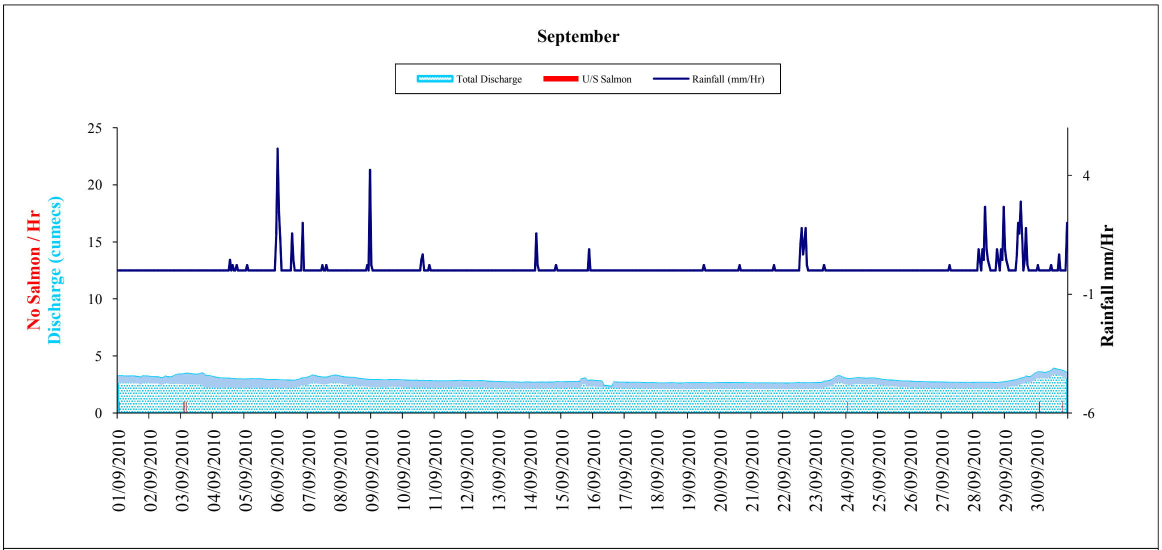

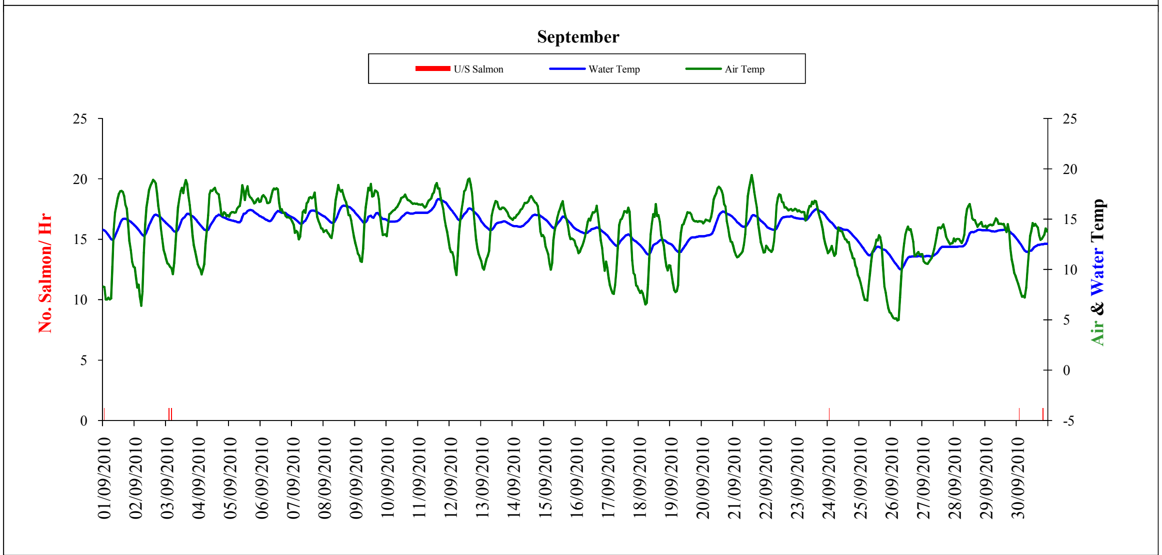

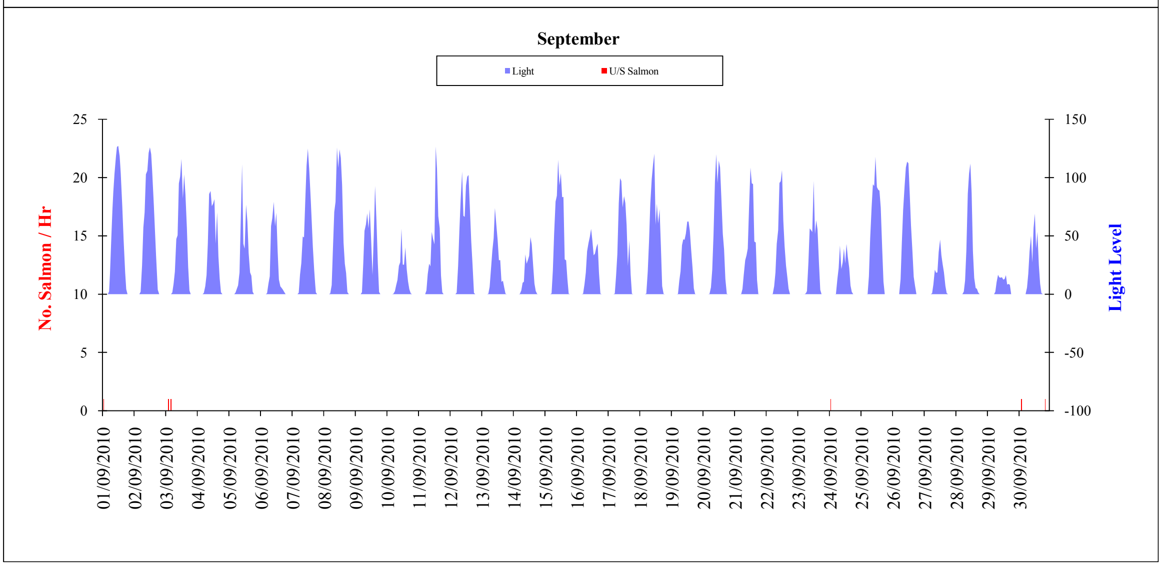

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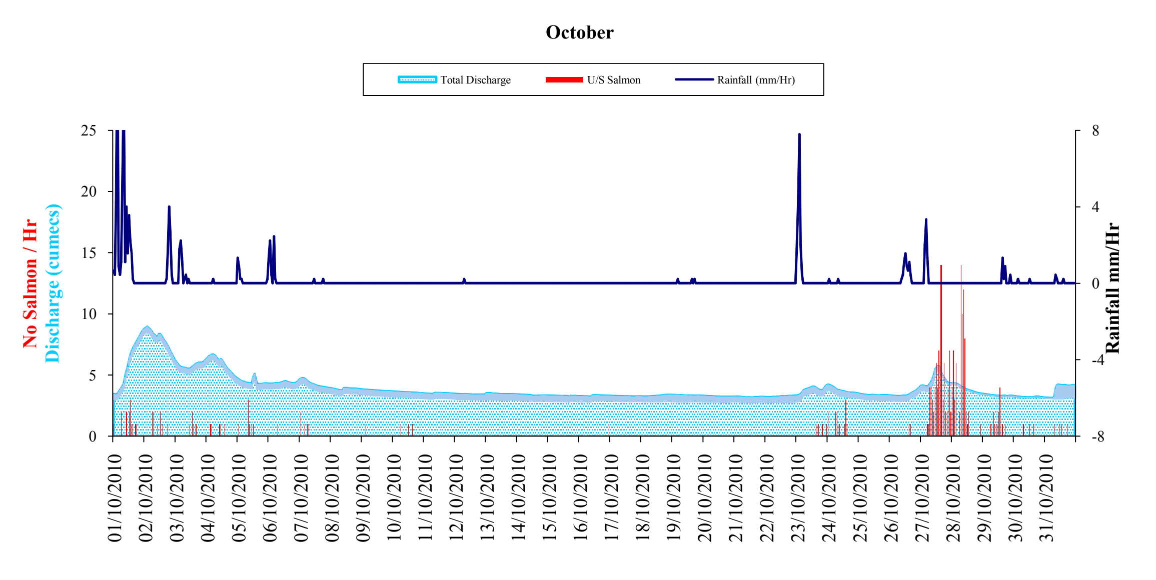

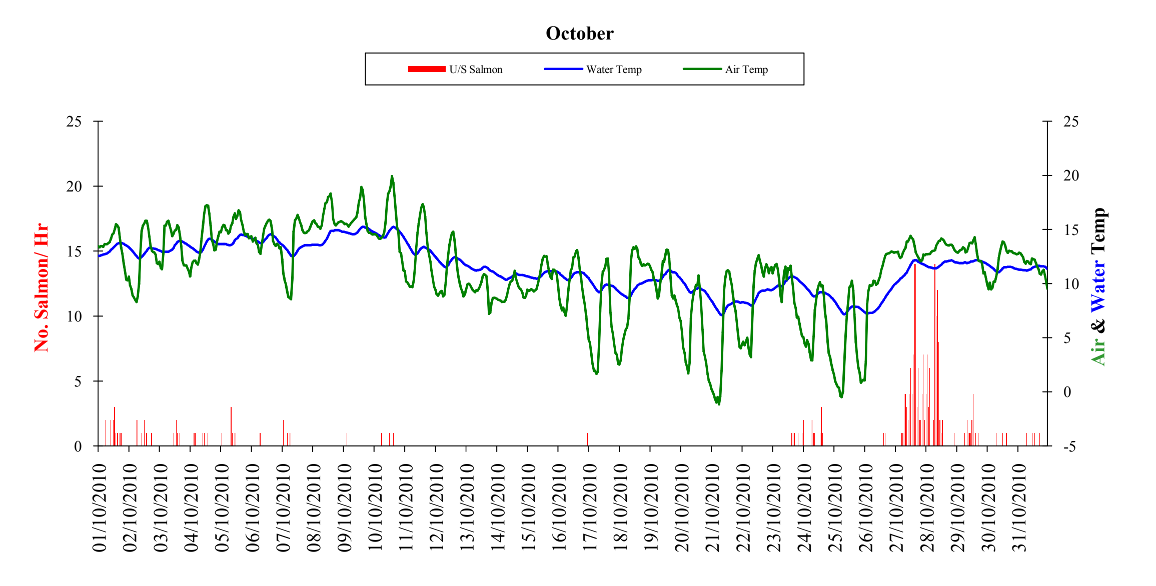

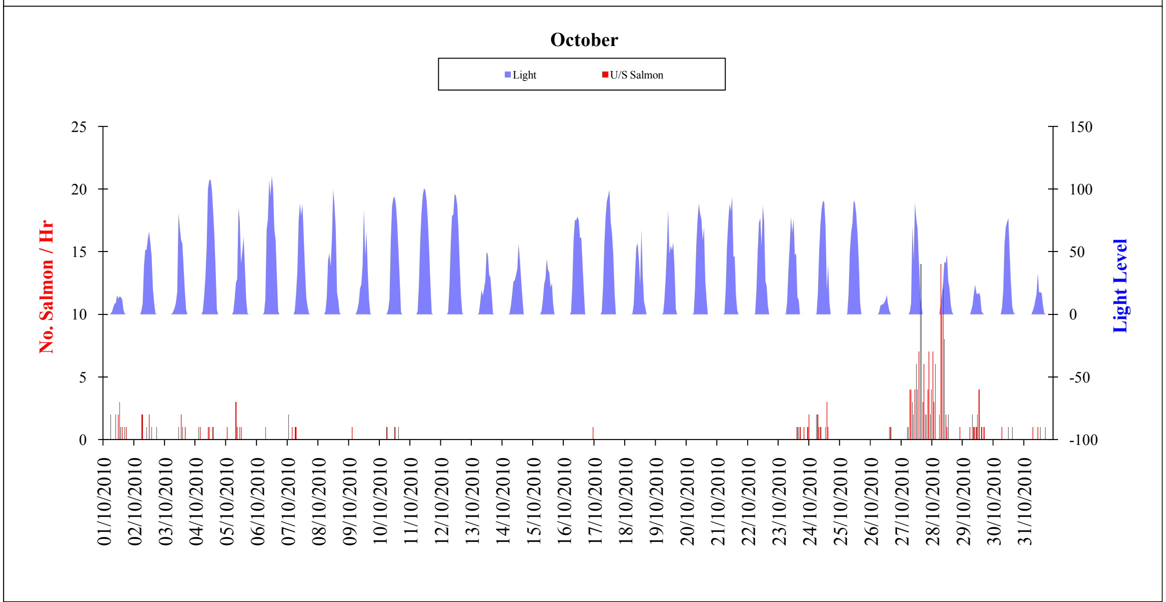

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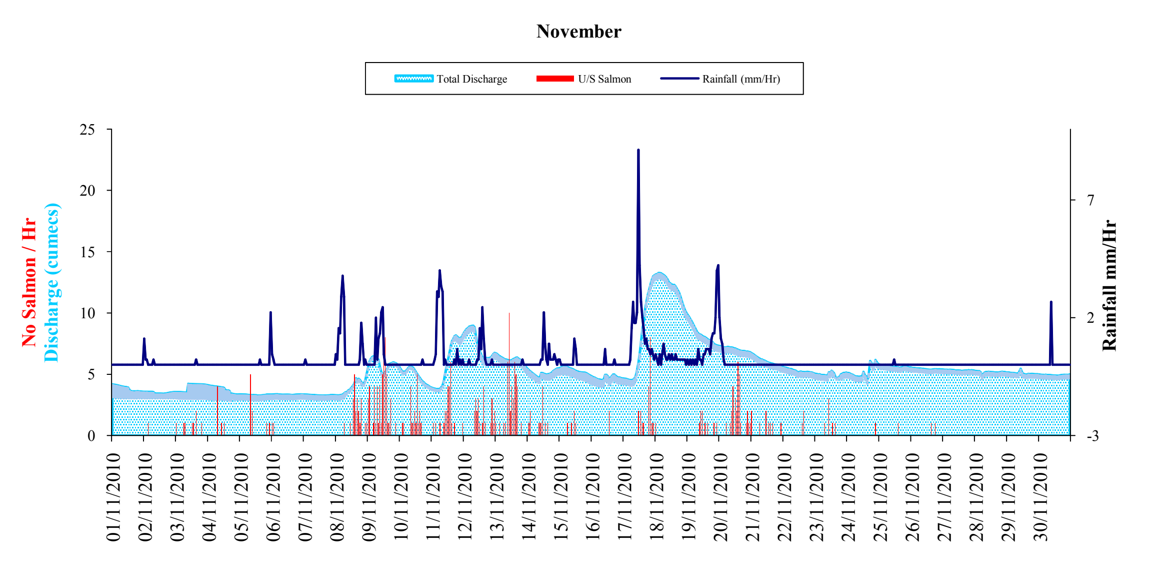

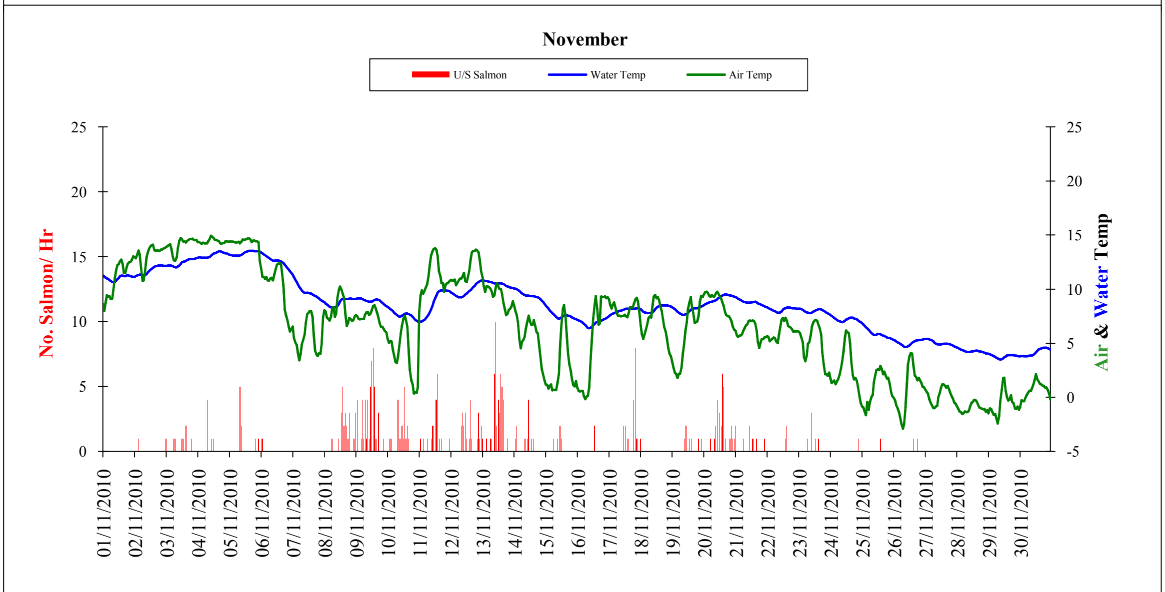

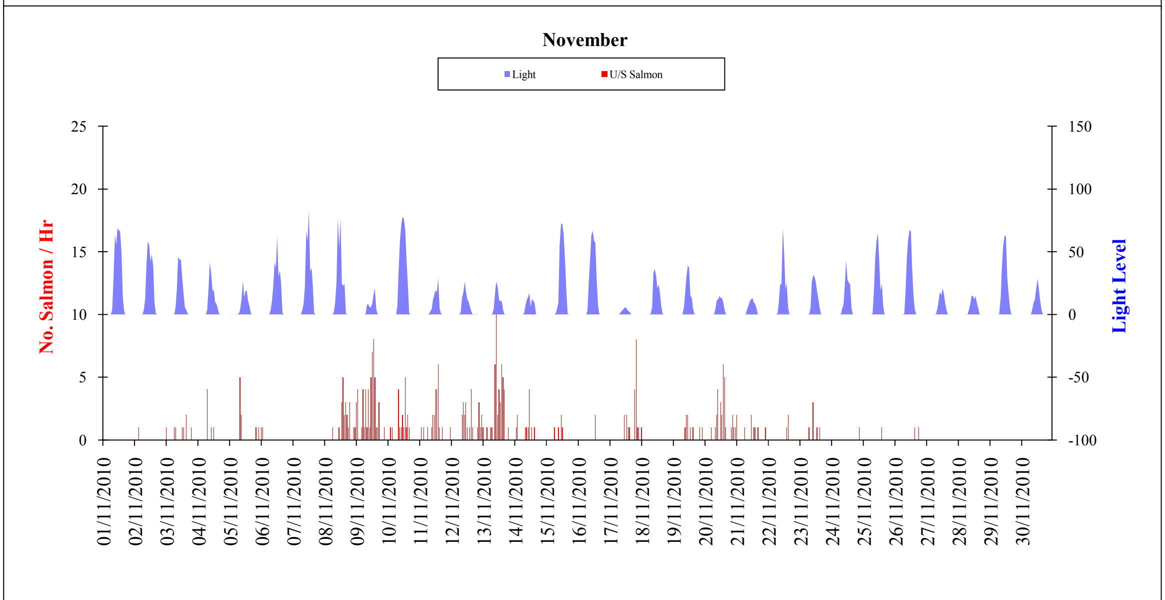

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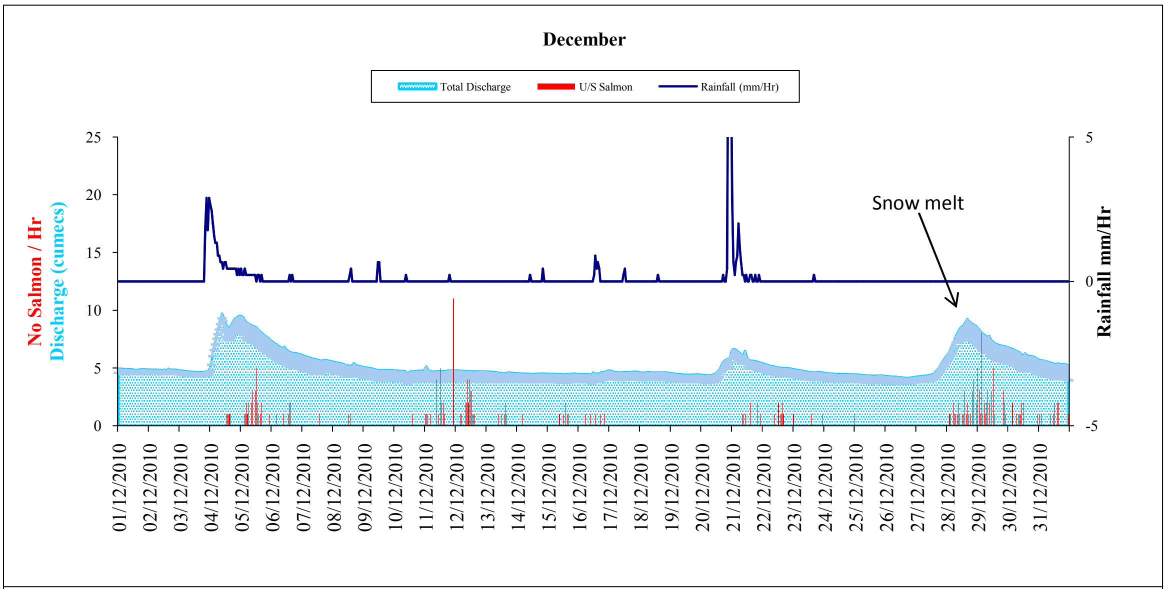

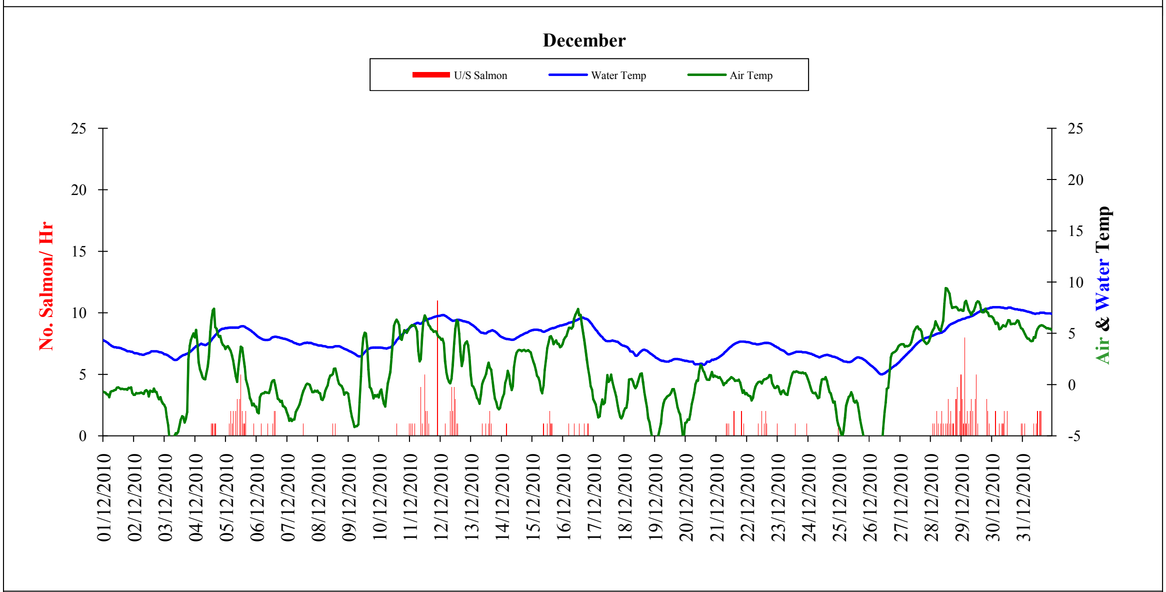

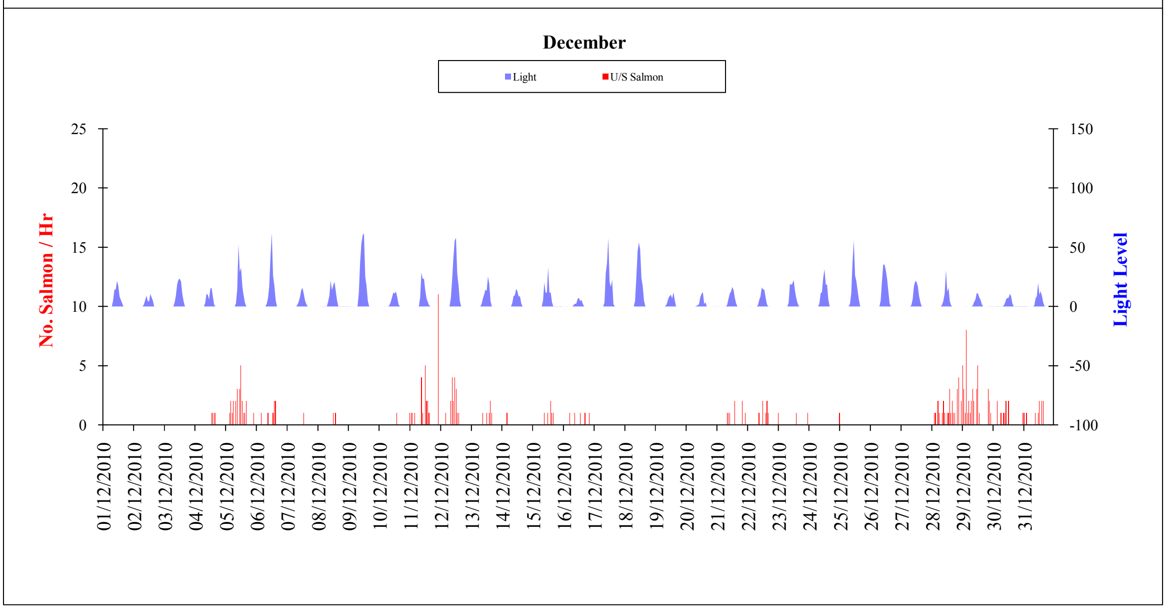

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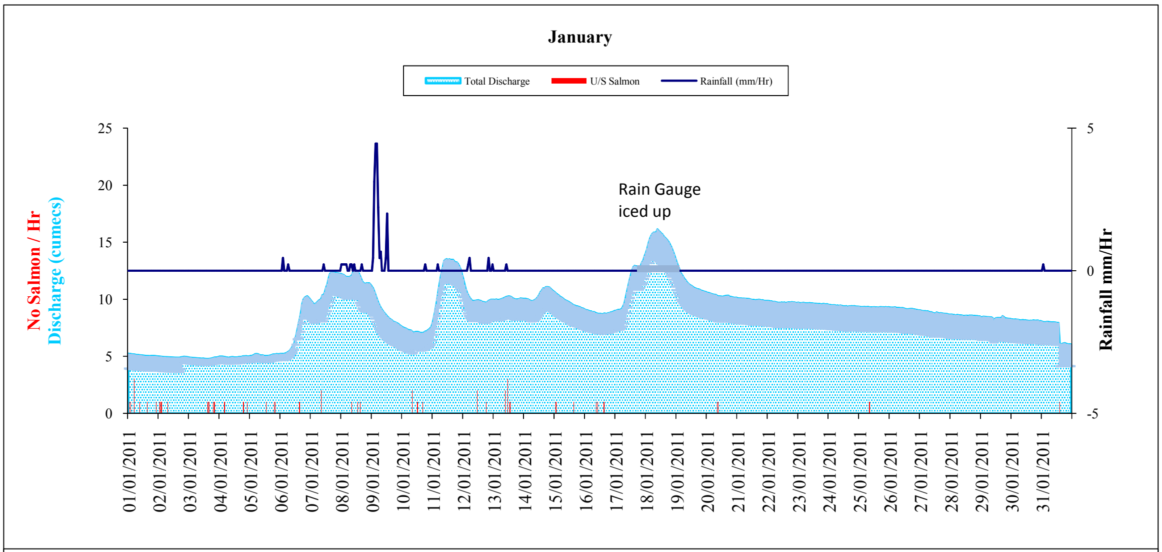

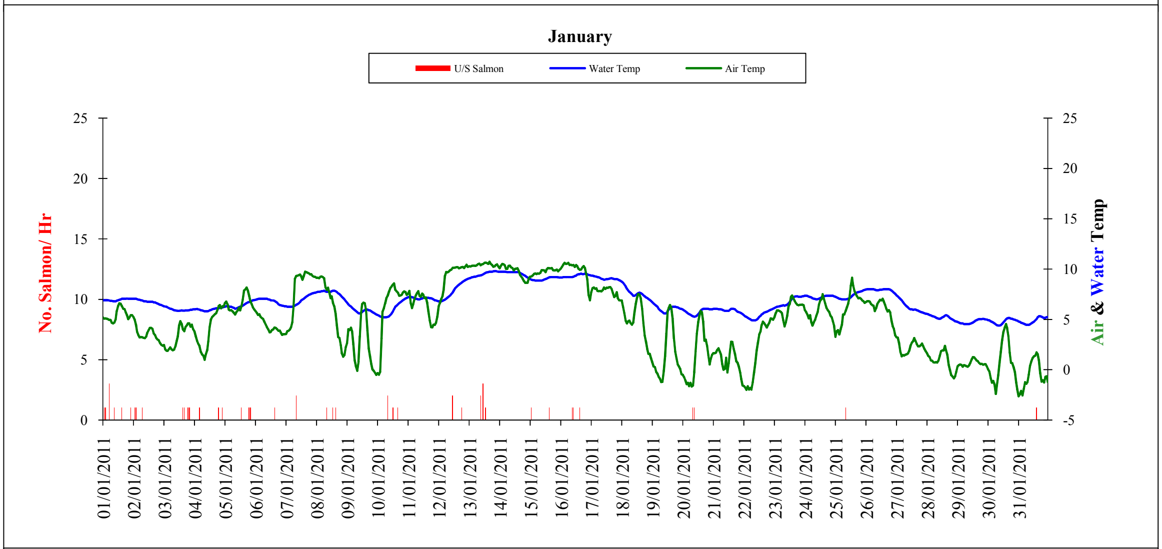

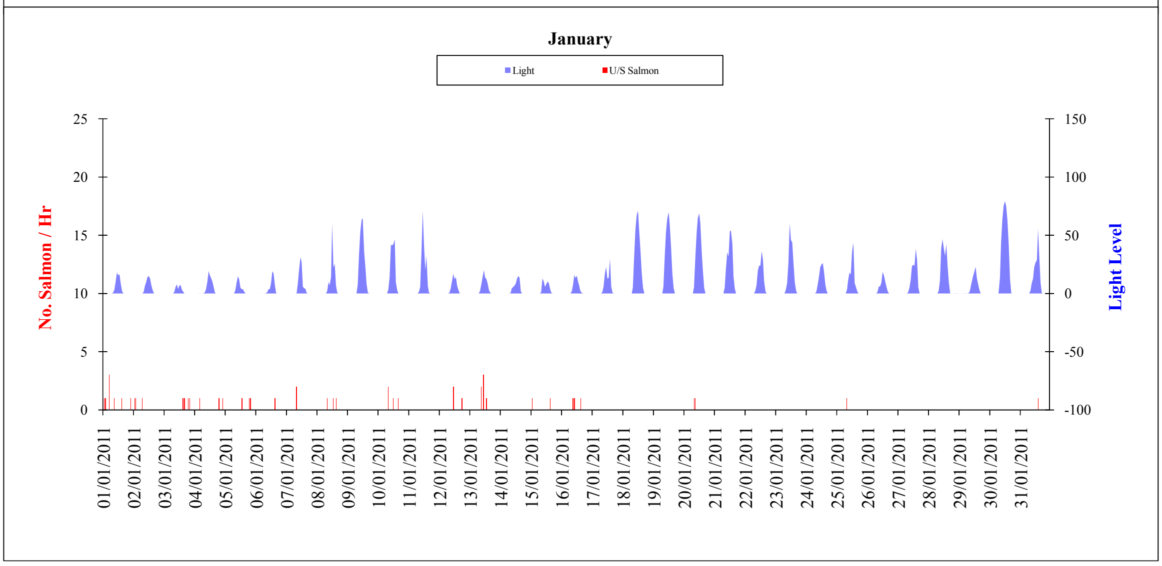

Appendix I Hourly data

The Game & Wildlife Conservation Trust

For over 75 years our scientists have been researching why species like the grey partridge, water vole, corn bunting and black grouse have declined. We are continually developing practical measures to reverse these declines.

Our aim is simple – a thriving countryside rich in game and other wildlife.

We are an independent charity reliant on voluntary donations and the support of people who care about the survival of our natural heritage.

Our science is funded by our members. Be the first to know about our new research and call 01425 651010 to join us today.

Game & Wildlife
CONSERVATION TRUST

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