

South Cumbria Rivers Trust Riverfly Initiative 2018 Report



A project funded by CaBA & Natural Course



Contractor

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Unrestricted

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1. Introduction

South Cumbria Rivers Trust (SCRT) supported by a wide volunteer network, annually undertake riverfly (invertebrate) surveys as a method of monitoring water quality. Riverflies spend the majority of their lives in water and are vital components of the food chain, on which fish, birds and mammals depend. The common characteristics amongst riverflies of limited mobility, relatively long life-cycles, presence throughout the year (generally) and specific tolerances to changes in environmental conditions make them good indicators for monitoring water quality. Furthermore, different species of invertebrates demonstrate different tolerances to the various forms of ecological stress and are often amongst the most sensitive aquatic species to pollutant stresses.

The riverfly monitoring initiative, under the national riverfly partnership, was originally designed to engage anglers with the water quality of local rivers. Although, anglers are still a major and valued part of the initiative it now engages a much wider range of volunteers from a variety of different backgrounds. Sampling allows volunteers to monitor the health of a local beck, thereby establishing a population baseline and highlighting any subsequent deterioration in water quality, it is also a great way to engage with the local area. Any serious declines in water quality are reported to the local riverfly hub and Environment Agency for further investigation.

Project Aims:

- 1) Develop a robust scientific evidence base and on-going monitoring programme
- 2) Support the national riverfly programme
- 3) Assess invertebrate populations and water quality to support the catchment plans
- 4) Increase community engagement across South Cumbria
- 5) Provide opportunities for people to increase their knowledge of their local area
- 6) Share data with the Becks to Bay partnership and wider public

2. Methodology

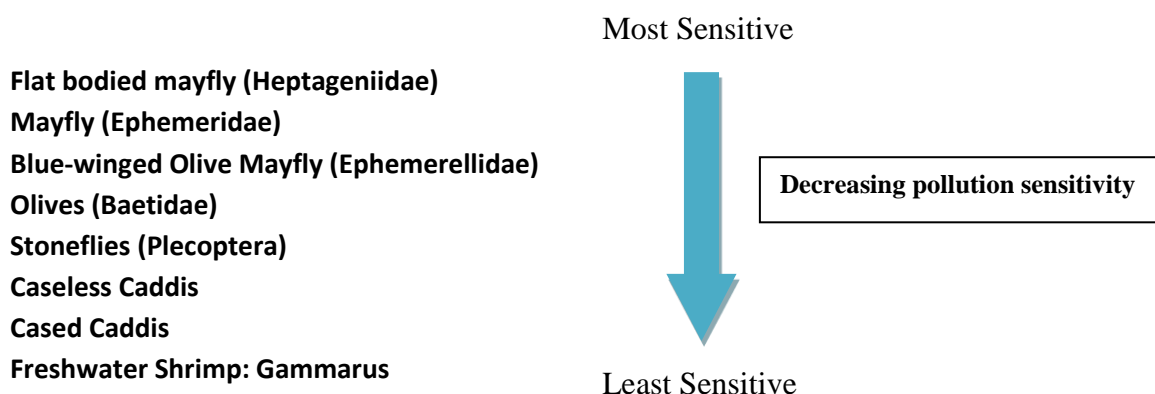
2.1. Site Selection

Existing volunteers generally continue to survey the same sites contributing to an already established dataset. Any new volunteers are allocated a site to suit them based on their location and the contribution to SCRT's work and monitoring programme. All sites are checked with the Environment Agency (EA) to ensure there is no duplication of EA sampling sites and to co-ordinate with historic sites.

2.2 Sampling Method

Sampling is undertaken monthly between April and September. In South Cumbria, this is restricted to the summer months so as not to disturb spawning fish; South Cumbria is a particularly important area for migratory fish.

The number of individuals within 8 specific riverfly groups collected in a kick sample are recorded, including Mayflies (*Ephemeroptera*), Caddis-flies (*Trichoptera*) and Stoneflies (*Plecoptera*). The methodology used is the same as the Environment Agency's routine sampling method for invertebrates. It involves a three-minute kick-sample, augmented by a one-minute hand search of the substrate and vegetation. The total sampling time is split proportionally relative to the areas of habitat at the sampling site, i.e. it may be split between pool, riffle and in-river vegetation with relative coverage of each area. This allows comparable samples to be taken over time. However, where the EA will aim to identify all invertebrate families present, the riverfly initiative is focussed around 8 target groups:



These target groups are based on the different tolerances of invertebrate families to pollution, particularly organic pollution, facilitating an assessment of how degraded a river system is and highlighting any specific pollution events.

A relative abundance assessment is made for each of the target groups which then equates to a particular score:

Abundance	Score	Estimated Number
1-9	1	Quick Count
10-99	2	Nearest 10
100-999	3	Nearest 100
Over 1000	4	Nearest 1000

The total score for the site is calculated and compared to a 'trigger level'. Trigger levels are set on a site by site basis but are generally a value of 4 for South Cumbria. They are set to provide an indication of when a watercourse may be failing to meet water quality objectives. However, in some cases this may be adjusted to account for natural conditions such as in the upper Duddon Valley which is acid stressed. If the total score falls below the trigger level and it is believed that this is due to a pollution event wiping out the invertebrate community then the local co-ordinator is contacted. The local co-ordinator will follow this up with a further sample to confirm the score, before reporting this to the EA as a pollution incident.

Stretches of river with good water quality will contain most of the pollution sensitive invertebrates listed above. However, it must be noted that there are temporal variations and therefore a decline in one species does not necessarily represent a pollution event. For example, Blue Winged Olives (*Ephemerellidae*) are generally only present in late spring and summer.

3. Events & Training

Two training events were held in April and May 2018, the first was for new volunteers and the other was a refresher session for existing volunteers. 8 new volunteers attended the initial training session and have since been established with sites. The refresher session is open to any existing volunteers who would like to refresh their skills or would like further support ahead of the survey season; this was attended by 6 volunteers.

At the end of 2017 SCRT were successful in receiving £2,000 from Tesco Bags of Help to support engaging volunteers and new audiences with 'What's in their Beck' in the Barrow and Ulverston area during 2018. This supported the training of volunteers and provision of kit. It also supported two events to engage people with 'What's in their Beck', using riverflies as a demonstration. The first of these events was held at Dalton-in-Furness as part of their community day to engage a number of people with live riverflies and associated games and activities. The second was run with Barrow Community Kitchen and the local Tesco Metro. The day involved a litter pick along Mill Beck followed by a river dip and arts afternoon. Both events helped to engage new audiences in areas where we previously had only a few riverfly

volunteers. It is hoped that this can be followed up in 2019, however, the extent will be funding dependent.

An application to support further training and expand the programme was made to the Postcode Local Trust in April. This aimed to expand the training on offer to include 'riverfly plus' and 'RAPPER: macroalgae training' as well as supporting the continued provision of the standard riverfly programme however, unfortunately the application was unsuccessful. This then limited what we could offer and consequently we were unable to expand the programme to include riverfly plus. On the other hand, thanks to financial support from the Coniston and Crake project (Heritage Lottery Funded) we ran a trial macroalgae session using the RAPPER technique. This was a success and volunteers enjoyed the opportunity to look at macroalgae under the microscope. While the method would be relatively easy to establish as a programme across South Cumbria, once again difficulties come down to the provision of funding and, in particular, offering volunteers access to the microscopes required to undertake these surveys. One option is to run it as a 'Bio-blitz' week with microscopes hosted at SCRT.

4. Results

4.1 South Cumbria Overview:

The riverfly programme continues to prove popular with volunteers, with each year seeing new volunteers joining the programme and becoming part of the community. However, we do inevitably lose a few volunteers who have signed up in previous years. Furthermore, 2018 was a particularly dry year, see section 5, and this is reflected in some of the results and the number of returns. The table below shows the number of sites and volunteers engaged with riverfly surveys across the five catchments of South Cumbria, during 2018. A map, Figure 1, shows the distribution of these sites. Data from 2017 is also provided for comparison.

Table 1. Summary of active volunteers and surveys undertaken in 2018

Catchment	No. of Sites	No. of Returns	No. of Active Volunteers
Bela	1	4	1
Crake	18	48	18
Duddon (inc. River Lickle)	27	55	8
Kent	7	27	10
Leven (inc. River Eea, Rusland, Newlands & Gleaston)	4	8	6
Total	57	133	43

Table 2. Summary of active volunteers and surveys undertaken in 2017

Catchment	No. of Sites	No. of Returns	No. of Active Volunteers
Bela	1	5	1
Crake	13	57	20
Duddon (Inc. River Lickle)	21	53	8
Kent	7	36	11
Leven (Inc. River Eea, Rusland, Newlands and Gleaston)	3	9	3
Total	45	155	43

**Note due to the acidic conditions on the Duddon catchment and generally low invertebrate numbers a reduced sampling programme with wider coverage is operated. A total of 33 sites on the Duddon have been agreed and there are a further 4 volunteers trained who due to complications in arranging access permissions with landowners during 2016 will now start their surveys at the beginning of the next season in 2017.*

4.2 General observations

Overall results for South Cumbria continue to show a positive picture, however, we have had a couple of low scores this year. Some of these are related to the low water levels and high-water temperatures experienced in summer 2018, resulting in a temporary dip in riverfly populations. These have been noted and all populations have shown a good recovery in more recent surveys. There was only one other site to record values below the trigger level which was a site of local concern. The site is near a caravan park where it is believed the septic tank needs upgrading as it is contributing to poor water quality downstream. Three sites were set up in close proximity at this location; the first is on a tributary coming into the stream (the control), one on the tributary from the caravan park (site 1) and one downstream of both of these (site 2). The control site is the only site to consistently record values above the trigger level (excluding when the beck was in drought), the other two sites regularly failed to reach the trigger level score of 4. Comparatively, the site (site 2) further away from the sources of pollution did show more variation and a greater abundance of riverflies, see Figure 2 **Error! Reference source not found.** Trigger level breaches were reported to the Environment Agency, who are involved, as well as local parish councils and the caravan site now has a deadline to put improvements in place. Riverfly monitoring will continue pre -and -post any improvements to the site, with the hope that there will be a re-colonisation of the becks by riverflies and other species over-time.

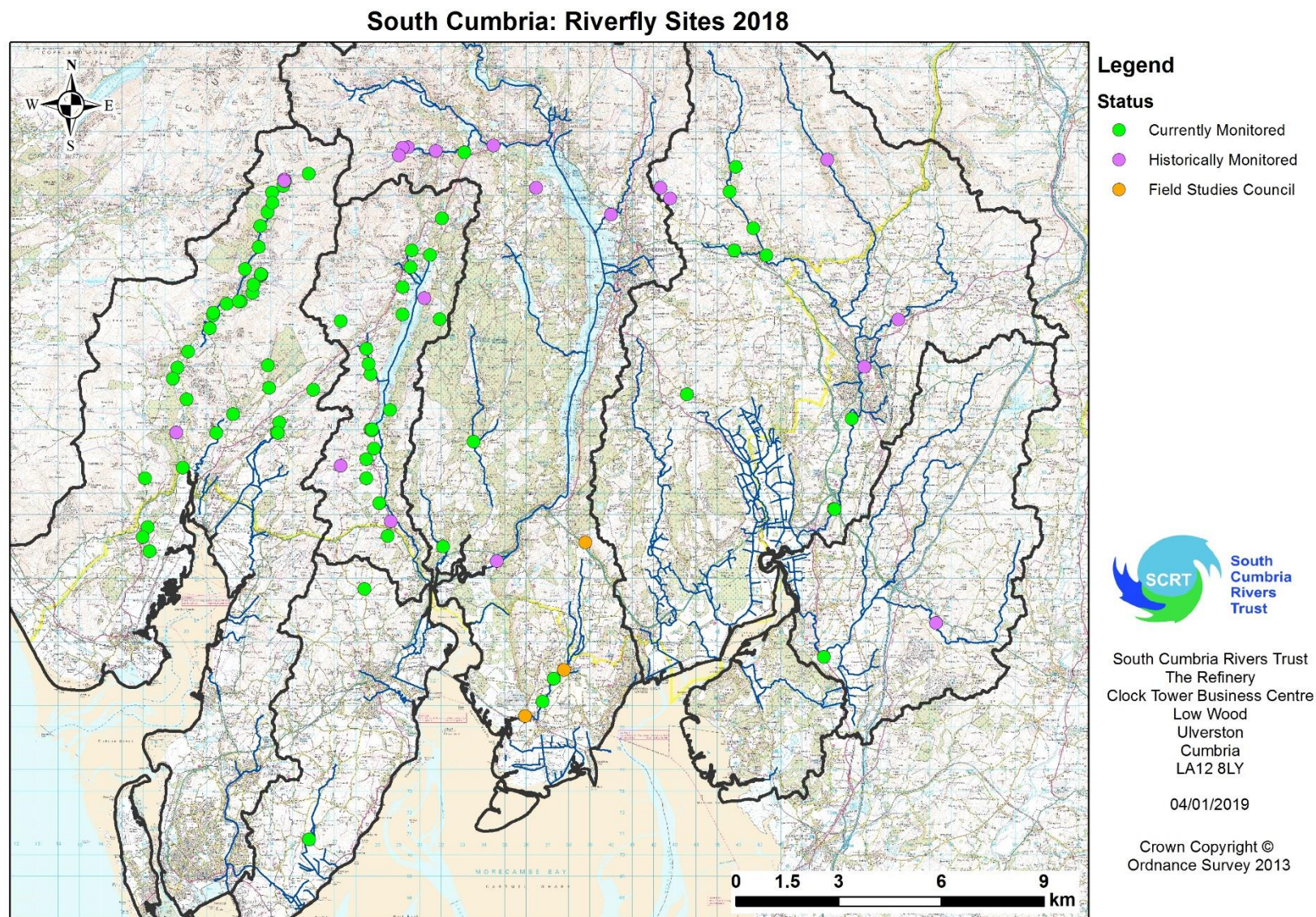


Figure 1. Riverfly sites across South Cumbria in 2018

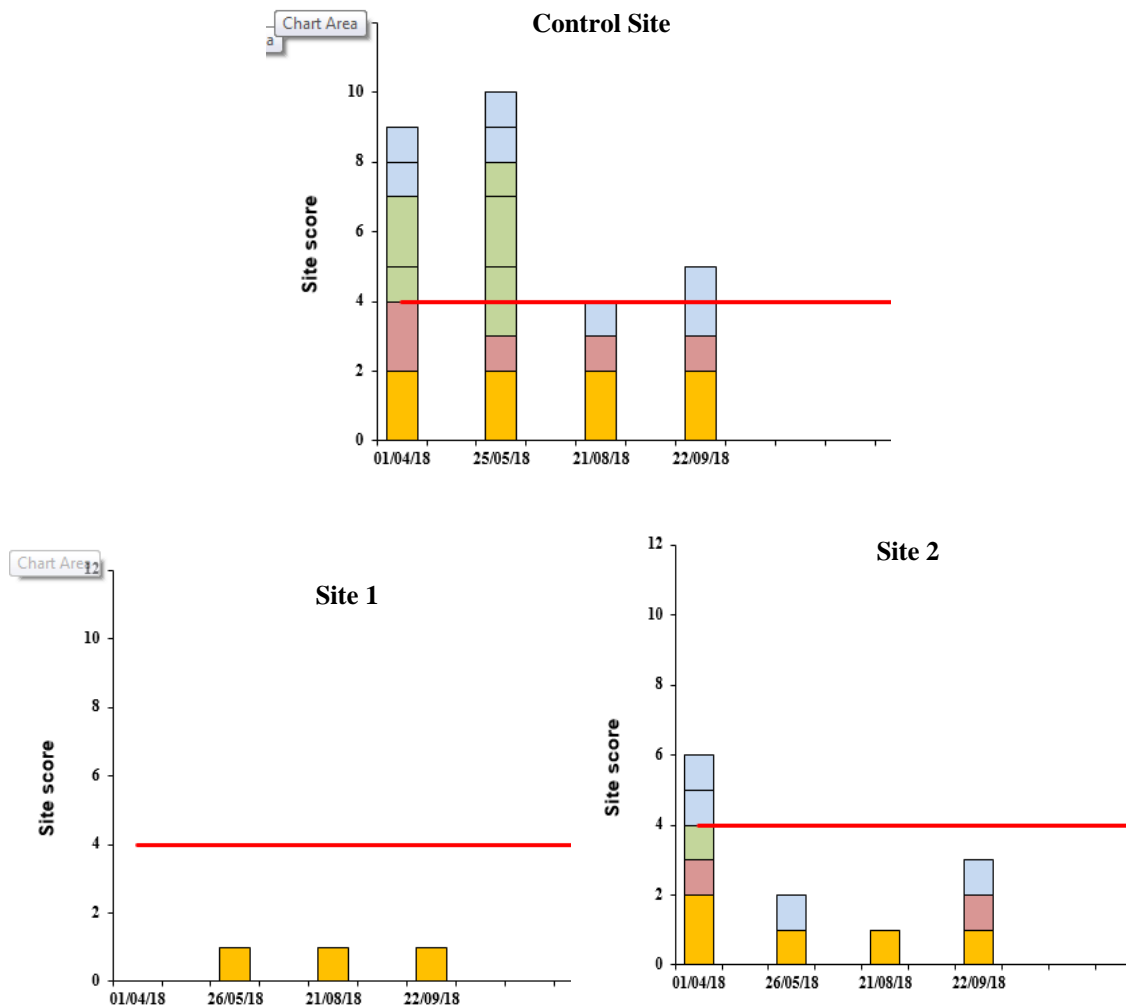


Figure 2. Riverfly results from the two sites downstream from pollution source, and a tributary (control) joining above site 2.

4.3 Catchment Observations and Historic Comparisons

Due to the nature of riverfly surveys and natural variations in populations it is difficult to draw comparisons, and even more so this year because of the dry weather experienced during the summer months. However, one of the major benefits of active riverfly volunteers during 2018 was their time spent out in the catchments and the fact they were able to identify the becks or rivers which were vulnerable to the high temperatures, for example those which dried up. This has added to SCRTs records and may help to develop future work to make the catchments of South Cumbria more resilient to extreme weather.

4.3.1 Coniston and Crake

This is the first year of the delivery phase for the Conserving Coniston and Crake project. The catchment has a long-standing history of volunteers participating in riverfly surveys and this has been further developed to support the project. For example, new sites are being established where projects such as de-culverting have been undertaken. This will add to the knowledge of how riverflies and other species then recolonise these areas to help quantify some of the associated biodiversity benefits. Furthermore, the Conserving Coniston and Crake project has a large community element which has helped bring in additional volunteers. A number of the sites surveyed by volunteers dried up during the drought, affecting the fish and invertebrate populations.

4.3.2 Duddon

The Duddon catchment typically has low numbers of riverflies, particularly in the upper reaches. This is attributed to natural background conditions which are typically acidic. Therefore, it was thought that this catchment could be particularly suited to the 'riverfly plus' technique which is being developed. The local community (Duddon Rivers Association), were keen to monitor the pH whilst out undertaking riverfly surveys. However, with the difficult nature of monitoring pH, the unsuccessful bid to the postcode lottery and the dry summer this didn't happen during 2018. On the other hand, the results submitted during the 2018 surveys were comparable to previous years. Last year surveys on the River Lickle showed low populations of riverflies, however, this year the scores seemed to reflect healthier populations and there were no trigger breaches.

4.3.3 Kent

Riverfly sampling on the Kent is now into its third year of sampling. No new sites were added this year and there were slightly less surveys submitted than in previous years, however, results were consistent. It may be that in 2019 there is a need to review the sites which are being surveyed on the Kent and advertise the opportunity to potential new volunteers.

5. Challenges

5.1 Weather

The summer of 2018 was a particularly warm one with periods of drought, see Figure 3. Several smaller streams across South Cumbria completely dried up for a period of, making sampling impossible. In other streams/ rivers where sampling was possible, water temperatures were high and there were many areas where water was confined to pools or flow was limited, this therefore affected the results. Several sites breached the trigger level

(4), however, upon investigation this was due to environmental conditions such as the low water levels not a pollution incident. Therefore, the number of surveys returned this year is lower than normal as for a couple of months, particularly in June and July sampling either wasn't possible as there was no water or would be not be representative.

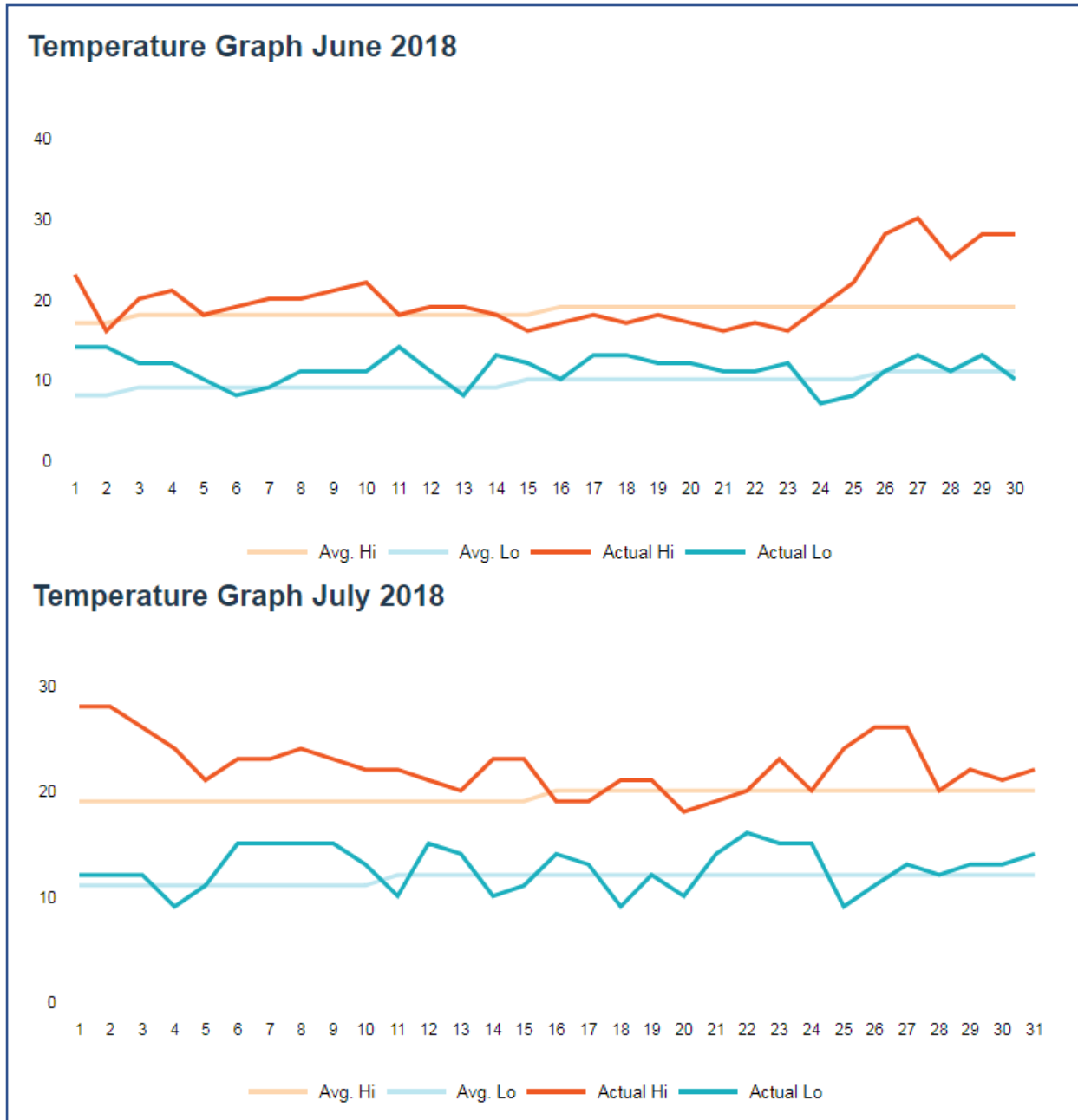


Figure 3. Temperature records for Windermere, South Cumbria, during June and July 2018



Figure 4. Gobling Beck, Duddon, a riverfly sampling site during June 2018.



Figure 5. Smithy Beck, Coniston, a riverfly site during June 2018

5.2 Riverfly Database

Several difficulties have been experienced with the National Riverfly Database this year, including the registration of volunteers. Several volunteers still haven't received their log-in details at the end of the survey season following registration in May (2018), other volunteers have their log-in details, but their sites haven't been added to the database. This is hindering progress and consequently not everyone is working to the same system, which makes reporting and sharing results difficult. South Cumbria Rivers Trust have been following this up with the National Partnership but have received little response and so are now investigating other options to make the system more local although results will still be shared with the national initiative. See [Next Steps](#) for further options which are being explored for 2019.

6. Catchment Management

Riverfly data provides extensive coverage across the catchments of South Cumbria which is important as it allows us to monitor water quality over a relatively large area. This can then highlight any areas of potentially lower water quality which SCRT staff and partners can follow up or investigate further. Additionally, this can be linked to wider catchment monitoring and existing projects to build up a more comprehensive picture. This is something which will continue to be developed in 2019.

7. Next Steps for 2019

Development of the riverfly database and submitting surveys to SCRT is planned for 2019. This is following some of the challenges outlined above and in response to previous concerns raised by some volunteers that by moving to a national system they were losing some of the local interaction. Initial discussions have begun with the Rivers Trust, to learn from options developed elsewhere, such as the example at South East Rivers Trust (<https://southeastrivers.maps.arcgis.com/apps/MapSeries/index.html?appid=fa2b35c1528647e895476348173c4490>) where data is hosted locally on their website. This also facilitates the data collation to inform reports such as this and enables a more informed overview of the catchments of South Cumbria. Where possible this data will still be shared with the national database.

If you would like to become a riverfly volunteer in South Cumbria please contact Jayne Wilkinson (jayne@scrt.co.uk) to register your interest.

8. Acknowledgements

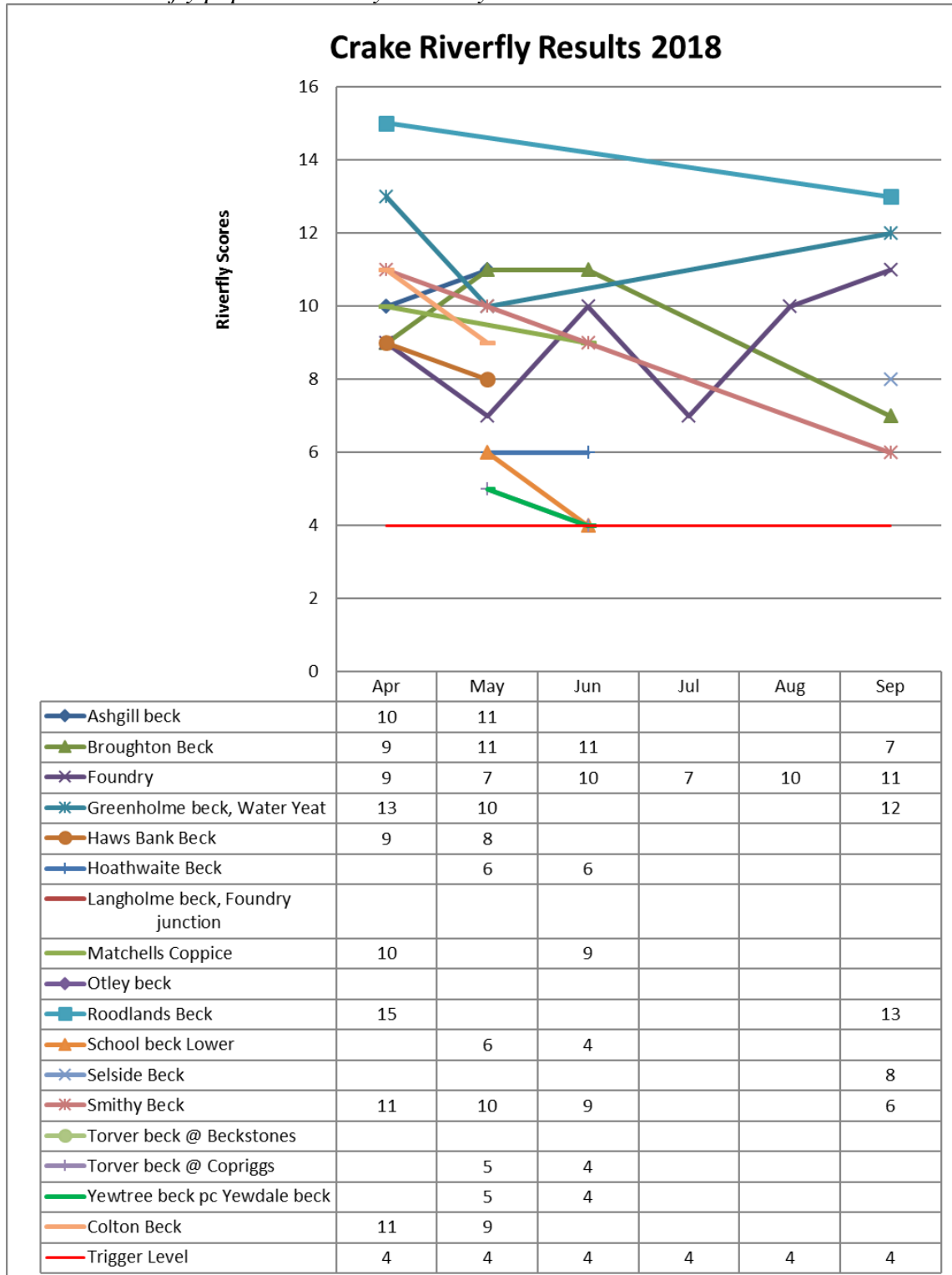
SCRT would like to thank all the volunteers for their amazing efforts in continuing this important piece of monitoring. It also wouldn't happen without the dedication of Mel Fletcher who kindly runs the training programmes and the Riverfly Partnership for their continued support. Additionally, we would also like to acknowledge Tesco Bags of Help for their very kind award of £2,000 to support riverfly training and events in the Barrow and Ulverston area during 2018.



Appendix I:

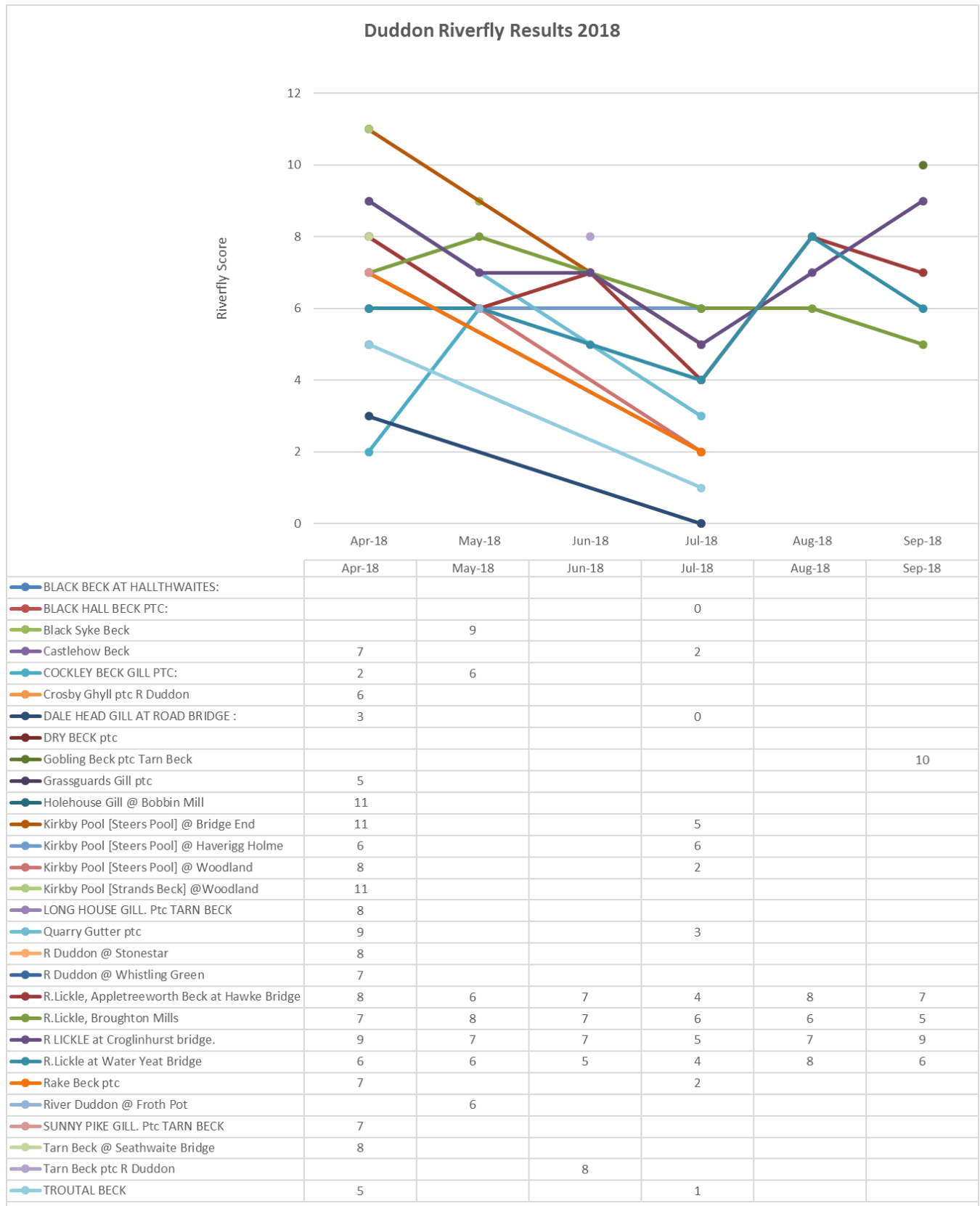
Graph & table of sites and scores for the 2018 riverfly survey season in the Crake catchment.

Please note the graphs are there for information only, it is difficult to compare between months as riverfly populations vary naturally.



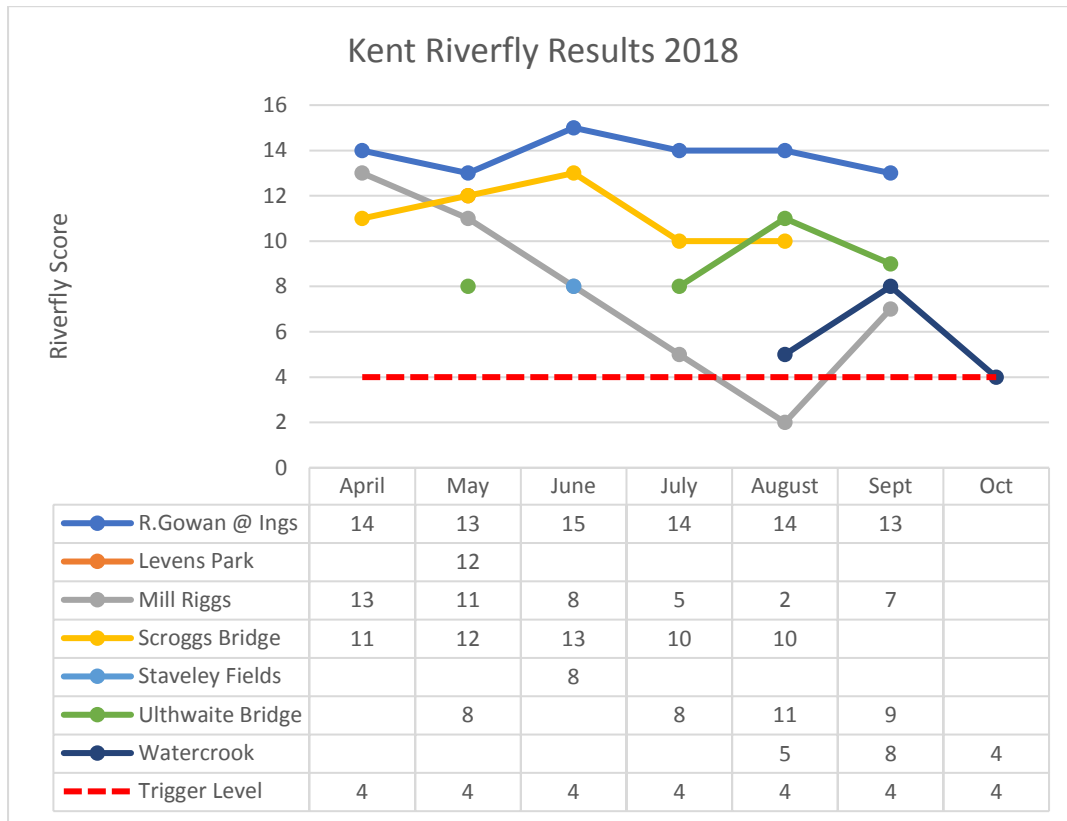
Appendix II:

Graph and table of sites and scores for the 2018 riverfly survey season in the Duddon Catchment



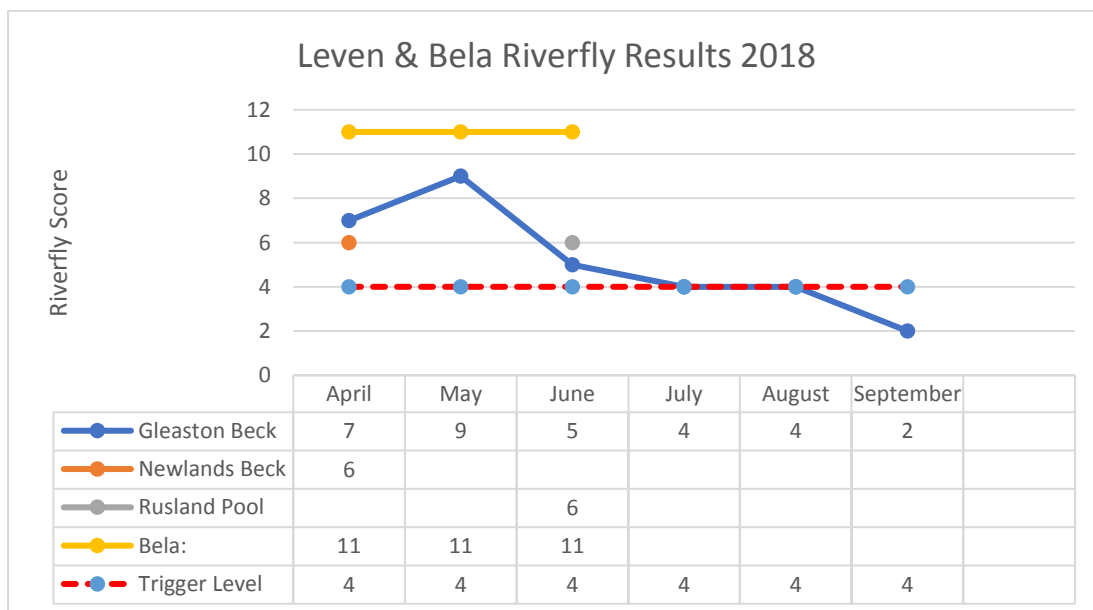
Appendix III

Graph and table of sites and scores for the 2018 riverfly survey season in the Kent catchment



Appendix IV

Graph and table of sites and scores for the 2018 riverfly survey season in the Leven and Bela catchments





South Cumbria Rivers Trust is registered in England and Wales as a company limited by guarantee (Company Registration No: 5763380) and a charity (Charity No: 1114682). We established in 2000 with the aim to protect, conserve and rehabilitate the aquatic environments of South Cumbria.

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