South Cumbria Rivers Trust Riverfly Initiative 2019 Report





A project funded by the Catchment Based Approach

SCRT

Contractor

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1. Introduction

South Cumbria Rivers Trust (SCRT) run an annual programme of riverfly (invertebrate) surveys as a method for monitoring water quality. Surveys are largely undertaken by volunteers, with SCRT providing training, support and co-ordination. Riverflies spend the majority of their lives in water and are vital components of the aquatic food chain, on which fish, birds and mammals depend. Furthermore, 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. The national riverfly programme, which SCRT operate under, is designed to be easy to follow; it looks at a small sub-set of riverflies to give a general indication of water quality and 'flag' up any serious pollution incidents.

The national riverfly monitoring initiative, was originally designed to engage anglers with the water quality in their local rivers. Although, anglers are still a major and valued part of this initiative it has now been running for a number of years engaging a wide range of volunteers from a variety of different backgrounds. This method allows people to monitor the health of a local beck, reporting any serious declines in water quality and aiding SCRT in the continued understanding and engagement of riverine issues across South Cumbria. Any serious declines in water quality recorded as part of the monitoring are reported to the Environment Agency for further investigation.

Project Aims:

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





2. Methodology

2.1. Site Selection

Sites are selected based on a volunteer's preferred location or where there are gaps in the wider programme. It is designed to ensure that sampling is as easy as possible for the volunteer. The Coniston and Duddon catchments have a relatively good coverage of survey sites across the majority of the main becks. The Kent also has reasonable cover, although there are some gaps. However, there is limited to no cover in the Leven and Bela catchments; these will be a focus for future years. All sites are checked with the Environment Agency (EA) prior to sampling to ensure there is no duplication with EA sampling sites and to enable coordination with historic sites. Where ever possible, if a volunteer has stopped sampling a site a new volunteer will be sought for this site to continue the dataset.

2.2 Sampling Method

Sampling is undertaken monthly between April and September. It is restricted to these times because South Cumbria is a particularly important area for migratory fish, and so sampling during these months only minimises disturbance to spawning fish. Water levels and weather conditions are also generally better during the summer months, meaning it is safer for volunteers to survey.

The sampling method involves a three-minute kick-sample, augmented by a one-minute hand search. The total sampling time is split proportionally across the areas of habitat at the sampling site, i.e. it may be split between pool, riffle and vegetation with relative coverage of each area. This methodology is the same as the Environment Agency use in their routine sampling for invertebrates. However, where the Environment Agency will aim to identify all invertebrate families present, and to a higher degree, the riverfly initiative solely focusses on 8 target groups, as below.







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 across the UK.

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 by the Environment Agency on a site by site basis but are generally a value of 4 for South Cumbria. When a site records a total score of less than the trigger level this gives an indication that the site may be failing to meet water quality objectives and may have been subject to a pollution event. If the trigger level is breached this is initially reported to SCRT as the local riverfly hub, SCRT will then check if this is as the result of a pollution incident or if it is an error in sampling. If it is believed that the breach is due to a pollution event, it is reported through the designated protocol to the Environment Agency. The riverfly initiative is recognised as a standard citizen science monitoring scheme for assessing water quality and has been used by the EA in pollution incident follow ups.

A trigger level is set because it is important to note that there are temporal variations in riverfly populations; the riverfly groups listed above all have different life cycles with all but freshwater shrimp having a non-aquatic adult phase. Therefore, a decline in one species does not necessarily represent a pollution event however, a dramatic decline in all species, and therefore the biodiversity of a site, may be indicative of a pollution event. With continued monitoring volunteers begin to get to know their site and can often observe any changes in the health of the system just by a visual assessment.

3. Events & Training

During 2019 a training session for new volunteers was held at the beginning of the survey season in May. Only 2 new volunteers attended the session however, both of these volunteers have now begun surveying 1-2 sites each and results were received throughout the summer. An additional site was proposed for one of the volunteers, however, there have been difficulties getting hold of the landowners to source permissions, consequently this site is yet to be established and will be reviewed in 2020.





A refresher session was also run for any existing volunteers who may want to review their sampling technique or ask any questions. 12 people attended the session. This year we also took the opportunity to ask existing volunteers what they would like to see from the programme and how it can be better suited to meet their needs. In previous years there had been reports that people felt a little disconnected from the rest of the local group, particularly since the transition to submitting results direct to the national riverfly database. A new system was proposed and a draft presented on the day, this received good feedback and has been developed since. This new system now captures all the riverfly data for SCRT, further information on this can be found in section 5.2.

Riverfly demonstrations are frequently undertaken as part of an event or taken to shows to facilitate engagement. Events this year included, Conserving Coniston and Crake shows, Winster & Gilpin survey demo day, Penny Bridge School Eco-group sampling and Crosthwaite School activity day.

4. Results

4.1 South Cumbria Overview:

The riverfly programme continues to be one of SCRT's largest volunteer programmes with around 40 people participating every year. Table 1 shows the number of people who engaged with the initiative and submitted records during 2019, Table 2 provides a comparison for 2018. During 2019 SCRT received more records than 2018, however, surveying was limited in 2018 due to a period of drought. Comparatively, during 2019 there were less active volunteers and consequently a lower number of sites were surveyed. This is particularly evident on the Duddon which is partly due to weather conditions and also to people having other commitments. It should also be noted that the River Eea is now classed as 'minor catchments', compared to 2018 when it was combined with the 'Leven' catchment results. Figure 1 gives and overview of the results submitted to the new 'riverfly dashboard' hosted on the SCRT website. This dashboard is interactive and can be viewed on the <u>SCRT website</u>. As this was a transitional year some results were still submitted direct to the national riverfly hub.



Catchment	No. of Sites	No. of Returns	No. of Active Volunteers
Bela	1	7	1
Crake	15	62	14
Duddon (inc. River Lickle)	10	25	5
Kent	7	28	10
Leven (inc. Rusland, Newlands & Gleaston)	0	0	0
Minor Catchments (inc. River Eea, Rusland, Newlands & Gleaston)	6	23	6
Total	39	145	36

 Table 1. Summary of active volunteers and surveys undertaken in 2019

Table 2. 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	27	55	8
Lickle)			
Kent	7	27	10
Leven (inc. River Eea,	4	8	6
Rusland, Newlands &			
Gleaston)			
Total	57	133	43





Figure 1. Screenshot showing overview tab on the riverfly dashboard for South Cumbria.



4.2 General observations

Results continue to show a positive picture. There were a few sites which recorded values below the trigger level, however, these are generally sites which are already known to the Environment Agency or which upon further investigation gave a higher score. Furthermore, a number of these records were when water levels were 'very low' (Figure 3) and unlikely to be representative.

4.3 Coniston and Crake

2019 was the second year of the delivery phase for the Conserving Coniston and Crake project. This project has been a big support for the riverfly programme, particularly via the community engagement elements where we have been able to engage new audiences, such as the school at Penny Bridge. However, this catchment has a long-standing history of volunteers participating in riverfly surveys with a well-established group. Some sites in this catchment, including Greenholme, Langholme and Torver beck, have been surveyed for the past 10 years.

This was the only catchment to record a value below the trigger level, this was recorded at 2 neighbouring sites, see Figure 2; it was believed this was related to discharge from a septic tank. However, the Environment Agency are aware of these sites and the site of concern has recently been made to upgrade their septic tank. These sites will continue to be monitored in future years.

4.4 Duddon

The Duddon catchment typically has a lower number of volunteers but a high number of sites compared to the other catchments. Natural background conditions mean this catchment is quite acidic and there are typically lower numbers of riverflies recorded. Therefore, volunteers often survey a few sites at a lower frequency. It is known that some volunteers are leaving the area in 2020 and so new volunteers will be sought to continue the monitoring at these sites.

There were no trigger breaches during 2019 in the Duddon catchment, although, in the Lickle catchment there was one site, Appletreeworth Beck, which fell below the trigger level. However, it wasn't believed that this was due to a pollution incident, and values subsequently increased again.







Figure 2. Riverfly results from 2019 for two sites downstream from a pollution source, and a tributary upstream (control), note the trigger level is the same for each site.





4.5 Kent

The Kent has a number of sites which have been consistently monitored over the past three to four years. This is largely since the establishment of the Kent Catchment Partnership in 2015, however, there have been very few new volunteers join the partnership or become riverfly volunteers since then. During 2019 there were 28 records submitted, these are largely from the Gowan and upper Kent tributaries, there is a gap in coverage on the Mint and Sprint systems, and an effort will be made to fill these gaps during 2020.

4.6 Minor Catchments

A number of new sites have been established in 'minor catchments' this year. Largely in the area around Ulverston. This is an area where we haven't previously surveyed and for which we have limited local knowledge, therefore these sites are an important part of building an insight into these catchments. One site near Ulverston reported high levels of algae, which impeded riverfly surveys; this is an indication that this site may be nutrient enriched.

5. Challenges

5.1 Weather

Weather can have a big impact on riverfly surveys, particularly as it effects water levels, both high and low water levels can mean surveys aren't representative and high levels can also mean the river/ beck is unsafe to access. Early in the season water levels were generally quite low (and in some cases 'no water' was recorded), this restricted any monitoring. Comparatively, during August and September water levels were high which in some cases prevented sampling. No records were recorded during very high flows; volunteers are advised not to sample during high flows due to safety reasons and because results aren't likely to be representative. Figure 3, shows the number of occasions a survey was undertaken at certain water level conditions. For comparison rainfall data for the summer period has been included in Appendix I.









5.2 Riverfly Database

During 2019 difficulties continued to be experienced with the national riverfly database. Several people reported that they could no longer log in, and as this is hosted nationally this isn't something we can resolve locally. It is also difficult to view the full results (a data request is required) or an overview by catchment, note full results for those records submitted in early 2019 have been requested but not yet received. Therefore, steps were taken this year to revert back to a more local system. The local system, 'the riverfly dashboard', is hosted on the SCRT website and can be viewed by anyone with an internet connection. This system incorporates a form, enabling volunteers to submit records direct to the website and then view the results alongside other surveys in the catchment. Feedback on the new system has been positive and this will continue to the developed into the future. It is hoped that this will provide a local intermediate step to ensure people feel an ownership to their results, however, results will still be shared with the national partnership. The riverfly dashboard currently only displays results for one year; however, investigations are being made to upload the historic data held by SCRT.

5.3 Funding

Funding on-going monitoring is always a challenge. In previous years funding has been sought to support the riverfly programme, however, this hasn't always been successful. In general funders are looking for new techniques with on-the ground outputs. However, the riverfly programme is very valuable as a long-term dataset and engagement tool. Currently, funding is taken from project pots where possible and further supported by the catchment-based approach. More grants tend to be available to support citizen science engagement and it is hoped that one such pot can be used in 2020, see next steps for more information.

6. Catchment Management

Riverfly data provides extensive coverage across the catchments of South Cumbria enabling water quality to be monitored over a relatively large area. Without the help of volunteers, it would not be possible for SCRT to cover such an extensive area. Reports from riverfly surveys help SCRT build a better picture of the catchments which can inform future project work and catchment management.

7. Next Steps for 2020

During 2020 SCRT are hoping to receive some funding via the Tesco Bags of Help centenary grants to support citizen science and engaging people with their local rivers. This will be used to support the riverfly programme and to investigate options to develop an 'extended riverfly' programme which will use a similar method but look at the riverflies in more detail. By





providing opportunities for existing volunteers to continue learning and enabling new volunteers to see that there are ways they can progress, it is hoped that this will help to keep people's interest in the programme. The extended programme will also provide more indepth information on the health of our rivers, which can be further used to support catchment management.

Following a trial in 2020 the riverfly dashboard will continue to be developed, hosting more data and maintaining an interactive interface.

8. Acknowledgements

SCRT would like to thank all the volunteers who have participated in the riverfly programme during 2019, without whom we wouldn't be able to undertake this important piece of monitoring. Thanks also go to Mel Fletcher as riverfly tutor who kindly runs the training days and maintains links with the national riverfly programme. Similarly, thanks to Daniel Atkinson at the EA for his support at the training sessions and in establishing riverfly sites. Finally, thanks must go to all the landowners who kindly allow access to their land to undertake these surveys.





Appendix 1

Rainfall data from Holehird Gardens near Troutbeck throughout the summer months (April to Sept).

















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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