



Riverfly Surveys  
River Exe System  
2021 Annual Report





# Riverfly Surveys 2021

## River Exe System

### Introduction

For a second year, COVID-19 has affected many activities including our Riverfly surveys. We are grateful to those volunteers who were able to survey and understand why some were unable to.

The recommended 'windows' for survey were 8-23 May (Spring), 3-18 July (Summer) and 4-19 September (Autumn).

Compared with the average climate 1961-1990, the Met. Office monthly rainfall and temperature mean values for the Southwest and South Wales were:

	mar	apr	may	jun	jul	aug	sep	oct
Rainfall	-37%	-81%	143%	-30%	35%	-30%	-6%	59%
Mean Temp. diff. deg C	1.4	-0.7	-0.7	1.3	1.9	0.3	2.2	1.7

It can be seen that in May 2021 the mean temperature was 0.7 deg. C below average and the rainfall was 143% of the average based on the 30-year period 1961-90. The exceptional May conditions prevented some surveys being done, or being done outside the window.

(These historic Met. Office regional climate data also illustrate the impact of climate change. If you had asked in 1984, "what is the chance of seven years in a row with a mean annual temperature above 10.0 deg. C?" the answer would have been 1 in 6 billion because there had only been four in the previous 100 years. The last seven years have all been above 10.0 deg. C.)

The number of sites within the overall Exe catchment is now 53. This is an increase of one as Bury Bridge on the River Haddeo has been included. Last year about 1 in 3 sites were not surveyed at all due mainly to Covid restrictions. This year the proportion was down to about 1 in 6 (9 sites). The main reason this year is that we have volunteer vacancies that we have not been able to fill due to Covid restrictions preventing training.

Riverfly data has many uses including:

- Identifying acute issues such as pollution incidents
- Enabling analysis such as cycles and trends that might indicate chronic issues
- Informing the Environment Agency and others, to influence priorities

Survey results are entered onto the national Riverfly database that is hosted by the Freshwater Biological Association.

### The Riverfly Method

Riverfly surveys provide a quick and easy way to assess the aquatic invertebrate life, and therefore indicate the health of a watercourse. Its strengths are its simplicity and that it gives immediate results that can warn of an acute problem such as a pollution event. Over time, survey results show how invertebrate populations vary, and might suggest chronic long-term issues.

Invertebrates are dislodged from the river bed by kick-sampling upstream of a collecting net in a prescribed manner. A count is made of each of eight target invertebrates. Seven of these are insects, representing two types of *Trichoptera* (caddis or sedge), four types of *Ephemeroptera* (up-wing flies) and *Plecoptera* (stoneflies). The eighth target is *Gammarus* (freshwater shrimp).

The count from each target is converted to a score based on the scale of the number. A count of 1 to 9 converts to 1, 10 to 99 converts to 2, 100 to 999 converts to 3, and so on. These scores are added to give a total, or summary, score typically in the range 5 to 20.

Hence the summary scores combine quantity and diversity. A score of 4 might mean one of each of four groups, or up to 9,999 of one group. It provides a headline but it is important to look at the individual scores and counts before reaching conclusions.

## Summary Scores

Over 1200 individual counts, and hence scores, are potentially collected each year, which can be reduced to three seasonal summary scores from each site. This allows:

1. Comparison with corresponding results from previous years and with the site average.
2. Comparison with a trigger level alarm threshold that is set by the Environment Agency.

Note that:

- Scores do not just depend on water quality but on a range of factors including natural nutrient levels, morphology, hydrology and climate.
- Site averages do not include current year values. Their worth increases with the record length (median 6 years, maximum 10 years).
- Scores vary between years (natural cycles) and during the year (seasonal variation). Scores are often highest in spring and lowest in autumn. (This is probably due to it being harder to identify by eye the smaller new generation than the larger old generation that is close to maturity.)

<b>Summary Results 2021 (total of 120 surveys)</b>	Spring	Summer	Autumn
Scores at or above the seasonal site average <sup>1</sup>	16 (42%)	16 (41%)	12 (29%)
Scores below the seasonal site average	22 (58%)	23 (59%)	29 (71%)
Scores above the EA trigger threshold	38 (100%)	33 (83%)	31 (74%)
Scores at the EA trigger threshold	0 (0%)	4 (10%)	9 (21%)
Scores below the EA trigger threshold	0 (0%)	3 (8%)	2 (5%)

In an average year you would not expect all the results to be average, but half the results to be above and half below. It can be seen that, in 2021, scores were more than half below, and this worsened as the year progressed.

The number of surveys failing to exceed the trigger threshold also increased from spring to autumn although, to some extent, this can be attributed to the usual seasonal variation.

This data, including the full results, are included at the end of the report.

<sup>1</sup> Bury Bridge does not yet have an average from previous surveys.

## Trigger Level Failures

The main purpose of trigger levels is to provide a threshold score below which the Environment Agency (EA) should be alerted. Volunteers are asked to contact the EA as soon as possible if a repeat survey also fails, particularly if there are other indications of an acute problem.

No spring summary scores were below trigger-level.

Three summer survey summary scores were below trigger level:

- The River Exe **d/s Tiverton STW**. Any score below the trigger-level is a concern but the summer scores from nearby sites above (u/s Tiverton STW) and below (Black Bridge) were both above trigger-level, as was the autumn score, so this anomaly appears localised and short-lived.
- **Templeton Bridge and Thongsleigh** on the River Dart. These results were of more concern because the reductions from the spring results (from 14 to 5 for Templeton Bridge and from 13 to 6 for Thongsleigh) were dramatic. The score at Riverside only just met the target of 7. Having three poor results from the top, middle and bottom of the catchment suggested an issue that was present along the whole river. Historically, there have been water quality problems on this river.

The surveys were undertaken on 10<sup>th</sup> and 11<sup>th</sup> July and reported to the Environment Agency on 20<sup>th</sup> July. The Analysis & Reporting Team responded immediately and arranged to investigate the sites with the volunteers who raised the alarm. A detailed bankside analysis of invertebrates was carried out at Templeton Bridge and a report issued shortly afterward, on 29<sup>th</sup> July. This concluded:

*“The most likely cause of trigger level breaches at Templeton Bridge is prolonged spells of warm weather without rain. This will result in unfavourable conditions in headwater habitats, with respect to temperature and levels of dissolved oxygen. Under such conditions the invertebrate and fish community is particularly vulnerable to relatively modest levels of organic pollution, although no evidence for this could be found today.”*

A number of lessons can be learnt from this incident:

- The system works well, using the trigger level to alert the EA so that issues could be investigated and followed up.
- The close relationship between the EA staff and the volunteers was valuable and appreciated.
- A discrete pollution can quickly disperse. It’s not known whether, or when, this might have occurred on this occasion but the earlier an issue is reported the greater the likelihood of the cause being found. Volunteers are always advised to use the EA incident ‘hotline’ if a summary score fails, particularly if this is unusual for the site, and/or if there are obvious signs of pollution such as a strong smell or dead fish.
- Whether or not there was pollution, the effect of “prolonged spells of warm weather without rain” is a factor that we may have to contend with increasingly due to climate change.

Scores at a further four sites were at trigger level. The Iron Mill Stream at **Iron Mill Bridge**, The Dart at **Riverside**, the Exe at **Bramford Speke** and the Spratford Stream at **Cullompton**.

Two autumn survey summary scores were below their site thresholds:

One of these was again **Thongsleigh** and the other was on the River Barle at **Withypool**. Scores at neighbouring sites on the Barle, above (**Simonsbath**) and below (**Landacre**) were above their trigger levels. An initial score of 4 was also reported from the River Culm at **Culmstock**, however a repeat survey on a later date scored above the trigger level.

The scores at a further nine sites were at trigger level:

These included the Little Exe at **Hollam**, the Sherdon Water at **Ferny Ball**, the Iron Mill Stream at **Iron Mill Bridge**, again the Dart at **Templeton Bridge**, the Culm at **Hayne Barton** and the Exe at **Brampton Speke**. Of particular concern: all three sites in the River Lowman catchment, at **Uplowman**, **Chieflowman Bridge**, and at **Collipriest** had scores at the trigger level.

## Notes and Other Activity

### Ecology Notes

We are sometimes asked what meaning to attach to each of the eight Riverfly targets. The Riverfly website includes useful resources including Ecology Notes, which are reproduced as Appendix 1.

### Ben Fitch

We have been fortunate that the Riverfly Project Manager, Ben Fitch, was based within our catchment. Whilst his role was national he supported us locally, including at training sessions and as a volunteer himself at Cowley Bridge on the River Exe. Sadly, Ben left the Riverfly Project Office at the end of August, after seven years. His role has been taken on by other Freshwater Biological Association team members, based in the Lake District.

### Riverfly Endorsement

Those of us who receive regular Licence News from the Environment Agency may have noted that the November edition includes a link to the Anglers Riverfly Monitoring Initiative (ARMI) website.

### Citizens Science Initiative

This initiative was mentioned last year and trialling at a number of sites on the River Culm has continued this year. It is separate from Riverfly and is led in this region by the Westcountry Rivers Trust. The surveys, that include water quality tests, complement Riverfly and can be undertaken at the same time. These tests can indicate the presence of pollutants such as phosphates.

### Riverfly Partnership Newsletter

The latest (November 2021) Riverfly Newsletter is included as Appendix 2.

### Riverfly Training

Whilst Riverfly surveys might have been possible for some of us, it has not been possible to arrange Covid-compliant training. This has been disappointing as we have a waiting list of new volunteers and a number of vacancies to fill. Hopefully, we shall be able to arrange training before the start of the 2022 season and we will be in touch when we have firm plans. Perhaps a few of us might also need refresher training by then?

**Northbrook, Exeter**

The Northbrook is a small stream that drains parts of Exeter south-west of Heavitree into the Exe upstream of Countess Wear. It is an urban stream but the lower reach is open, within a parkland amenity.

A Riverfly survey was undertaken in October, to provide a baseline for future monitoring, that may involve the University. Whilst not a typical part of our network, we would like to include this site in future, if a regular survey programme can be established.

**Acknowledgements**

This network relies upon support from the River Exe and Tributaries Association (RETA). Whilst RETA recognises that the greatest resource is the time given freely by volunteers, we rely on RETA's funding to cover external costs such as replacement kit.

**Richard Horrocks**

**Lower Exe, Culm and Creedy Coordinator**

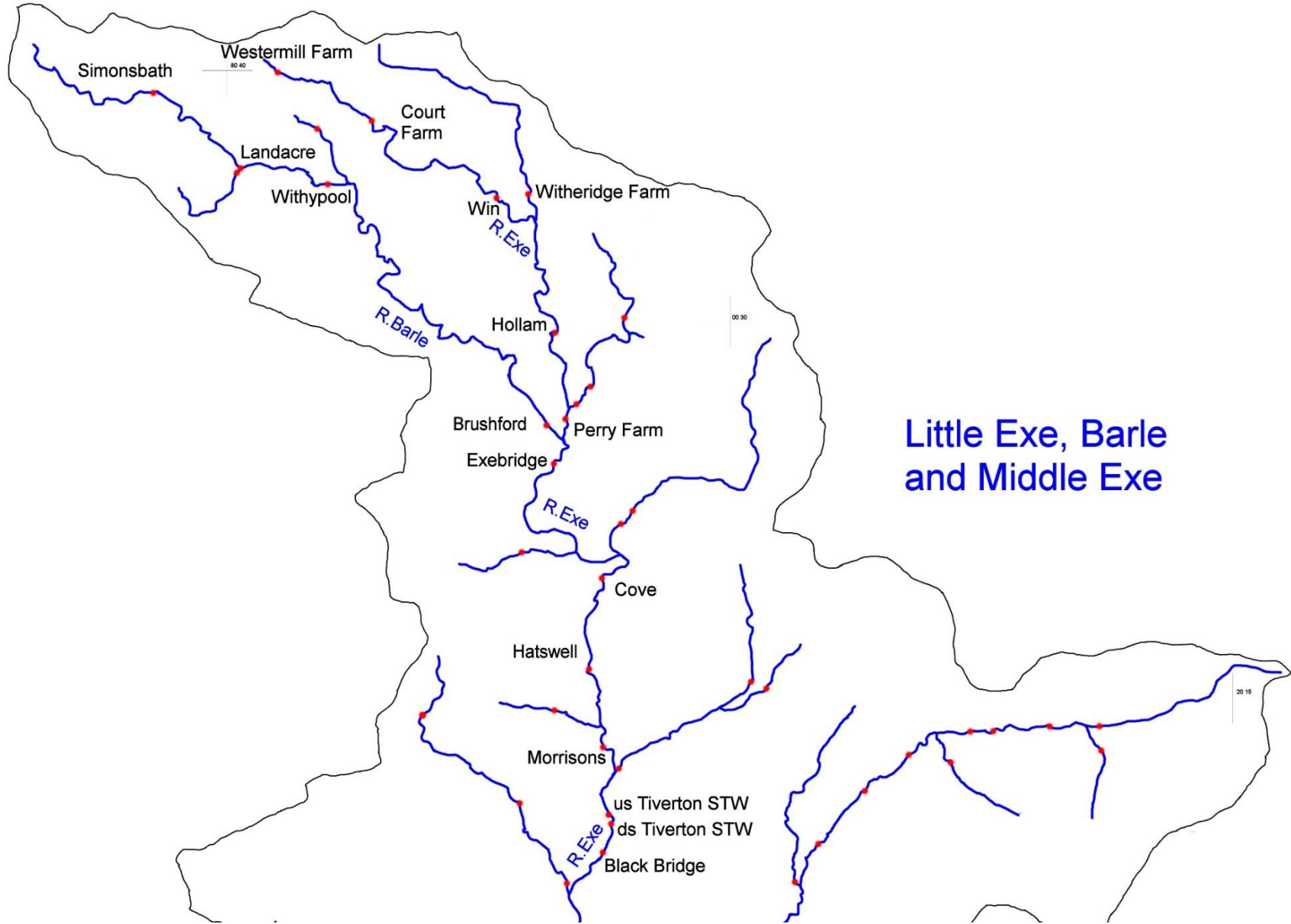
[richard.horrocks1@btinternet.com](mailto:richard.horrocks1@btinternet.com)

**Fred Leach**

**Overall Coordinator**

**Barle, Upper Exe and Middle Exe Coordinator**

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**Little Exe, Barle  
and Middle Exe**



**Summary Little Exe, Barle and Middle Exe**

	River	Location	#
Little Exe & Barle	L. Exe	Westermill Fm	6
	L. Exe	Court Fm	6
	L. Exe	Winsford	6
	L. Exe	Hollam	7
	L. Exe	Perry Farm	6
	Barle	Simonsbath	5
	Barle	Withypool	5
	Barle	Landacre	5
	Barle	Brushford	6

2021		
Spr	Sum	Aut
		11
11	11	7
13	11	8
7	9	8
10	6	4
8		7
11	10	10

As % Average		
Spr	Sum	Aut
		106%
91%	103%	73%
98%	94%	73%
64%	96%	81%
105%	92%	52%
93%		82%
86%	83%	97%

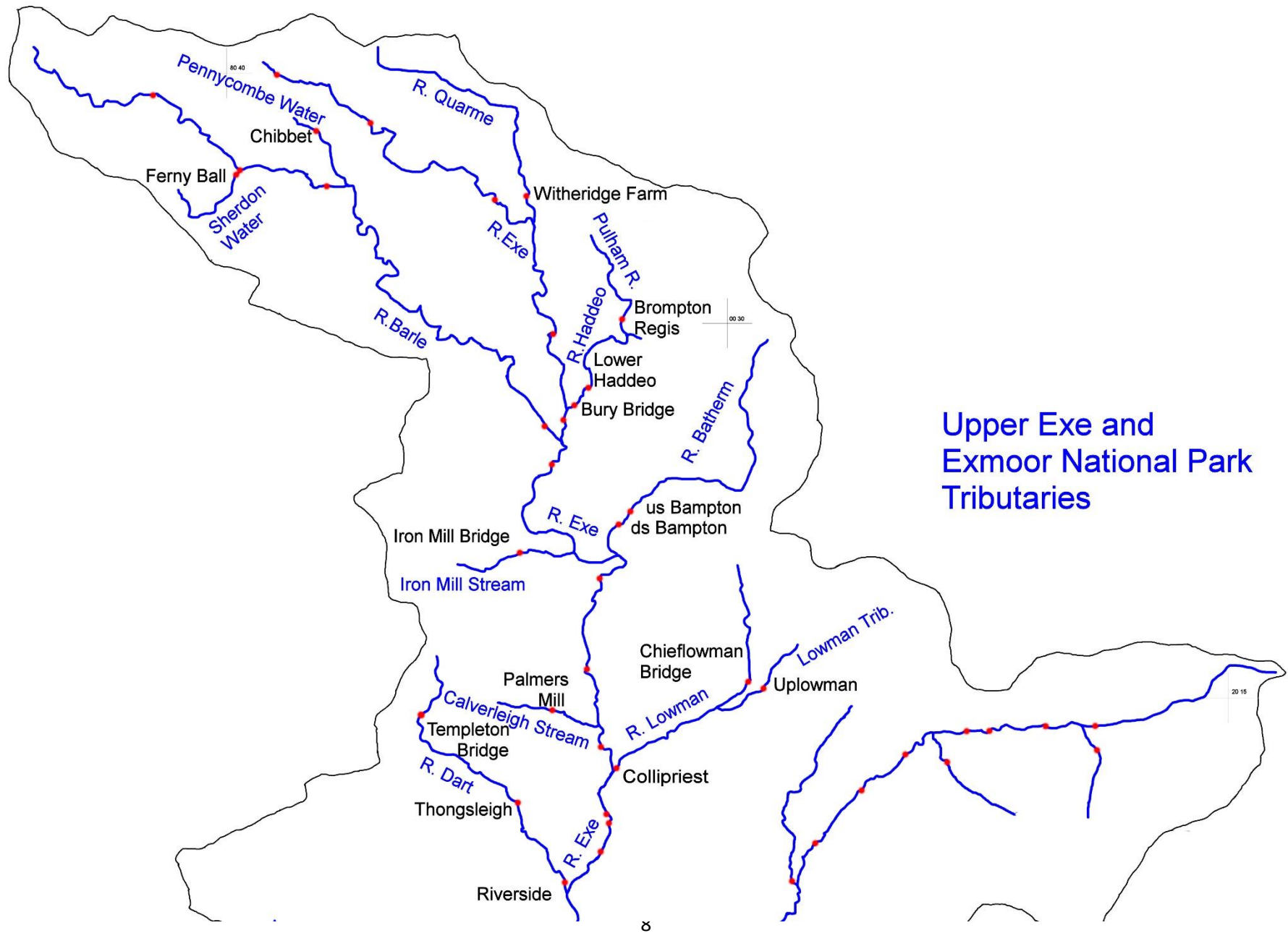
Trigger Fail		
Spr	Sum	Aut
		1
1	1	0
1	1	1
1	1	1
1	1	-1
1		1
1	1	1

	River	Location	#
Middle Exe	Exe	Exebridge	6
	Exe	Cove Bridge	6
	Exe	Hatswell	6
	Exe	Tiverton Morrisons	6
	Exe	us Tiverton STW	6
	Exe	ds Tiverton STW	6
	Exe	Black Bridge	6

11	13	8
9	8	8
10	8	9
10	7	9
7	9	8
10	5	8
11	11	7

84%	104%	77%
82%	77%	96%
111%	95%	129%
121%	85%	141%
88%	123%	138%
109%	73%	114%
75%	92%	66%

1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	-1	1
1	1	1



## Upper Exe and Exmoor National Park Tributaries

**Summary ENP and Middle Exe Devon Tribs.**

	River	Location	#
Exmoor NP	Sherdon Water	Ferny Ball	6
	Quarme	Witheridge Farm	7
	Pulham	d/s Brompton Regis	6
	Haddeo	Bury Bridge	7
	Haddeo	Lower Haddeo	7
	Pennycombe Water	Chibbet	6

2021		
Spr	Sum	Aut
10		6
		12
12	12	9
	9	10
8	11	8

As % Average		
Spr	Sum	Aut
123%		71%
		105%
101%	120%	95%
N/A	N/A	N/A
45%	68%	51%

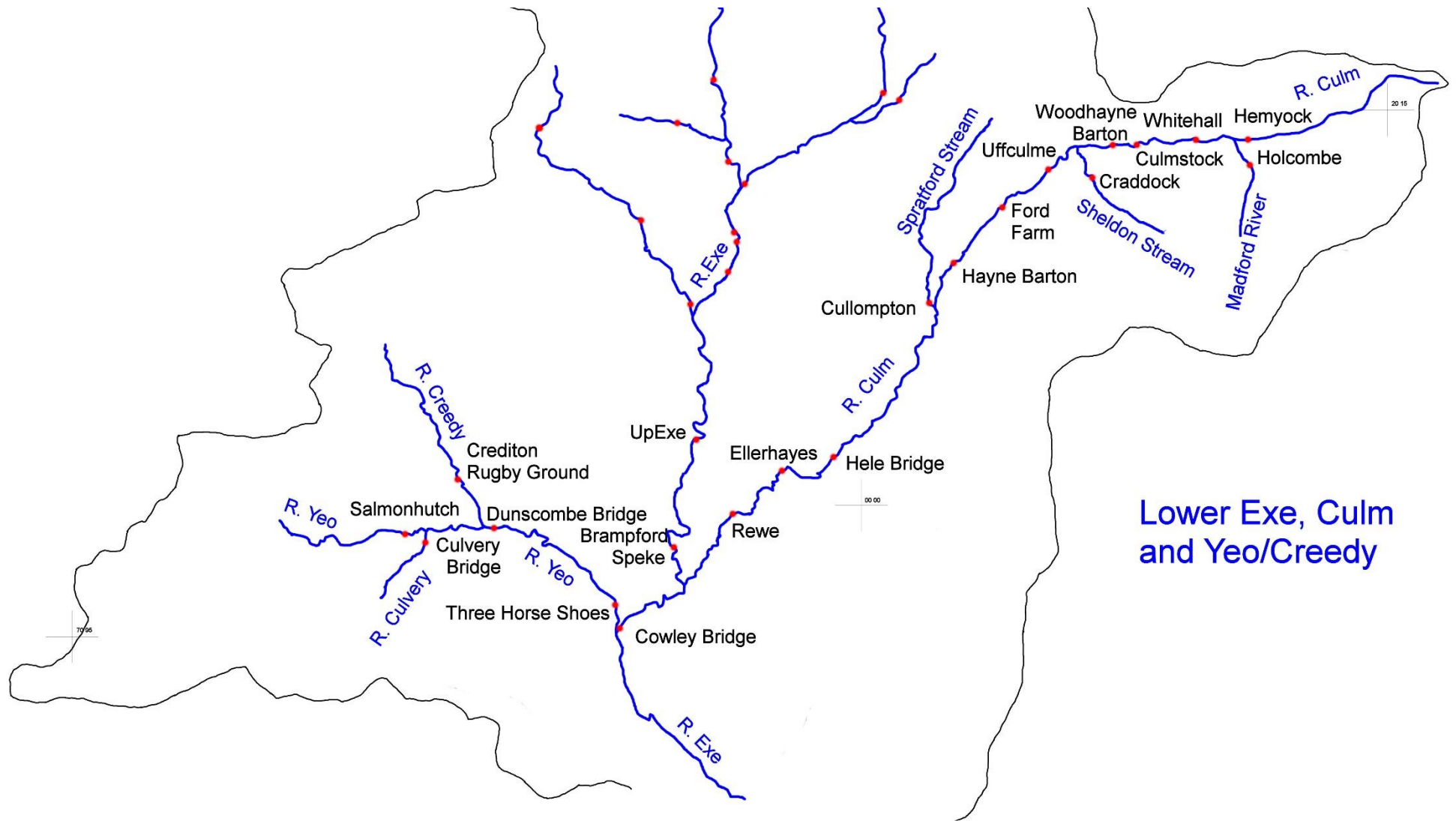
Trigger Fail		
Spr	Sum	Aut
1		0
		1
1	1	1
	1	1
1	1	1

	River	Location	#
Middle Exe Devon Tribs.	Bathern	us Bampton	6
	Bathern	ds Bampton	6
	Iron Mill Stream	Iron Mill Bridge	7
	Lowman Trib	Uplowman	7
	Lowman	Chieflowman Bridge	7
	Lowman	Collipriest	7
	Calverleigh Stream	Palmers Mill	7
	Dart	Templeton Bridge	7
	Dart	Thongsleigh	7
	Dart	Riverside	7

11	9	7
	11	8
	7	7
9	9	7
11	10	7
11	11	7
9	10	9
14	5	7
13	6	6
11	7	8

106%	85%	77%
	112%	92%
	80%	79%
83%	111%	102%
99%	104%	90%
78%	103%	69%
92%	101%	100%
156%	61%	84%
130%	68%	88%
117%	90%	107%

1	1	1
	1	1
	0	0
1	1	0
1	1	0
1	1	1
1	-1	0
1	-1	-1
1	0	1



## Lower Exe, Culm and Yeo/Creedy

**Summary Culm, Lower Exe and Creedy/Yeo**

	River	Location	#
Culm & Tributaries	Culm	Rewe	5
	Culm	ds Ellerhayes Bridge	5
	Culm	ds Hele Rail Bridge	5
	Culm	Hayne Barton	7
	Culm	Ford Farm	7
	Culm	us Uffculme	7
	Culm	Woodhayne Barton	7
	Culm	Culmstock	7
	Culm	Whitehall	7
	Culm	us Hemyock	7
	Spratford Stream	Cullompton	6
	Sheldon Stream	Craddock	7
	Madford River	Holcombe	7

2021		
Spr	Sum	Aut
12	9	7
9	8	8
14	9	8
12	10	8
13	13	9
11	12	9
17	14	12
8	6	7
11	13	9
16	17	14

As % Average		
Spr	Sum	Aut
115%	93%	82%
64%	65%	73%
127%	88%	88%
120%	109%	89%
111%	118%	110%
99%	124%	113%
96%	91%	92%
97%	97%	130%
87%	114%	88%
90%	108%	99%

Trigger Fail		
Spr	Sum	Aut
1	1	0
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	1	1
1	0	1
1	1	1
1	1	1

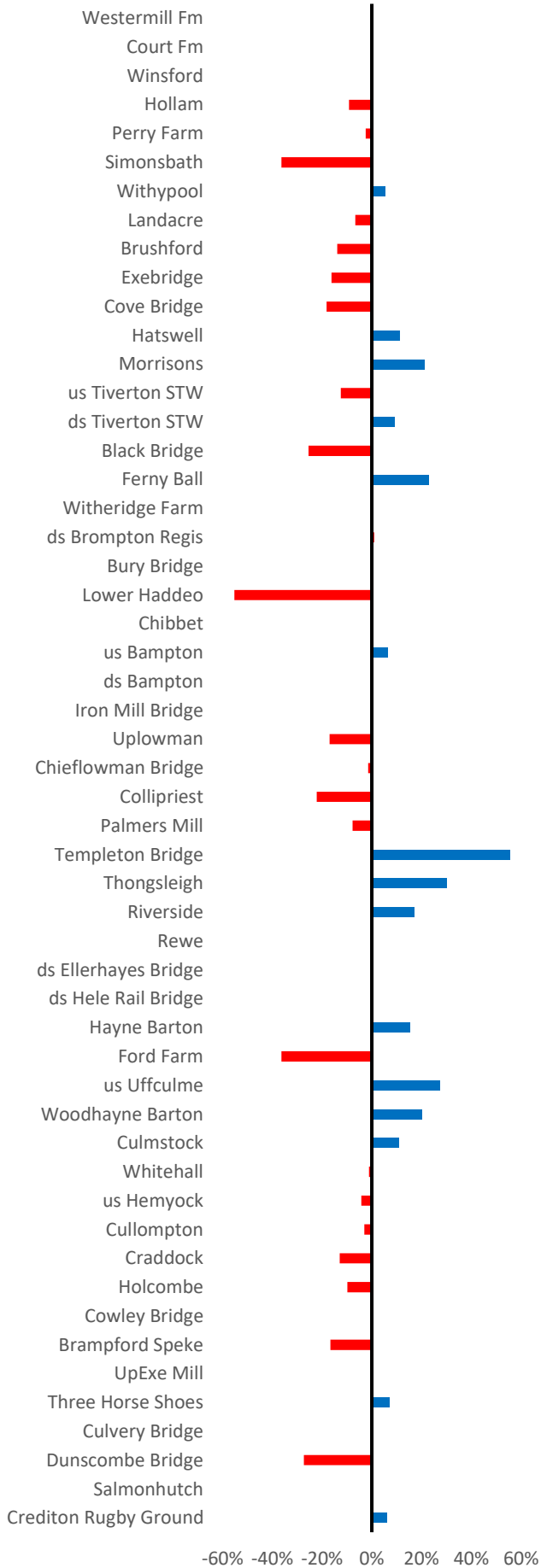
Lower Exe and Creedy	Exe	Cowley Bridge	7
	Exe	Brampford Speke	7
	Exe	UpExe Mill	7
	Creedy	Three Horse Shoes	6
	Culvery	Culvery Bridge	6
	Yeo	Duncombe Bridge	6
	Yeo	Salmonhutch	6
	Creedy	Crediton Rugby Ground	6

10	7	7
15	11	10
10	7	
	12	7
12	13	

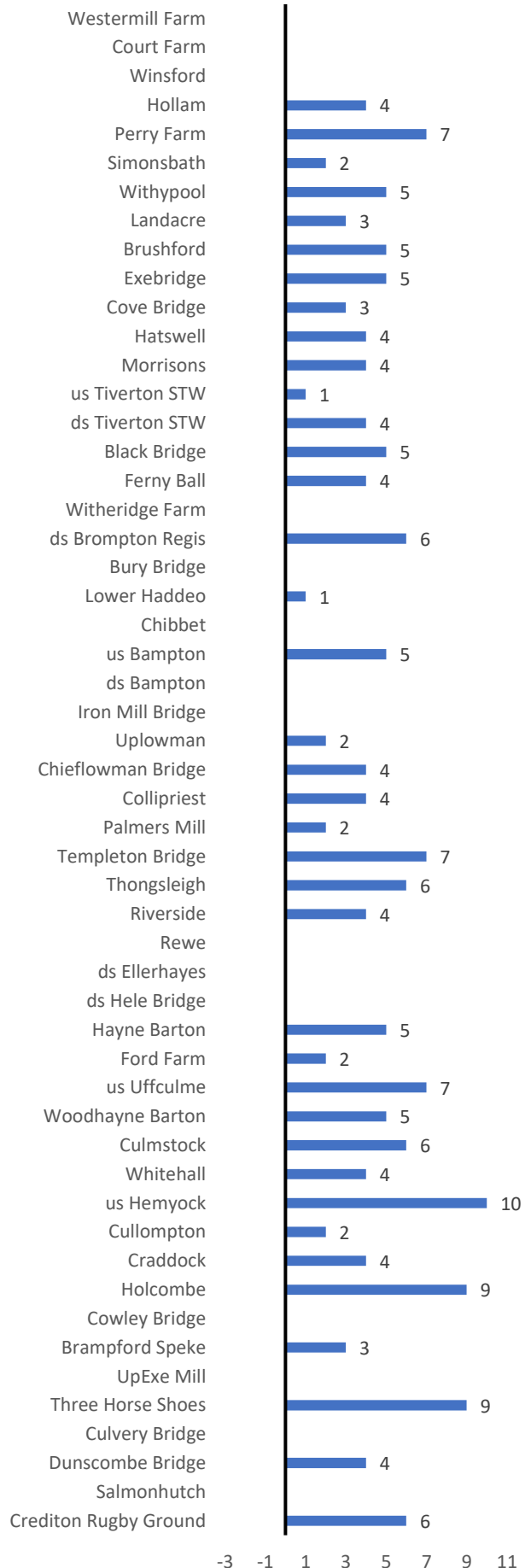
83%	93%	88%
107%	92%	78%
73%	70%	
	133%	97%
106%	120%	

1	0	0
1	1	1
1	1	
	1	1
1	1	

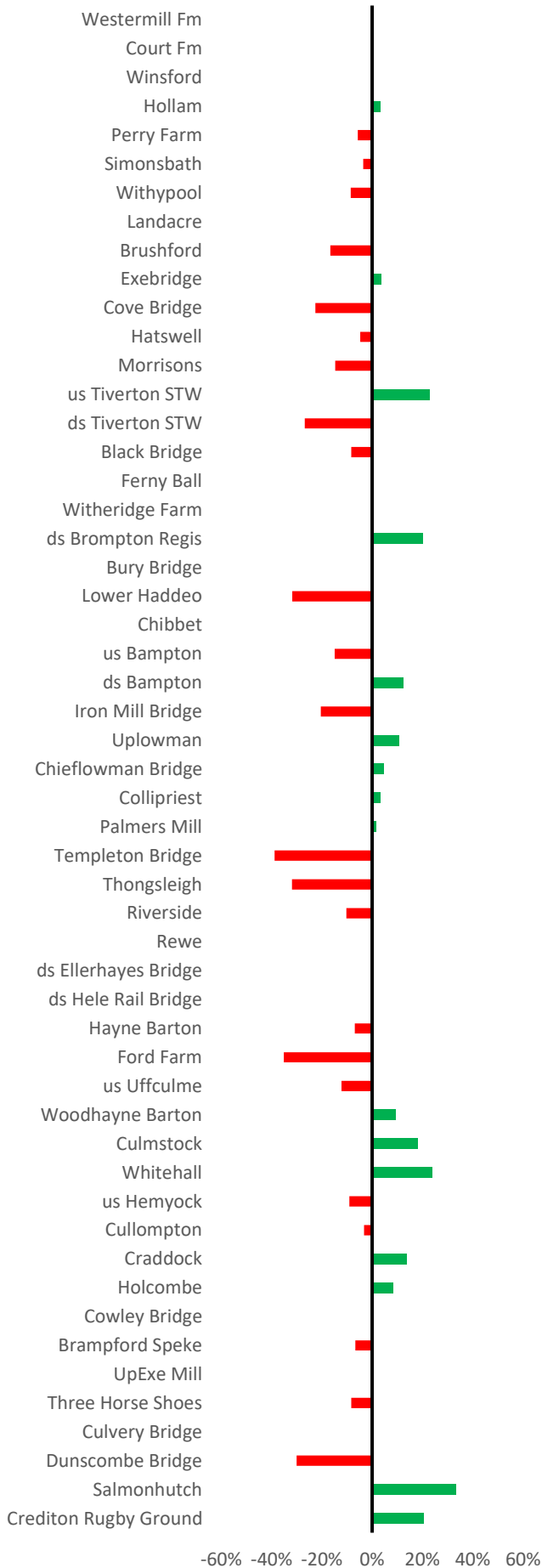
### Spring difference from Average



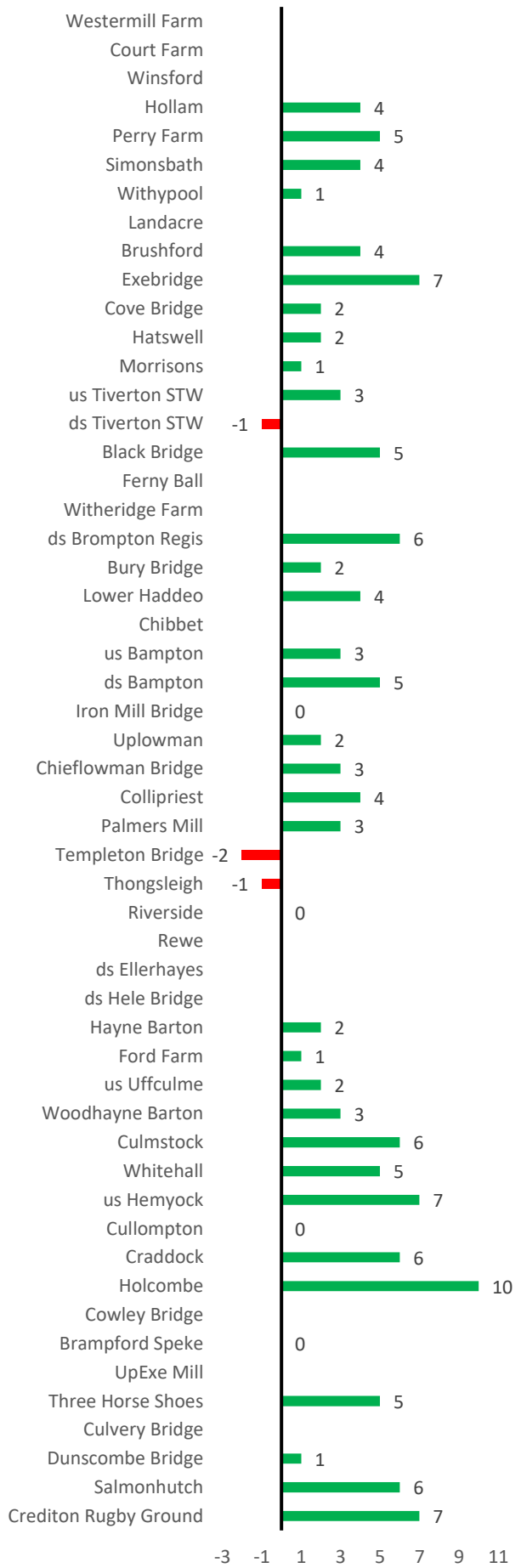
### Spring difference from Trigger



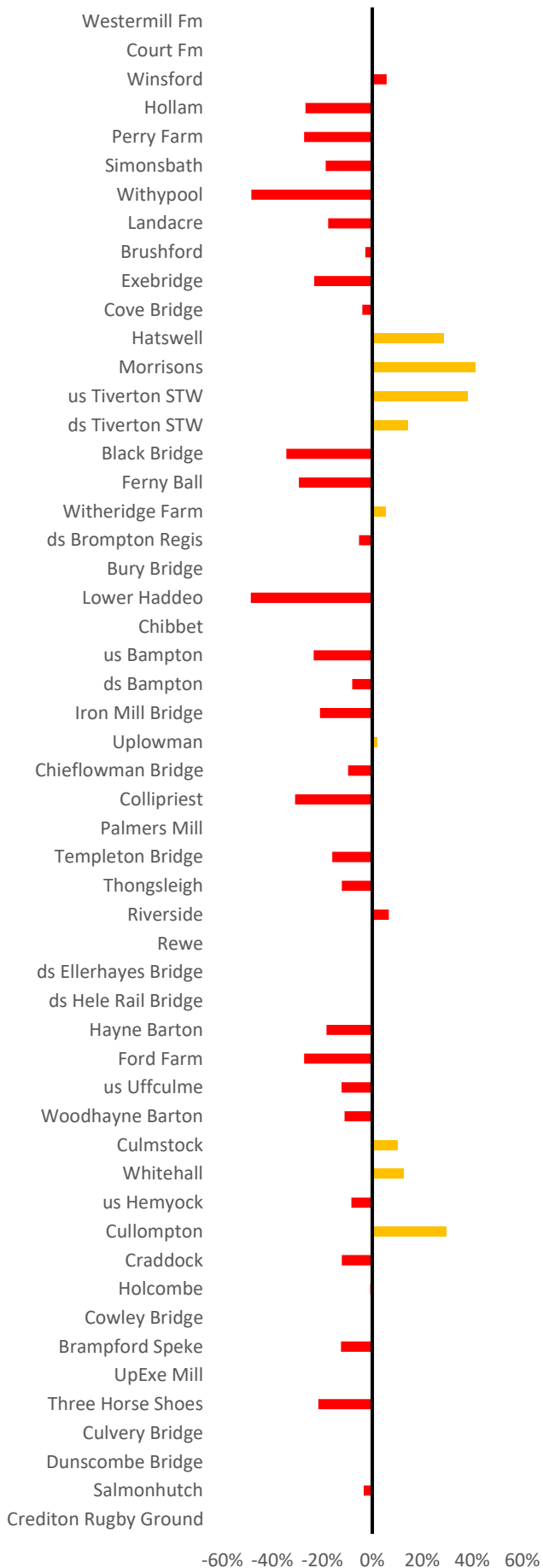
## Summer difference from Average



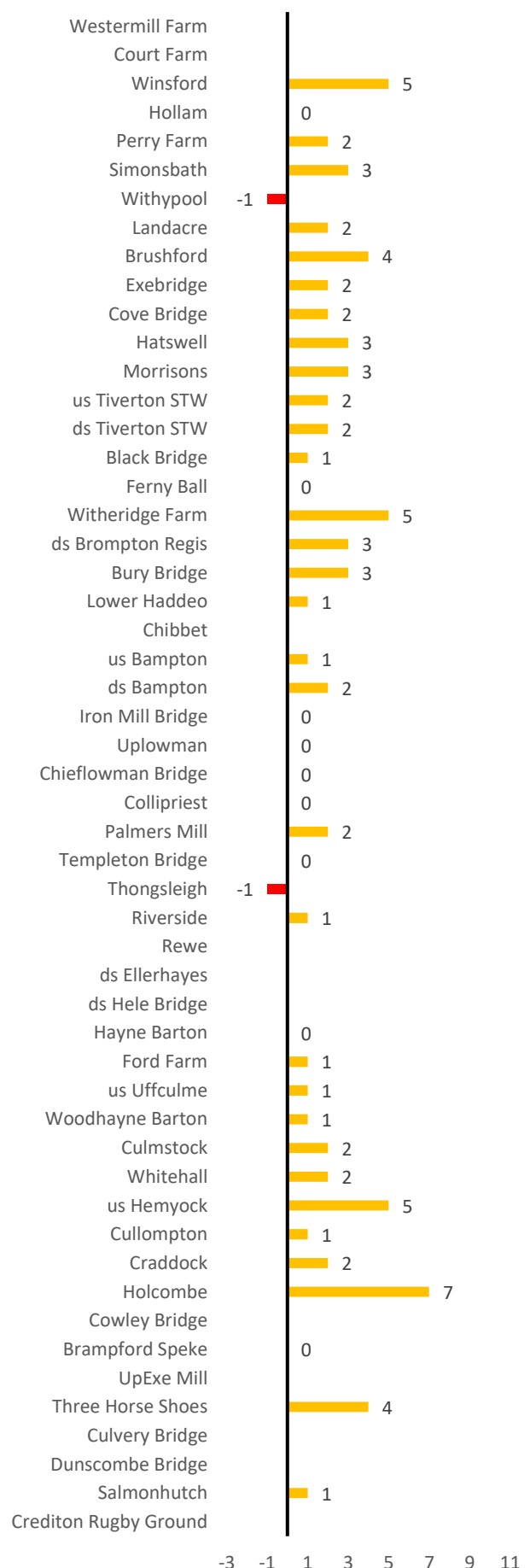
## Summer difference from Trigger



## Autumn difference from Average



## Autumn difference from Trigger





**LITTLE EXE & BARLE**

River	Little Exe	Little Exe	Little Exe	Little Exe	Little Exe
Site	Westermill Farm	Court Farm	Winsford	Hollam	Perry Farm
NGR	SS 82127 39949	SS 85748 38010	SS 90710 34914	SS 93095 29627	SS 93460 26240
Trigger Score	6	6	6	7	6

**Spring**

Date							04-Jun-21		03-Jun-21	
Time							12:00		12:00	
Recorded by	no survey		no survey		no survey		Julian Capps		J Hughes Alan Searle M Williams	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis							10	2	20	2
Caseless Caddis							10	2	10	2
Mayfly							1	1	5	1
BWO										
Flat Bodied H.							40	2	100	3
Olive							20	2	20	2
Stonefly							30	2	150	3
FW Shrimp										
Total Score							11		13	

**Summer**

Date							05-Jul-21		15-Jul-21	
Time							12:00		12:00	
Recorded by	no survey		no survey		no survey		Julian Capps		Alan Searle M Williams	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis							10	2	75	2
Caseless Caddis							5	1	5	1
Mayfly										
BWO							4	1	24	2
Flat Bodied H.							40	2	50	2
Olive							30	2	50	2
Stonefly							30	2	50	2
FW Shrimp							1	1		
Total Score							11		11	

**Autumn**

Date					08-Sep-21		14-Sep-21		15-Sep-21	
Time					11:00		15:00		13:30	
Recorded by	no survey		no survey		Ueli Zellweger		Julian Capps		Alan Searle M Williams	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis					10	2	4	1	3	1
Caseless Caddis					2	1	3	1	2	1
Mayfly										
BWO					8	1				
Flat Bodied H.					11	2	4	1	15	2
Olive					12	2	20	2	50	2
Stonefly					15	2	10	2	50	2
FW Shrimp					4	1				
Total Score					11		7		8	

**LITTLE EXE & BARLE**

River	Barle	Barle	Barle	Barle	
Site	Simonsbath	Withypool	Landacre	Brushford	
NGR	SS 77125 39120	SS 84000 35460	SS 80511 36125	SS 92670 25870	
Trigger Score	5	5	5	6	

**Spring**

Date	22-Jun-21		22-Jun-21		05-Jun-21		03-Jun-21			
Time	11:00		12:45		09:00		12:00			
Recorded by	Alan Barrow		Alan Barrow		Jo Down		J Hughes Alan Searle M Williams			
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	3	1	40	2	10	2	150	3		
Caseless Caddis	2	1	7	1	5	1	5	1		
Mayfly					1	1	1	1		
BWO	45	2	30	2			5	1		
Flat Bodied H.	5	1	15	2	25	2	50	2		
Olive	35	2	60	2	8	1	5	1		
Stonefly			1	1	6	1	30	2		
FW Shrimp										
Total Score	7		10		8		11			

**Summer**

Date	29-Jul-21		29-Jul-21				15-Jul-21			
Time	11:00		12:45		09:00		12:00			
Recorded by	Alan Barrow		Alan Barrow		no survey		Alan Searle M Williams			
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	50	2	6	1			40	2		
Caseless Caddis	1	1					10	2		
Mayfly	1	1								
BWO	60	2	40	2			8	1		
Flat Bodied H.	7	1	4	1			5	1		
Olive	40	2	30	2			40	2		
Stonefly							5	1		
FW Shrimp							1	1		
Total Score	9		6				10			

**Autumn**

Date	14-Sep-21		14-Sep-21		21-Sep-21		15-Sep-21			
Time	13:00		12:15		08:45		14:30			
Recorded by	Alan Barrow		Alan Barrow		Jo Down		Alan Searle M Williams			
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	14	2			3	1	30	2		
Caseless Caddis					10	2	5	1		
Mayfly										
BWO	100	3	50	2						
Flat Bodied H.			25	2	7	1	10	2		
Olive	100	3			30	2	100	3		
Stonefly					4	1	50	2		
FW Shrimp										
Total Score	8		4		7		10			

**MIDDLE RIVER EXE**

River	Exe	Exe	Exe	Exe	Exe
Site	Exebridge	Cove Bridge	Hatswell	Morrison's	us Tiverton STW
NGR	SS 93010 24470	SS 94890 19770	SS 94312 16220	SS 95048 13015	SS 95262 10328
Trigger Score	6	6	6	6	6

**Spring**

Date	03-Jun-21		03-Jun-21		09-May-21		09-May-21		07-Jun-21	
Time	12:00		10:30		16:00		16:00		11:30	
Recorded by	J Hughes M Williams A Searle		Alan Searle		Robert Wightmore		Robert Wightmore		Adrian Howell	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	60	2	10	2	3	1	2	1	4	1
Caseless Caddis	5	1	8	1	1	1	1	1	1	1
Mayfly			3	1	2	1	1	1		
BWO	5	1			1	1	4	1		
Flat Bodied H.	200	3	50	2	50	2	25	2	9	1
Olive	20	2	5	1	10	2	6	1	10	2
Stonefly	50	2	60	2	15	2	20	2	7	1
FW Shrimp							5	1	1	1
Total Score	11		9		10		10		7	

**Summer**

Date	15-Jul-21		17-Jul-21		07-Jul-21		05-Jul-21		28-Jul-21	
Time	12:00		10:30		16:00		16:00		11:30	
Recorded by	M Williams A Searle		Alan Searle		Robert Wightmore		Robert Wightmore		Adrian Howell	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	150	3	2	1					6	1
Caseless Caddis	20	2	2	1	4	1			2	1
Mayfly					1	1			2	1
BWO							4	1		
Flat Bodied H.	100	3	20	2	25	2	20	2	12	2
Olive	100	3	50	2	10	2	4	1	10	2
Stonefly	50	2	75	2	15	2	25	2	2	1
FW Shrimp							2	1	2	1
Total Score	13		8		8		7		9	

**Autumn**

Date	15-Sep-21		17-Sep-21		05-Sep-21		04-Sep-21		22-Sep-21	
Time	15:30		10:00		16:00		15:30		11:00	
Recorded by	M Williams A Searle		Alan Searle		Robert Wightmore		Robert Wightmore		Adrian Howell	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	2	1	2	1	2	1	6	1	12	2
Caseless Caddis	1	1	2	1	4	1	3	1	6	1
Mayfly					3	1	1	1		
BWO	1	1			3	1	3	1		
Flat Bodied H.	3	1	20	2	7	1	4	1	13	2
Olive	15	2	50	2	25	2	2	1	12	2
Stonefly	50	2	75	2	12	2	16	2	6	1
FW Shrimp							2	1		
Total Score	8		8		9		9		8	

**MIDDLE RIVER EXE**

River	Exe	Exe		
Site	ds Tiverton STW	Black Bridge		
NGR	SS 95284 10043	SS 94920 08879		
Trigger Score	6	6		

**Spring**

Date	07-Jun-21		03-Jun-21							
Time	11:30		11:30							
Recorded by	Adrian Howell		Alan Searle							
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	12	2	8	1						
Caseless Caddis	1	1	40	2						
Mayfly	2	1								
BWO										
Flat Bodied H.	12	2	30	2						
Olive	10	2	40	2						
Stonefly	6	1	20	2						
FW Shrimp	4	1	30	2						
Total Score	10		11							

**Summer**

Date	28-Jul-21		17-Jul-21							
Time	11:30		11:30							
Recorded by	Adrian Howell		Alan Searle							
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	1	1	100	3						
Caseless Caddis			1	1						
Mayfly										
BWO										
Flat Bodied H.	4	1	20	2						
Olive	6	1	5	1						
Stonefly	3	1	40	2						
FW Shrimp	6	1	40	2						
Total Score	5		11							

**Autumn**

Date	22-Sep-21		15-Sep-21							
Time	11:30		14:00							
Recorded by	Adrian Howell		Alan Searle							
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	15	2	5	1						
Caseless Caddis	4	1	30	2						
Mayfly	2	1								
BWO										
Flat Bodied H.	6	1	2	1						
Olive	12	2	50	2						
Stonefly			5	1						
FW Shrimp	8	1								
Total Score	8		7							

**EXMOOR NP TRIBUTARIES**

River	Sherdon Water	Quarme	Pulham	Haddeo	Haddeo
Site	Ferny Ball	Witheridge Farm	ds Brompton Regis	Lower Haddeo	Bury Bridge
NGR	SS 80540 36071	SS 92031 35145	SS 95829 30188	SS 93892 26681	SS 94470 27455
Trigger Score	6	7	6	7	7

**Spring**

Date	05-Jun-21				01-Jun-21		24-May-21			
Time	08:30				14:00		11:00			
Recorded by	Jo Down		no survey		Julian Capps		Fred Leach R Butcher		no survey	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	19	2			10	2	12	2		
Caseless Caddis	17	2			20	2				
Mayfly					1	1	7	1		
BWO										
Flat Bodied H.	21	2			40	2	40	2		
Olive	10	2			20	2	30	2		
Stonefly	14	2			20	2	5	1		
FW Shrimp					4	1				
Total Score	10				12		8			

**Summer**

Date					29-Jul-21		14-Jul-21		14-Jul-21	
Time	08:30				14:00		11:00			
Recorded by	no survey		no survey		Julian Capps		Fred Leach R Butcher		R Butcher Fred Leach	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis					6	1	35	2	5	1
Caseless Caddis					4	1	4	1	2	1
Mayfly					1	1	3	1	1	1
BWO					10	2	7	1	5	1
Flat Bodied H.					20	2	15	2	9	1
Olive					40	2	30	2	40	2
Stonefly					4	1	8	1	7	1
FW Shrimp					20	2	9	1	5	1
Total Score					12		11		9	

**Autumn**

Date	21-Sep-21		08-Sep-21		14-Sep-21		13-Sep-21		13-Sep-21	
Time	08:30		11:30		10:00		11:15		10:15	
Recorded by	Jo Down		Ueli Zellweger		Julian Capps		Fred Leach R Butcher		R Butcher Fred Leach	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	7	1	20	2			14	2	15	2
Caseless Caddis	8	1	3	1	10	2	6	1	6	1
Mayfly			2	1	1	1			1	1
BWO			8	1						
Flat Bodied H.	5	1	10	2	8	1	8	1	3	1
Olive	12	2	10	2	30	2	40	2	100	3
Stonefly	1	1	12	2	10	2	8	1	9	1
FW Shrimp			3	1	2	1	1	1	3	1
Total Score	6		12		9		8		10	

**EXMOOR NP TRIBUTARIES**

River	Pennycombe Water				
Site	Chibbet				
NGR	SS 83620 37630				
Trigger Score	7				

**Spring**

Date										
Time										
Recorded by	no survey									
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis										
Caseless Caddis										
Mayfly										
BWO										
Flat Bodied H.										
Olive										
Stonefly										
FW Shrimp										
Total Score										

**Summer**

Date										
Time										
Recorded by	no survey									
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis										
Caseless Caddis										
Mayfly										
BWO										
Flat Bodied H.										
Olive										
Stonefly										
FW Shrimp										
Total Score										

**Autumn**

Date										
Time										
Recorded by	no survey									
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis										
Caseless Caddis										
Mayfly										
BWO										
Flat Bodied H.										
Olive										
Stonefly										
FW Shrimp										
Total Score										

**MIDDLE EXE DEVON TRIBUTARIES**

River	Bathern	Bathern	Iron Mill Stream	Lowman	Lowman
Site	us Bampton	ds Bampton	Iron Mill Bridge	Uplowman	Chieflowman Bridge
NGR	SS 96106 22472	SS 95722 21956	SS 91751 20831	ST 01410 15360	ST 00900 15720
Trigger Score	6	6	7	7	7

**Spring**

Date	18-May-21						11-May-21		11-May-21	
Time	11:00						13:15		12:20	
Recorded by	John Dawson Fred Leach		no survey		no survey		C Roderick Jones		C Roderick Jones	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	3	1					2	1	1	1
Caseless Caddis	3	1							1	1
Mayfly	1	1					3	1	6	1
BWO	2	1							1	1
Flat Bodied H.	70	2					10	2	15	2
Olive	60	2					20	2	30	2
Stonefly	2	1					1	1	5	1
FW Shrimp	15	2					75	2	20	2
Total Score	11						9		11	

**Summer**

Date	08-Jul-21		08-Jul-21		19-Jul-21		05-Jul-21		05-Jul-21	
Time	11:00						13:15		12:20	
Recorded by	John Dawson Fred Leach		John Dawson Fred Leach		Fred Leach		C Roderick Jones		C Roderick Jones	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	1	1	8	1	4	1			3	1
Caseless Caddis	6	1	17	2	2	1				
Mayfly							1	1	1	1
BWO			5	1	4	1	1	1		
Flat Bodied H.	12	2	20	2	4	1	1	1	10	2
Olive	30	2	30	2	5	1	15	2	20	2
Stonefly	1	1	1	1	4	1	10	2	12	2
FW Shrimp	25	2	40	2	1	1	10	2	15	2
Total Score	9		11		7		9		10	

**Autumn**

Date	21-Sep-21		21-Sep-21		01-Oct-21		17-Sep-21		17-Sep-21	
Time	10:30		11:30		11:15		14:30		15:15	
Recorded by	John Dawson Fred Leach		John Dawson Fred Leach		Fred Leach M Werrett		C Roderick Jones		C Roderick Jones	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	2	1	5	1	9	1				
Caseless Caddis					7	1				
Mayfly							1	1	1	1
BWO							1	1		
Flat Bodied H.	5	1	2	1	6	1			3	1
Olive	100	3	100	3	11	2	20	2	25	2
Stonefly	6	1	6	1	3	1	4	1	3	1
FW Shrimp	7	1	30	2	5	1	20	2	30	2
Total Score	7		8		7		7		7	

**MIDDLE EXE DEVON TRIBUTARIES**

River	Lowman	Calverleigh Stream	Dart	Dart	Dart
Site	Collipriest	Palmers Mill	Templeton Bridge	Thongsleigh	Riverside
NGR	SS 95434 12049	SS 93092 14527	SS 87782 14411	SS 91690 10777	SS 9352807676
Trigger Score	7	7	7	7	7

**Spring**

Date	03-Jun-21		09-May-21		18-May-21		12-Jun-21		20-May-21	
Time	12:00		15:00		12:00		12:00		12:00	
Recorded by	Alan Searle		Robert Wightmore		Stephen Powles		Stephen Powles		Stephen Powles	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	5	1	9	1	14	2	16	2	3	1
Caseless Caddis	5	1	1	1	10	2	4	1	3	1
Mayfly			4	1	2	1	2	1	4	1
BWO	5	1	3	1	30	2	24	2		
Flat Bodied H.	20	2	10	2	30	2	48	2	80	2
Olive	8	1	6	1	40	2	40	2	160	3
Stonefly	20	2	4	1	20	2	8	1	4	1
FW Shrimp	100	3	4	1	8	1	20	2	30	2
Total Score	11		9		14		13		11	

**Summer**

Date	17-Jul-21		07-Jul-21		11-Jul-21		10-Jul-21		10-Jul-21	
Time	12:00		15:00		12:00		12:00		12:00	
Recorded by	Alan Searle		Robert Wightmore		Stephen Powles		Stephen Powles		Stephen Powles	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	8	1			3	1	1	1		
Caseless Caddis	5	1	6	1	1	1			2	1
Mayfly			1	1			1	1	3	1
BWO			1	1						
Flat Bodied H.	12	2	30	2	2	1	2	1	5	1
Olive	10	2	25	2	5	1	2	1	36	2
Stonefly	20	2	4	1			1	1	3	1
FW Shrimp	200	3	50	2	2	1	1	1	4	1
Total Score	11		10		5		6		7	

**Autumn**

Date	15-Sep-21		04-Sep-21		05-Sep-21		01-Sep-21		01-Sep-21	
Time	15:00		15:00		12:00		12:00		14:00	
Recorded by	Alan Searle		Robert Wightmore		Stephen Powles Simon Hunt		Stephen Powles Simon Hunt		Stephen Powles Simon Hunt	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	6	1	4	1	5	1	5	1	2	1
Caseless Caddis	2	1	10	2	1	1	1	1	2	1
Mayfly					3	1			1	1
BWO										
Flat Bodied H.	8	1	8	1	8	1	7	1	5	1
Olive	9	1	15	2	8	1	5	1	8	1
Stonefly			6	1	3	1	2	1	15	2
FW Shrimp	200	3	20	2	1	1	2	1	4	1
Total Score	7		9		7		6		8	



**RIVER CULM**

River	Culm	Culm	Culm	Culm	Culm
Site	Rewe	ds Ellerhayes	ds Hele Bridge	Hayne Barton	Ford Farm
NGR	SX 95218 99765	SS 97105 01402	SS 98961 01846	ST 03420 09210	ST 05300 11300
Trigger Score	5	5	5	7	7

**Spring**

Date							27-May-21		26-May-21	
Time							09:30		10:30	
Recorded by	no survey		no survey		no survey		Nigel Nesbitt		Nigel Nesbitt	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis							7	1	4	1
Caseless Caddis							22	2	10	2
Mayfly							10	2	3	1
BWO										
Flat Bodied H.							2	1	8	1
Olive							200	3	50	2
Stonefly							4	1	6	1
FW Shrimp							10	2	7	1
Total Score							12		9	

**Summer**

Date							17-Jul-21		18-Jul-21	
Time							09:30		10:30	
Recorded by	no survey		no survey		no survey		Nigel Nesbitt		Nigel Nesbitt	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis							11	2	5	1
Caseless Caddis							8	1	4	1
Mayfly										
BWO										
Flat Bodied H.							10	2	12	2
Olive							15	2	15	2
Stonefly							6	1	10	2
FW Shrimp							2	1		
Total Score							9		8	

**Autumn**

Date							14-Sep-21		09-Sep-21	
Time							12:00		14:15	
Recorded by	no survey		no survey		no survey		Nigel Nesbitt		Nigel Nesbitt	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis							2	1	3	1
Caseless Caddis							4	1	11	2
Mayfly										
BWO										
Flat Bodied H.							4	1	5	1
Olive							10	2	25	2
Stonefly							2	1	2	1
FW Shrimp							6	1	6	1
Total Score							7		8	

**RIVER CULM**

River	Culm	Culm	Culm	Culm	Culm
Site	us Uffculme	Woodhayne Barton	Culmstock	Whitehall	us Hemyock
NGR	ST 07125 12775	ST 09510 13640	ST 10430 13620	ST 12749 13905	ST 14729 13905
Trigger Score	7	7	7	7	7

**Spring**

Date	27-May-21		26-May-21		27-May-21		19-May-21		30-May-21	
Time	12:00		09:15		14:30		17:00		15:00	
Recorded by	Alan Dodds Mark Couldrick		Nigel Nesbitt		Alice Sumption Mark Couldrick		Richard Horrocks		Chris Morter	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	5	1	12	2	9	1	12	2	5	1
Caseless Caddis	10	2	14	2	101	3	2	1	15	2
Mayfly			6	1	2	1	11	2	25	2
BWO	20	2							70	2
Flat Bodied H.	10	2	5	1	10	2	6	1	35	2
Olive	100	3	100	3	100	3	20	2	240	3
Stonefly	15	2	5	1			20	2	330	3
FW Shrimp	15	2	50	2	100	3	2	1	65	2
Total Score	14		12		13		11		17	

**Summer**

Date	21-Jul-21		17-Jul-21		14-Jul-21		15-Jul-21		18-Jul-21	
Time	12:00		09:15		14:30		17:00		15:00	
Recorded by	Alan Dodds Mark Couldrick		Nigel Nesbitt		Richard Preston Alice Sumption Mark Couldrick		Richard Horrocks Penny Price		Chris Morter	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	10	2	12	2	10	2	20	2	2	1
Caseless Caddis	10	2	3	1	10	2	3	1	35	2
Mayfly							1	1		
BWO							2	1	8	1
Flat Bodied H.	20	2	14	2	10	2	30	2	110	3
Olive	5	1			100	3	80	2	20	2
Stonefly			10	2	5	1	80	2	200	3
FW Shrimp	10	2	200	3	100	3	7	1	60	2
Total Score	9		10		13		12		14	

**Autumn**

Date	06-Sep-21		14-Sep-21		21-Sep-21		06-Sep-21		08-Sep-21	
Time	11:00		10:00		14:00		13:00		10:00	
Recorded by	Richard Horrocks		Nigel Nesbitt		Richard Preston Alice Sumption		Richard Horrocks		Chris Morter	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	6	1	10	2	1	1	4	1	1	1
Caseless Caddis	4	1	8	1	5	1	3	1	9	1
Mayfly							2	1	9	1
BWO									7	1
Flat Bodied H.	7	1	4	1			2	1	30	2
Olive	50	2			100	3	100	3	70	2
Stonefly	20	2	8	1	1	1	1	1	75	2
FW Shrimp	6	1	300	3	100	3	2	1	15	2
Total Score	8		8		9		9		12	

**RIVER CULM TRIBUTARIES**

River	Spratford Stream	Sheldon Stream	Madford River		
Site	Cullompton	Craddock	Holcombe		
NGR	ST 02570 07706	ST 08730 12370	ST 14723 12970		
Trigger Score	6	7	7		

**Spring**

Date	19-May-21		19-May-21		30-May-21					
Time	18:30		18:00		16:00					
Recorded by	Richard Horrocks		Richard Horrocks		Chris Morter					
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	2	1	3	1	12	2				
Caseless Caddis			2	1	15	2				
Mayfly	1	1	23	2	14	2				
BWO					40	2				
Flat Bodied H.			20	2	70	2				
Olive	5	1	50	2	40	2				
Stonefly	2	1	50	2	60	2				
FW Shrimp	2000	4	5	1	70	2				
Total Score	8		11		16					

**Summer**

Date	16-Jul-21		10-Jul-21		18-Jul-21					
Time	18:30		18:00		16:00					
Recorded by	Richard Horrocks		Richard Horrocks Dominic Acland		Chris Morter					
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis			4	1	110	3				
Caseless Caddis			4	1	15	2				
Mayfly			3	1						
BWO			1	1	25	2				
Flat Bodied H.			100	3	120	3				
Olive	3	1	50	2	90	2				
Stonefly	2	1	50	2	80	2				
FW Shrimp	1500	4	10	2	110	3				
Total Score	6		13		17					

**Autumn**

Date	08-Sep-21		06-Sep-21		08-Sep-21					
Time	19:00		12:00		11:00					
Recorded by	Richard Horrocks		Richard Horrocks		Chris Morter					
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis					9	1				
Caseless Caddis	1	1	4	1	17	2				
Mayfly			2	1	1	1				
BWO			4	1	30	2				
Flat Bodied H.			12	2	3	1				
Olive	12	2	50	2	280	3				
Stonefly					85	2				
FW Shrimp	1000	4	10	2	90	2				
Total Score	7		9		14					

**LOWER EXE**

River	Exe	Exe	Exe		
Site	Cowley Bridge	Bramford Speke	UpExe Mill		
NGR	SX 90823 95300	SX 92885 98398	SS 93826 02545		
Trigger Score	7	7	7		

**Spring**

Date			07-Jun-21							
Time			14:15							
Recorded by	no survey		Adrian Howell		no survey					
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis			10	2						
Caseless Caddis			6	1						
Mayfly			7	1						
BWO										
Flat Bodied H.			12	2						
Olive			12	2						
Stonefly			6	1						
FW Shrimp			4	1						
Total Score			10							

**Summer**

Date			28-Jul-21							
Time			14:15							
Recorded by	no survey		Adrian Howell		no survey					
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis			8	1						
Caseless Caddis			2	1						
Mayfly			4	1						
BWO										
Flat Bodied H.			11	2						
Olive			8	1						
Stonefly			2	1						
FW Shrimp										
Total Score			7							

**Autumn**

Date			22-Sep-21							
Time			13:30							
Recorded by	no survey		Adrian Howell		no survey					
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis			8	1						
Caseless Caddis										
Mayfly										
BWO										
Flat Bodied H.			10	2						
Olive			10	2						
Stonefly			4	1						
FW Shrimp			6	1						
Total Score			7							

**CREEDY YEO**

River	Creedy	Culvery	Yeo	Yeo	Creedy
Site	Three Horse Shoes	Culvery Bridge	Dunscombe Bridge	Salmonhutch	Crediton Rugby Ground
NGR	SX 90715 96207	SX 83346 98597	SX 86071 99107	SX 82716 98876	SS 84795 00950
Trigger Score	6	6	6	6	6

**Spring**

Date	31-May-21				03-Jun-21				03-Jun-21	
Time	12:00				12:00				12:00	
Recorded by	Ben Dymoke-Marr		no survey		Martin Davies		no survey		Martin Davies	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	15	2			2	1			3	1
Caseless Caddis	5	1			2	1				
Mayfly	20	2								
BWO	15	2			30	2			5	1
Flat Bodied H.	40	2			4	1			110	3
Olive	2	1			200	3			300	3
Stonefly	100	3			30	2			6	1
FW Shrimp	20	2							120	3
Total Score	15				10				12	

**Summer**

Date	21-Jul-21				26-Jul-21		21-Jul-21		26-Jul-21	
Time	12:00				12:00				12:00	
Recorded by	Ben Dymoke-Marr		no survey		Martin Davies		Ben Dymoke-Marr		Martin Davies	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	4	1					5	1	2	1
Caseless Caddis	10	2			4	1	5	1	3	1
Mayfly	10	2			6	1			10	2
BWO					4	1	10	2	2	1
Flat Bodied H.	3	1			6	1	1	1	30	2
Olive	3	1			12	2	100	3	100	3
Stonefly	10	2					10	2	8	1
FW Shrimp	10	2			4	1	10	2	40	2
Total Score	11				7		12		13	

**Autumn**

Date	12-Sep-21						10-Sep-21			
Time	12:00						12:00			
Recorded by	Ben Dymoke-Marr		no survey		no survey		Ben Dymoke-Marr		no survey	
	Count	Score	Count	Score	Count	Score	Count	Score	Count	Score
Cased Caddis	1	1								
Caseless Caddis	10	2					5	1		
Mayfly	4	1								
BWO							5	1		
Flat Bodied H.	3	1								
Olive	10	2					50	2		
Stonefly	10	2					10	2		
FW Shrimp	8	1					5	1		
Total Score	10						7			

## APPENDIX 1

### ARMI Ecology Notes from the Riverfly Partnership website

#### Caddisflies or Sedges (Trichoptera)

Adult caddisflies are moth-like but have hairy wings rather than scales. They hold their wings like a tent or roof over their bodies when at rest.

##### *Life cycle*

There are four stages in the life cycle: egg, larva, pupa, adult. They complete their life cycle within one year.

**Cased caddis.** The larvae of most caddisflies live in cases which they build out of their surroundings, usually either from plant material or stones. The material used for the case or the way the case is constructed often provides a good clue to which family of cased caddis the larva belongs. Some cling fast to large stones in the fast-flowing sections of rivers, while others are confined to the slower flowing or vegetated parts of the river. The larvae of many species browse algae from the surface of stones and plants, and others shred vegetation. Larvae of cased caddis are extremely or moderately sensitive to pollution depending on family.

**Caseless caddis.** The larvae of some families of caddisfly do not build hard cases. Instead some are free-living predators, while others construct silk webs which they use to filter out organic matter or prey items from the current, which they then consume. Some consume rotting wood, in which they make galleries. Most live in the moderate to fast-flowing stretches of rivers where they are found under stones or amongst vegetation. They are moderately sensitive to pollution.

#### Up-winged Flies (Ephemeroptera)

So-called because the adults hold their wings vertically above their bodies when at rest.

##### *Life cycle*

Up-winged flies are unique amongst insects in having two winged stages (the subimago and the imago).

There are three stages in the life cycle: the egg, the larva (which includes the subimago) and the adult. There is no pupal stage. Adult Up-winged flies have no mouthparts and so are unable to feed. For this reason, they rarely live for more than a few days as adults.

The larvae browse algae and bacteria from the surface of stones and plants.

**Mayfly** (Ephemeridae) is the largest of the British Up-winged flies. The larvae usually take 2 years to complete development. They live partially buried in fine silts and sand in slower flowing stretches of the river. They are sensitive to pollution.

**Blue-winged olive** (Ephemerellidae) is a small up-winged fly that is usually found amongst vegetation in the faster flowing sections of rivers. One year is needed to complete development. During the autumn and winter, they almost all overwinter in the egg stage and so do not usually occur in kick samples. Very few overwinter as larvae. It is very sensitive to pollution and siltation.

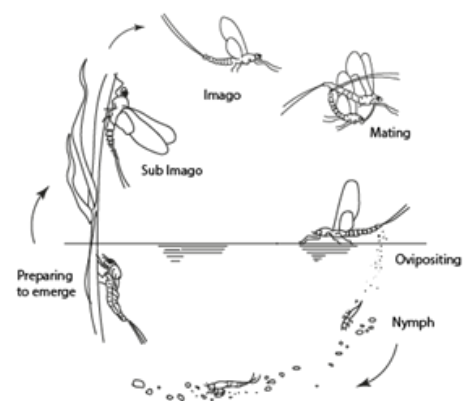


Figure 1 Lifecycle of the Mayfly. Original image: Peter Hallam

**Flat-bodied up-wing** (Heptageniidae) has moderate to large larvae that occur in fast-flowing stretches of rivers and can be found clinging to large stones. They take one year to complete their development. They are extremely sensitive to pollution.

**Olive** (Baetidae) has small to moderately sized larvae that occur in moderate to fast-flowing stretches of the river, often amongst vegetation or under large stones. Some species can complete development within a few months, but some take one year, and adults may occur year-round. Most species are highly sensitive to pollution, but some of the common species are only moderately sensitive to pollution.

**Stoneflies** (Plecoptera)

So-called because the larvae are usually found crawling over stones on the river bed.

*Life cycle*

There are three stages to the life cycle: egg, larva, adult.

The larvae are moderate to large. The smaller species are usually found in slow to moderately fast rivers especially in the lowlands and southern England, while the large larvae occur in fast flowing rivers, especially in the uplands and northern Britain. The small species take one year to complete development, whereas the large larvae may take several years to complete development. The larvae of the large species are carnivorous, whereas the smaller species browse algae and bacteria from the surface of plants and stones, and some shred vegetation. They are mostly extremely sensitive to pollution. There are some that are highly tolerant of acidic and metal rich mine waters.

**Freshwater shrimp** (*Gammarus*)

These are crustaceans with a three-stage life cycle: egg, larvae, adult. They live in moderate to fast-flowing water. They shred plant matter and can be extremely abundant amongst leaf litter and woody debris. They are moderately sensitive to pollution but are very intolerant of pesticides.

**ARMI Eight: Sensitivities, Habitat and Diet**

Cased and caseless caddises have been omitted from the table below as their sensitivities are highly variable between species.

✓ - tolerant    ▶ - medium tolerant    ✗ - intolerant

	Slow Flow	Nutrient Enrichment	Sedimentation	Acidification
Mayfly	✓	✗	✓	✗
Blue Winged Olive	✗	✗	✗	✗
Flat Bodied Up Wing	✗	✗	✗	✗
Olive	▶	✓	✗	✗
Stonefly	▶	✗	▶	✓
Gammarus	✓	▶	✗	✗

Riverfly	Habitat
Cased Caddis	Depending on species- Still and slow flowing lakes, rivers and streams, ponds and ditches
Caseless	Depending on species- Fast flowing rivers and streams, lakes ponds rivers and streams
Mayfly	Lakes to fast flowing rivers. Burrows into substrate
Blue Winged Olive	Fast flowing streams and rivers
Flat Bodied Up Wing	Fast flowing water
Olive	Running and still water
Stonefly	Running water or still waters
Gammarus	Most water bodies but rarely in acid waters

Riverfly	Diet
Cased Caddis	Depending on species - Plant matter, algae, sometimes small invertebrates - herbivorous and detritus
Caseless	Depending on species - omnivores, predatory detritus or herbivorous
Mayfly	Filter feeder
Blue Winged Olive	Algae and detritus
Flat Bodied Up Wing	Algal grazer
Olive	Algae and detritus
Stonefly	Predator or detritus
Gammarus	Omnivores

### Understanding your ARMI Sample Further

*Gammarus* and chironomids tend to increase when organic matter increases. They are often found in greater numbers above dams for example, where organic matter is trapped.

Figure 2 Chironomid larvae.  
Photo: Tom Koerner/USFWS



Heavy rainfall can increase flow and wash away riverflies temporarily. It can also introduce riverflies from much further upstream- introducing riverflies that might not normally be encountered.

Blue-Winged Olives are rarely found in Autumn - Winter. They over winter in the egg stage, so you will often see an increase in size and abundance in Spring- Summer.

A decline in *Gammarus* can indicate acidification. If a decline in *Gammarus* is accompanied with an increase in BWO then the decline is more likely to be due to a decrease in organic matter, and indicates that the river is returning to more favourable conditions.

Figure 3 *Gammarus* infected with *Pomphorynchus*  
Photo: David Gardner



*Gammarus*- observed with a yellow or orange mass can be an indication of the parasites *Polymorphus* or *Pomphorhynchus*.



Figure 4

Left: Male and female *gammarus* in precopulatory amplexus. Photo: Dr David W Sutcliffe.  
Right: Male and female hoglouse

*Gammarus* and hoglice both engage in 'precopulatory amplexus' as part of their mating. This is where the male will carry the female for a number of days before she moults and mating can occur. During this stage they will swim and eat together, the male is the larger of the two.





## From the Team

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A huge welcome to the Autumn 2021 Riverfly Partnership Newsletter - what an unusual year it has been for us all. Since our last issue in September 2019, we have seen the onset of a global pandemic, several periods of lockdown, and unimaginable losses. We hope that you, our valued volunteers, and your families have kept well during this time, and our heartfelt condolences go to anyone that has lost a loved one to Covid-19. We cannot thank you enough for your continued efforts and support toward the Riverfly Monitoring Initiative in such unprecedented circumstances. Despite the pandemic, our volunteers have persevered to deliver some amazing results.

### In this issue:

- From the Team
- ARMI in Lockdown
- Online Training
- Extended and Urban Riverfly Launch Update
- New Features

From January 2020 to July 2021, you have:

- Uploaded **3778** records to the ARMI database.
- Captured information from **757** sites, in **349** rivers, across **105** catchments.
- Highlighted **197** trigger level breaches.



We are absolutely thrilled with this progress and cannot thank you enough! Keep up the fantastic work.

During the pandemic, we have been convening with hub coordinators and tutors to deliver our training in a way that is safe and accessible for all. If you completed your training this year, you would know that a large portion of the theory material was delivered online, along with the end-of-study test. This format has worked very well, with over 500 tests being taken since the online material was released. We would like to thank all of our coordinators and tutors for their flexibility and continued enthusiasm while running with this new format! Read more on page 2.

At the end of this Summer, Ben Fitch sadly left his position as Riverfly Project Manager. After 7 years with Riverflies, we know many of you will be as sorry to see him go as we are. Ben was keen to express his gratitude to each and every person who has been involved in ARMI, the Riverfly Partnership and Riverfly Plus over the years. Having met so many wonderful and committed people in his time, he has decided to stay on as a Riverfly volunteer. Thank you Ben for all your hard work. Alex Domenge has now undertaken the role of Riverfly Partnership Coordinator, and is joined in this role by Naomi Lumsden. Naomi is a keen bug-enthusiast, and is excited to be a part of the team!



## Riverfly Monitoring Initiative in Lockdown

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While a national lockdown halted the invertebrate monitoring efforts of the Environment Agency, the guidelines set out by the government for Covid-19 did allow our volunteers to continue surveying, if they felt comfortable to do so. We were amazed to find that between 16th March and 31st August 2020, our volunteers collected **886 records** from 183 different rivers. This data not only filled gaps in Environment Agency monitoring, but also identified 36 trigger breaches in that time. You can now view our [storymap](#) of monitoring during this period.



## Online ARMI Training

The online option for training was released at the end of May this year and we have received some [good feedback](#). To date the video has been watched 750 times, and the test has been completed 534 times by 397 people. The theory guide is available to all trained monitors. We are glad to have been able to provide a new item in the toolkit for all our ARMI participants.

The guide, methodology and testing was completed with the help of many partners; monitors, agency contacts and tutors all of whom played an integral role. We wish to give special thanks to Alan Dickson, Stuart Crofts, Simon Stebbings, Katherine Ryan, Rebecca Lewis, James Morgan and Judith Milner.



ARMI Monitoring Method: Kicksampling and Identification

▲ Tutor Stuart Crofts in the ARMI online training video.

## Urban Riverfly Update

We are gearing up to release the Urban Riverfly in Spring. In preparation for this we will be reviewing our data to find areas that will be well suited to [Urban Riverfly](#). These will be waterways with sites that have trigger levels at 5 or lower, or groups that only record baetid and gammarus. Urban Riverfly training will cover ARMI training, so in the future new groups will be able to get started with both ARMI and Urban Riverfly should they wish to.

We thank Nicola Edgar of the Environment Agency who came up with the idea and developed the methodology and scheme alongside Jess Andrews of the Environment Agency.

◀ Urban Riverfly Scheme Pilot volunteers. Photo: Nicola Edgar

## Extended Riverfly Update

We hope to have the [Extended Riverfly](#) option available this coming Spring. The [ID Chart](#) has been released, at £10 per copy, and we are happy to say it been very popular so far. The guide has been designed as a stand-alone item that allows for bankside identification of 33 groups, and some evaluations based on what you find. A pilot was conducted earlier this month, and the online training option is being finalised.

We wish to thank John Davy-Bowker of the FBA, Angus Menzies of the Dorset Wildlife Trust, Richard Chadd of the Environment Agency, Will Bartle of the Lincolnshire Chalk Streams Project and Phoebe Shaw Stewart of ZSL who created the training material and methodology.



The Extended ID Chart is available now. Photo: Mark Battista. ▶





## New Features

We have been working to provide you with great new features over at the [Riverflies website](#). Recently launched, the [Riverfly Plus interactive](#) page gives an insight into the factors that affect river health, both positively and negatively, and introduces the projects within the Riverfly Plus family that deal with these factors.

### Riverfly Plus

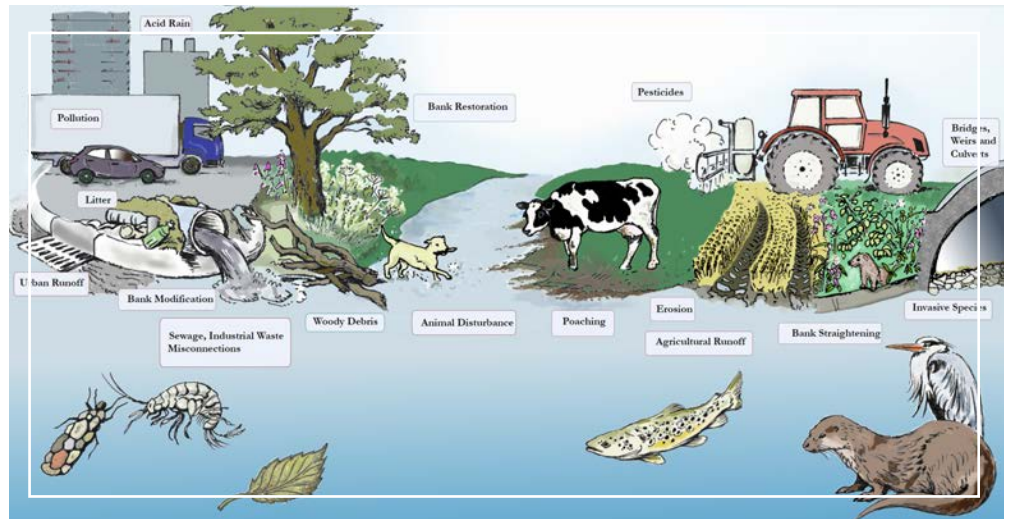
**ZSL**  
LET'S WORK  
FOR WILDLIFE

**Modular River Survey**

**earthwatch**  
EUROPE



Salmon & Trout  
Conservation  
KEEPING OUR WATERS WILD • EST 1903



We have also uploaded an up to date [trigger level setting guide](#) for the benefit of our coordinators and keen volunteers. You can now also find the option to 'Enter a Site' under the coordinator menu on the website - this is a quick and easy option for getting accepted sites put into the database.

## Richard Chadd



It is with deep sadness that we must inform you that one of the great supporters of the Riverfly Partnership, Richard Chadd, has died. Richard had initially started out undertaking training as a medical doctor but quickly realised that the natural world was more his thing. Richard worked as a biologist for the Environment Agency's Eastern Region. He was an expert freshwater ecologist and taxonomist who freely and cheerfully lent his expertise to specialists and non-specialists alike – he was passionate about training and encouraging people and students in freshwater ecology. He quickly saw the strength and potential of the Riverfly Partnership in enabling citizen scientists to provide robust evidence on water quality through the Anglers' Riverfly Monitoring Initiative and worked endlessly within the Environment Agency to promote the use of citizen science and the Riverfly initiative. He was an active member of the Riverfly Partnership Board, who kept the project to a high scientific standard, and was able to provide a vital perspective on how ARMI could be viewed with advantage by the Environment Agency. Most recently he put his energies into the development of the Extended Riverfly Scheme, which he trialled with volunteers in Lincolnshire, and guided it forward for its launch to the wider Riverfly community next year. Richard will be sorely missed by all of us, but his legacy will continue through the activities of ARMI volunteers drawing on the knowledge that he contributed.