Chew Catchment Riverfly Monitoring Summary Report Version 1.0

July 2025

Summary

Bristol Avon Rivers Trust (BART) secured funding to deliver SmartRivers macro-invertebrate monitoring on the River Chew annually between 2019 and 2024. Led by WildFish, SmartRivers is a citizen science programme that uses species-level macro-invertebrate sampling to assess water quality and identify the types of pollutants impacting river health – to a similar standard as the Environment Agency.

BART collected samples at five monitoring sites along the River Chew. The purpose of the monitoring was to establish a baseline data set of the macro-invertebrate communities present in the river Chew, to monitor any changes to these macro-invertebrate communities over time and to identify the main pressures impacting on the different sections of river.

BART is also the Bristol Avon Riverfly hub for the Riverfly Monitoring Initiative (RMI). The RMI uses citizen science to get people out and about on their local river, enjoying the natural environment and sampling for riverflies. The scheme is supported by the Riverfly Partnership and more info can be found on their website here: http://www.riverflies.org/rp-riverfly-monitoring-initiative.

BART volunteers have eight active sites in the Chew catchment – five on the river Chew, one on the Chew Stoke Stream, one on the Hollow Brook and one on the Compton Dando Stream as well as six sites with historic data that are not currently monitored.

This report covers the findings of the Chew catchment SmartRivers and RMI surveys. Figure 1 below shows the locations of the SmartRivers and RMI sites in the Chew catchment.
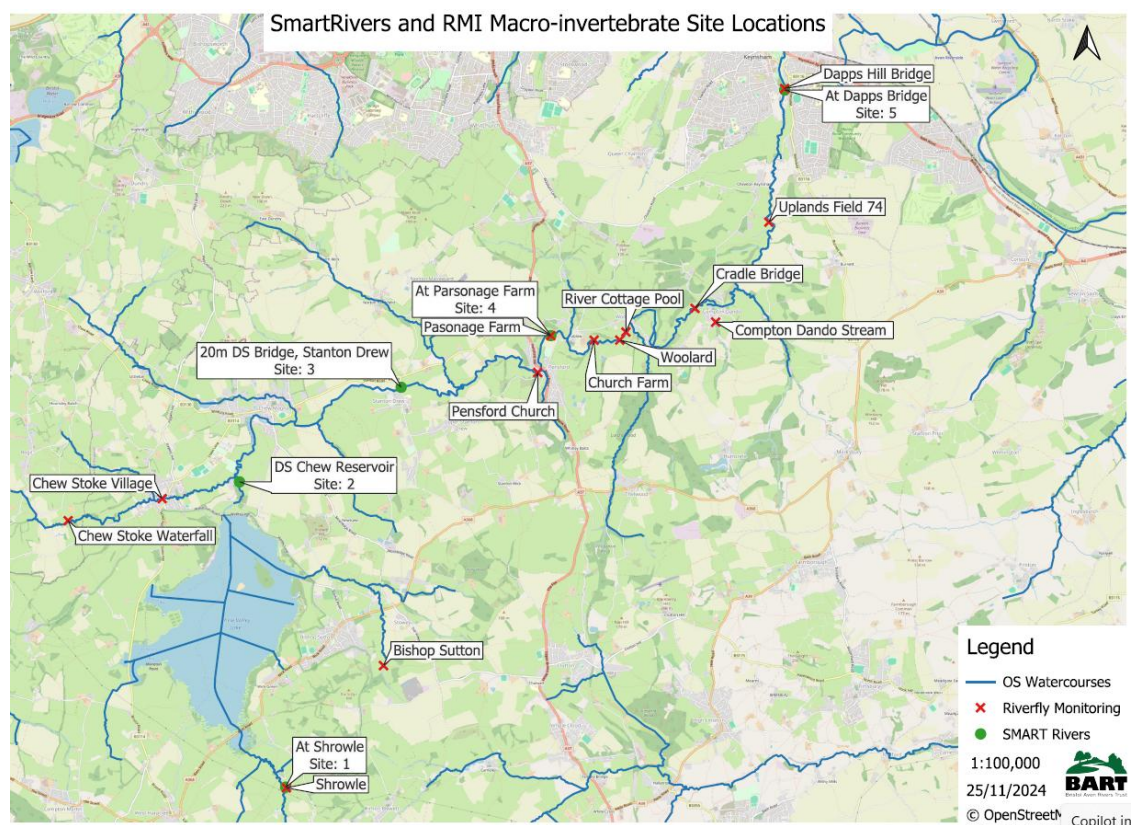
Figure 1 – Map of SmartRivers and RMI sites on the Chew

Findings: SmartRivers macro-invertebrate assemblages

The macro-invertebrate surveys found a variety of taxa at the five sites including cased caddisflies, caseless caddisflies, stoneflies, mayflies, beetles, fly larvae, freshwater shrimps and worms. The diversity of macro-invertebrates found varied between sites and sometimes seasons, from excellent to very poor.

Site 1 (most upstream reach located at Shrowle), Site 3 (Stanton Drew) and Site 4 (Parsonage Farm, Woolard) had Biological Monitoring Working Party (BMWP) scores from all samples that indicated good or excellent water quality (with the exception of autumn 2023 at Site 1 which scored Moderate, probably as a result of poor sampling due to very high river flows). BMWP is a procedure for measuring water quality using species of macro-invertebrates as biological indicators in which the method is based on the principle that different aquatic invertebrates have different tolerances to pollutants. The highest BMWP score was at Site 4 (Parsonage Farm) in spring 2022. Site 2 (DS Chew Reservoir) had lower BMWP scores than all the other sites which indicated moderate to poor water quality, with the exception of spring 2021 when the BMWP score was higher, indicating good water quality. Site 5 (Dapps Bridge) had BMWP scores that indicated good or excellent water quality with the exception of autumn 2020 when the BMWP score was much lower, indicating a potential water quality issue during this season.

Number of Scoring Taxa (NTaxa) scores were very variable between sites, indicating limited habitat availability at some of the sites; particularly at Site 2 (DS Chew Reservoir) and Site 5 (Dapps Bridge). The lowest NTaxa scores were at Site 2 (DS Chew Reservoir). The notes recorded at the time of sampling show that although there was a range of different flow types available at the site including pool, run and slack flow types, the site was mainly a very slow run habitat with very sluggish, ponded flow and high levels of silt – above 65%. The site was also very heavily shaded. These features provide very poor habitat variation for macro-invertebrates to colonise and are likely to be restricting the macro-invertebrate assemblages at this location.

There were no obvious trends in the biological indices over the years, however most scores in all samples were much higher in the spring samples compared to the autumn samples, suggesting greater pressures on the macro-invertebrate communities in autumn.

It should be noted that the catchment suffered from drought conditions in summer 2022 and the impact of the summer low flows could have had a detrimental effect on the macro-invertebrate assemblages recorded in the autumn 2022 samples. Sites 2, 3 and 4 showed a concerning drop in scores between spring 2022 and autumn 2022, potentially a result of the summer drought conditions.

High flows made it difficult to sample in autumn 2023 and as a result there was no autumn 2023 sample taken at Parsonage Farm as this site can be very deep. Although sampling was undertaken at Shrowle in November 2023 the flows were very high making sampling very difficult and the scores from this sample are uncharacteristically low and should be treated with caution.

Findings: SmartRivers Pressure Analysis

The SmartRivers database pressure analysis undertaken by WildFish looked at the macro-invertebrate communities found in each of the surveys and calculated which of the following pressures were impacting most on each of the sites: chemicals, nutrients "phosphate (P)", organics, flow and siltation.   The Chew SmartRivers results were very variable between sites and even samples. The pressure of most consistent concern at all the sites with the exception of Site 1 (at Shrowle) was siltation. Table one, below, shows the Chew SmartRivers results for siltation. Excessive sediment caused by anthropogenic factors is detrimental to the water quality and ecology of a watercourse, including fish and invertebrates. Impacts on macro-invertebrates include the clogging of gills and the destruction of suitable habitats.

No.	Site Name	Siltation (PSI)								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	UI	UI / SI	SI	UI	SI	SI	SI	MI	UI
2	DS Chew Reservoir	HI	I	I	HI	HI	HI	HI	I	HI
3	20m DS Bridge at Stanton Drew	SI / MI	MI	MI	MI	SI	MI	MI	MI	UI
4	Parsonage Farm	MI	MI	SI	MI/I	MI	I	MI	No sample	MI
5	Dapps Bridge	I	I	SI	SI	SI	MI	SI	MI	No score

Table 1 – Chew Siltation Table

Acronym	Rating
HI	Heavily Impacted
I	Impacted
MI	Moderately Impacted
SI	Slightly Impacted
UI	Unimpacted

Table 2 – Pressure Ratings Key

The pressures of least concern at all the sites (with the exception of site 2 which showed concerning impact from all the pressures) were organics and flow. Sites 1, 3, 4 and 5 showed little or no impact from organics and flow since 2019.

The site with least pressures exhibited by the macro-invertebrate communities was Site 1 (at Shrowle). All pressure ratings at Site 1 were good or above (with the exception of the high flow sample in autumn 2023), indicating that no considerable pressure was exhibited by the macro-

invertebrate communities there. Site 1 is located the furthest upstream of all the Chew SmartRivers sites, it is closest to the source of the river and is located upstream of Chew Valley Reservoir.

Site 2 (DS Chew Reservoir) had the greatest pressures exhibited by the macro-invertebrate communities. The pressure ratings at Site 2 indicated that there is severe sediment, flow, organics and nutrient "P" issues at this site. Pesticide ratings were also extremely concerning in 2019, 2020 and 2023; the 2021 and 2022 scores did not show any chemical impact at all. The pressure ratings and the biological indices together suggest that in this location the river is severely impacted by a number of pressures, resulting in a very restricted macro-invertebrate community. The location of Chew Valley Reservoir upstream, the concrete compensation flow weir directly above the site, a large weir downstream of the riverfly monitoring point, and livestock encroachment are all likely to be contributing to the pressures on the River Chew at Site 2.

The macro-invertebrate communities at Sites 3 (Stanton Drew), 4 (Parsonage Farm) and 5 (Dapps Bridge) indicated that the Chew in these locations is impacted by a variety of different pressures, some seasonal.

Site 3 macro-invertebrate communities suggest that pressure from siltation and chemicals are of most consistent concern at this site whilst nutrients "P" could be having a significant seasonal impact. The land use upstream of Stanton Drew is mainly agricultural. Run off from arable and pastoral fields are likely to be having an impact on the water quality at the Stanton Drew site.

The macro-invertebrates at Site 4 suggest that pressure from siltation and nutrients "P" are of most concern at this site, potentially exacerbated in autumn time. Again, it is likely that run off from arable and pastoral fields are likely to be having an impact on the water quality at the Parsonage Farm site. The regular data collected by the Riverfly Monitoring Initiative volunteer at this site also suggests that Bristol Water's compensation seasonal release pattern could potentially be impacting both the fish life and the wider ecology of the river Chew at this location, particularly during drought conditions over the period of this assessment.

The macro-invertebrates at Site 5 suggest that siltation is likely to be having the greatest impact on the macro-invertebrates with recurring issues from chemicals which should be further examined. The Dapps Hill Bridge site is located towards the downstream extent of the river Chew, approximately 500m upstream of the large weir in Keynsham Memorial Park, but upstream of the impounded sluggish flow conditions. The weir appears to have a detrimental impact on the River Chew by backing up water over a considerable distance, leading to slow flows and sediment accumulation. Although the river begins to return to a more natural state at the Dapps Bridge site, the weir may still be negatively affecting the watercourse there, including contributing to a build-up of overlying silt. The Chew results show pressures impacting the macro-invertebrate communities in both seasons over all the survey years. Data does, however, show that some pressures are greater in autumn compared with spring. In addition, autumn 2022 data from site 3, site 4 and site 5 suggests that the drought conditions in the catchment in summer 2022 are likely to have had a detrimental impact on the macro-invertebrate communities with greater impacts displayed in a number of the pressures at this time.

The annual SmartRivers summary report from WildFish, which provides an overview of the findings from SmartRivers invertebrate sampling across the country over the previous year, was released in November 2024: SmartRivers 2023 data update - Nov 24

In this document, WildFish has ranked rivers monitored through the SmartRivers programme according to water quality stress, using combined scores for chemical, sediment, and phosphorus

pressures. The River Chew is ranked 57th out of 61 rivers, with 61 representing the most stressed. This places the Chew as the fifth most stressed river nationally. This highlights very clearly the pressures that rivers across the Bristol Avon catchment are facing and how vital it is that BART continue to work with partners to protect the watercourses and improve the ecological conditions.

Findings: Riverfly Monitoring Initiative (RMI)

Riverfly Monitoring Initiative Overview Table

River	Site Name	Grid Reference	Average RMI Riverfly Score	Trigger Level Breaches
Chew	Shrowle	ST 57850 57260	13.6	0
Chew	Pensford Church	ST 61820 63680	10.2	0
Chew	Parsonage Farm	ST 62029 64252	12	2
Chew	Church Farm	ST 62703 64176	11.7	1
Chew	Woolard	ST 63103 64175	7.5	3
Chew	Cradle Bridge	ST 64280 64660	10.1	0
Chew	Uplands Field	ST 65440 65990	11.4	0
Chew	Dapps Hill Bridge	ST 65700 68060	7.1	0
Chew Stoke Stream	Chew Stoke Village	ST 55950 61770	9.6	0
Chew Stoke Stream	Chew Stoke Waterfall	ST 54480 61440	9.2	1
Compton Dando Stream	Compton Dando Stream	ST 64600 64443	10.2	0
Hollow Brook	Bishop Sutton	ST 59381 59148	11.3	0

Table 3 – RMI Overview Table

Average riverfly total scores in the Chew catchment ranged between 13.6 and 7.1. The highest average riverfly score was on the most upstream of the river Chew sites, at Shrowle, and the lowest average riverfly score was at the most downstream river Chew site, Dapps Bridge. This is likely to reflect the impact of run off entering the watercourse along its length through diffuse and point source pollution (including agricultural, urban and sewage treatment works outfalls) as well as the differing habitat conditions at the two sites. The Shrowle site has a variety of different flow and habitat types including riffles and pools, a side bar, a small quantity of in-stream macrophytes and

exposed tree roots. The Dapps Bridge site has less flow and habitat diversity, no instream macrophytes and greater levels of siltation overlaying the substrate.

The overall average riverfly score for all samples in the Chew catchment was 11.3. The overall average riverfly score for all samples in the Bristol Avon Catchment (with BART as the Riverfly Hub) was 9.6. Although this suggests that the Chew riverfly sites have better conditions for the riverfly groups than the average BART riverfly site it should be noted that some sites have many more samples than other sites and therefore skew the overall results. For example the Parsonage Farm site (which generally has high scores) has regular data since 2016 compared to the Dapps Bridge site (which gets fairly low scores) where the monitor only started sampling in summer 2023. The average riverfly scores for individual Chew sites could, however, be compared to each other or to the overall Bristol Avon scores, in which case eight of the Chew sites are higher than the average Bristol Avon score, two of the sites are lower and one is exactly the same. This suggests that conditions at the majority of the Chew sites are better for the riverfly groups compared to the Bristol Avon sites as a whole.

The drought conditions of summer 2022 affected many of the rivers across the Bristol Avon catchment and the RMI data from sites such as those on the Chew helped to inform the Environment Agency's drought investigations. River Chew sites that demonstrated clear drought impacts include the Compton Dando Stream site, the Chew at Woolard and the Chew at Parsonage Farm. The Compton Dando Stream site could not be sampled in summer 2022 due to very low flows. The RMI volunteer at the Parsonage Farm site reported extremely low flows in summer and early autumn 2022, a smell of sewage (could not identify source - reported to EA) and very low Riverfly scores. The RMI scores at this site were below the trigger level of 9 for August (7), September (6) and October (7) 2022. The Riverfly score recovered in the December 2022 sample to that expected for this time of year.

The taxon recorded at the Chew riverfly sites varies between sites and seasons. It has, however, been noted that Chew sites have low numbers of shrimps compared to other riverfly sites in the catchment. Analysis of national data over the last five years using the Riverfly Partnership's data hub showed that the average abundance score for shrimps nationally was 189 – by far the highest abundance score of all the eight groups. The average abundance score for shrimps in the Bristol Avon catchment over the last five years was 82 – again the highest abundance score of all the eight groups. The average abundance score for shrimps in the Chew catchment over the last five years was 13, considerably lower than both the national average and the Bristol Avon average.

Further analysis of national data over the last five years showed that the group with the highest abundance score on the Chew was Ephemeridae – the burrowing mayfly. The average abundance score of the burrowing mayfly on the Chew was 51. The national average abundance score for the burrowing mayfly was 10 and the average abundance score for the Bristol Avon was 15, showing that conditions on the Chew are favourable for the burrowing mayfly Ephemeridae.

Recommendations

This report has highlighted the numerous pressures impacting invertebrates across the River Chew. BART recommends investment into the catchment to undertake actions to improve the ecological condition of these waterbodies. This macro-invertebrate monitoring report should be referenced to help prioritise areas for action and to identify the works that will be most beneficial for the macro-invertebrate communities.

Suggested next steps and measures include:

- Working with landowners downstream of the Chew Valley lake to reduce surface water run-off and sediment influx into the watercourse;
- Working with the water industry to address sewage discharge issues and impact of treated continuous discharge;
- A programme of river restoration measures;
- Continuing SmartRivers Monitoring and comparing with other data sets to establish trends;
- Additional monitoring to measure impacts of actions implemented to improve the watercourse;
- A joined up approach with data sharing between BART, the Environment Agency, the water industry and other stakeholders to assess the impact of low flows on the ecology of the catchment, particularly downstream of the compensation flow;
- Include SmartRivers data in BART's RiverHub data dashboard to allow easy comparison of water quality data in the catchment;
- Continued support for the RMI programme including training sessions for new monitors, support of existing monitors and data analysis on a regular basis.

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1. Introduction

1.1   Riverfly Monitoring Overview

Bristol Avon Rivers Trust (BART) secured funding from Bristol Water and D'oyly Carte Charitable Trust to carry out annual SmartRivers macro-invertebrate monitoring on the River Chew from 2019 to 2024. SmartRivers, led by WildFish, is a water quality monitoring programme that uses species-level macro-invertebrate sampling to identify pollutants and understand the pressures affecting river ecosystems. BART collected samples at five locations along the River Chew.

The primary aim of this monitoring was to establish a baseline dataset of the macro-invertebrate communities, track changes over time, and identify the key pressures affecting different sections of the river. This report presents the findings from the macro-invertebrate surveys conducted during the project.

BART is the Bristol Avon Riverfly hub for the Riverfly Monitoring Initiative (RMI). The Riverfly Monitoring Initiative uses citizen science to get people out and about on their local river, enjoying the natural environment and sampling for riverflies. The scheme is supported by the Riverfly Partnership and more info can be found on their website here: http://www.riverflies.org/rp-riverfly-monitoring-initiative.

BART volunteers have eight active sites in the Chew catchment – five on the river Chew, one on the Chew Stoke Stream, one on the Hollow Brook and one on the Compton Dando Stream as well as six sites with historic data that are not currently monitored.   This report covers the findings of the Chew Catchment RMI surveys.

1.2   SmartRivers Macro-invertebrate Site Locations

The five sites were spread out along the river Chew, one site was upstream (US) of Chew Valley Reservoir and four sites were downstream. Site 1 was located upstream of Chew Valley Lake in Shrowle, on a section of the river that was monitored regularly by a volunteer as part of the Riverfly Monitoring Initiative but is currently looking for a new monitor. Site 2 was located downstream (DS) of Chew Valley Lake reservoir at a location that was also being monitored by Bristol Water's Framework Consultants as part of Bristol Water's investigations into the impact of the changes to the compensation flow from Chew Valley Lake. Site 3 was located at Stanton Drew, also a location where Ricardo was carrying out assessment for the compensation flow monitoring programme. Site 4 was located at Parsonage Farm at an active RMI volunteer monitoring point with excellent historic data. Site 5 was located at the downstream end of the waterbody at Dapps Bridge, before the confluence with the Bristol Avon. This site has had an active RMI volunteer sampling since summer 2023.

The locations of each of the sites are included in Table 4. A representative photo of each macro-invertebrate site is included as Appendix 1. A map of the sampling locations is included as Figure 2.

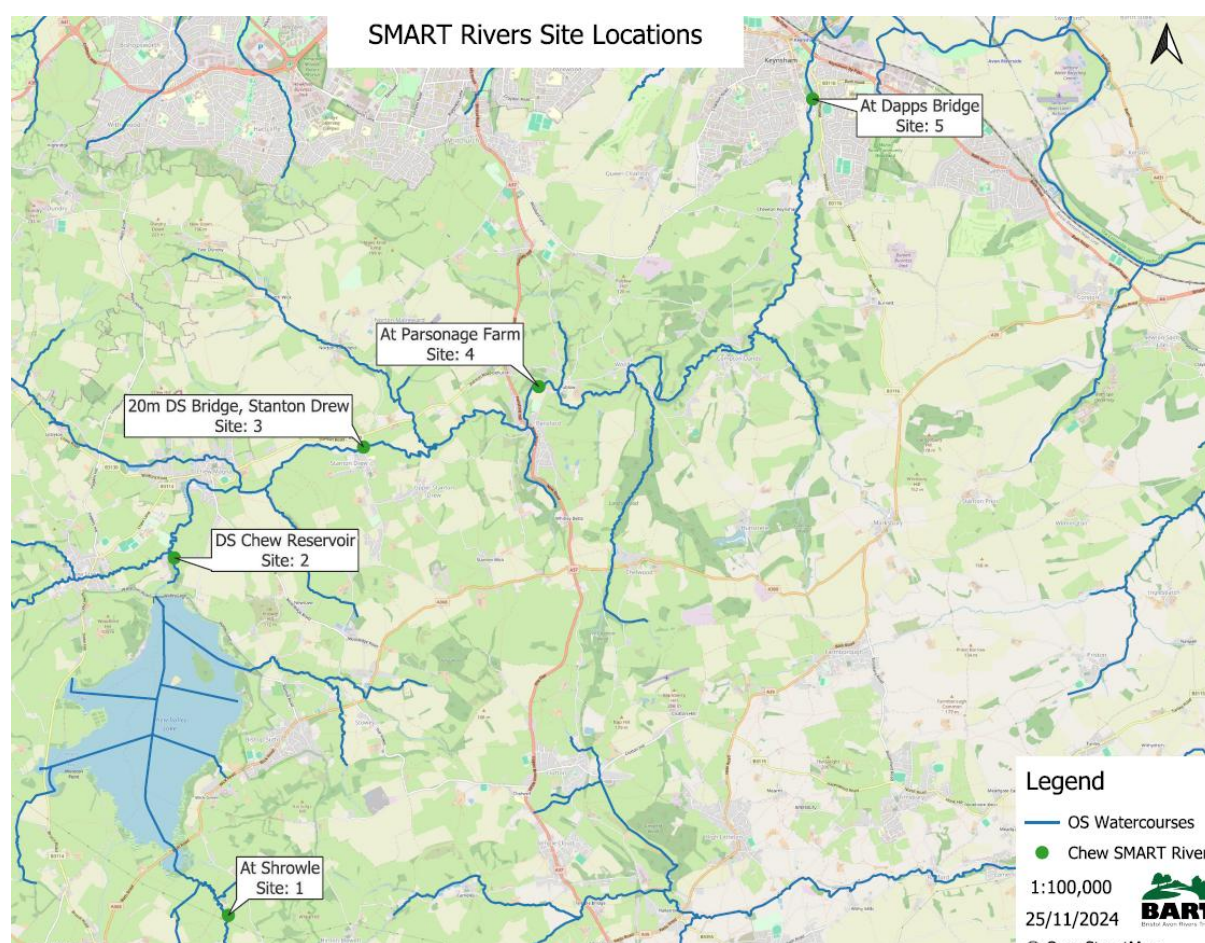| Site number	Site Name	NGR
1	At Shrowle	ST 57839 57271
2	DS Chew Reservoir	ST 57158 62020
3	20m DS Bridge, Stanton Drew	ST 59690 63468
4	At Parsonage Farm	ST 62029 64252
5	At Dapps Bridge	ST 65700 68036

Table 4 SmartRivers Site Locations

Figure 2 Map of SmartRivers Site Locations

1.3   Riverfly Monitoring Initiative (RMI) Site Locations

BART volunteers have eight active sites in the Chew catchment – five on the river Chew, one on the Chew Stoke Stream, one on the Hollow Brook and one on the Compton Dando Stream as well as six sites with historic data that are not currently monitored.   A map of all the sampling locations is included as figure 3 below.
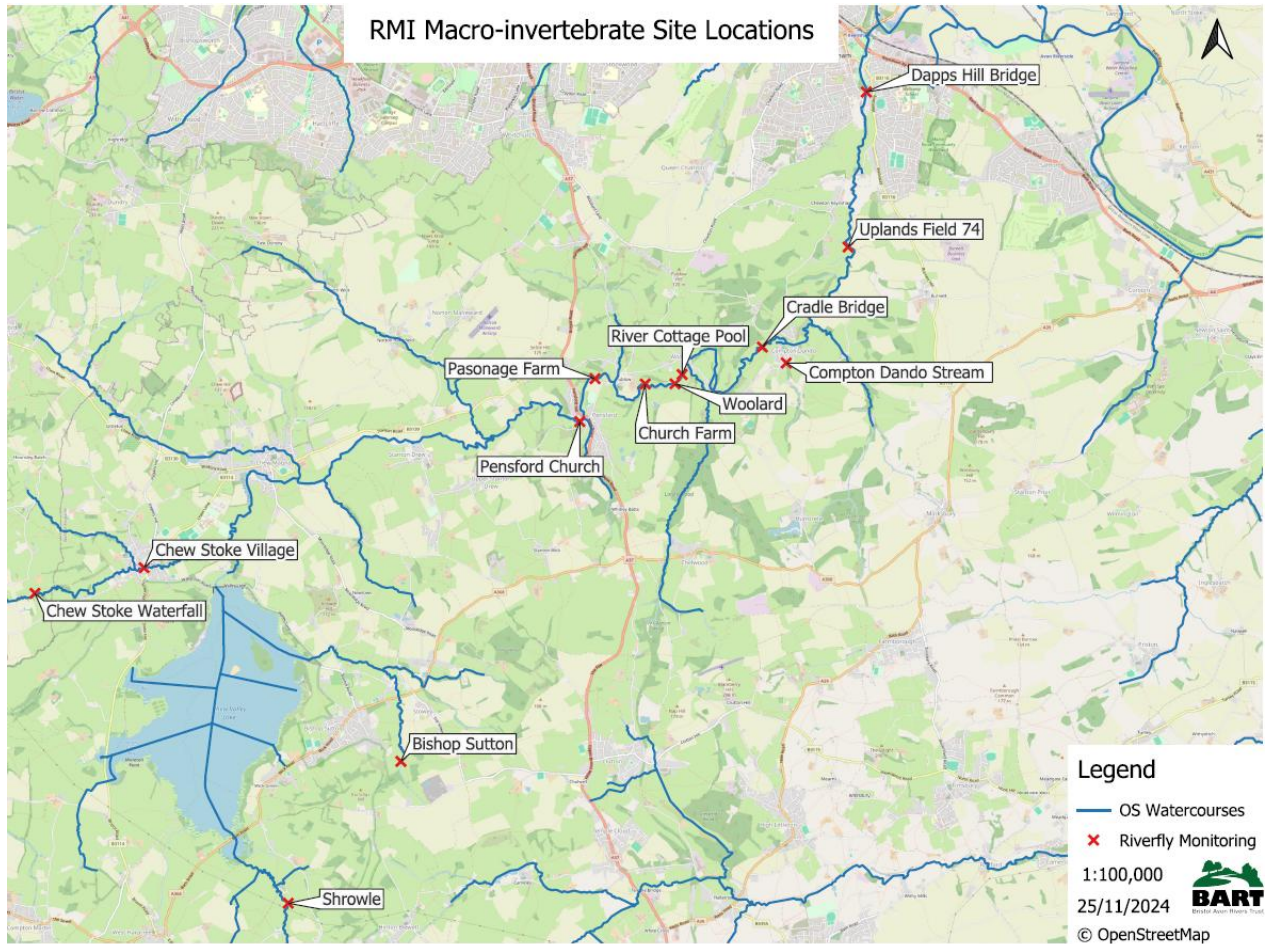
Figure 3 Map of RMI Site Locations

2. Methodologies

2.1 SmartRivers Macro-invertebrate Sampling and Analysis Methodology

One macro-invertebrate kick sample was taken by BART's Aquatic Ecologist Jessy Grant at each of the SmartRivers survey locations during each Smart Rivers season. The standard method used at each of the macro-invertebrate sites involved a three-minute kick sample of each habitat in proportion to its occurrence, collecting the macro-invertebrates in a standard, long-handled pond net with a mesh size of 1mm. This was followed by a one-minute hand search of stones and other moveable objects. The sampling method conformed to: BS EN ISO 10870:2012 Water quality - Guidelines for the selection of sampling methods and devices for benthic macro-invertebrates in fresh waters (BSI 2012).

Autumn 2019 samples were placed in labelled buckets, preserved using Industrial Denatured Alcohol (IDA) and taken to the Salmon and Trout Conservation Offices for external macro-invertebrate identification and data analysis.

Autumn 2020 and all 2021 to 2024 samples were placed in labelled buckets and taken back to the BART laboratory for further analysis. On return to the laboratory each sample was stored in the fridge. Before analysis, fine silt was washed from the sample by rinsing it with tap water through a 500-um sieve. Larger aperture sieves were then used to split the sample into fractions to enable efficient sorting. Small amounts of the sample were then placed in white trays for analysis, until the entire sample had been processed. Macro-invertebrates were identified as far as taxonomically possible using standard procedures. Results were entered onto the SmartRivers database for data analysis.

2.2 RMI Sampling and Analysis Methodology

The RMI monitoring methodology copies the standard sampling methodology outlined in section 2.1 above. The monitoring is carried out by a volunteer trained in RMI sampling. The same monitor samples the same site as regularly as possible – aiming for once a month.

Analysis is undertaken bankside following the method outlined in the RMI training. The sample is sorted in a white tray and macro-invertebrates from eight key groups are picked out and counted. The eight RMI groups are: stoneflies, burrowing mayflies, blue winged olive mayflies, olive mayflies, cased caddisflies, caseless caddisflies and shrimps.

Counts are entered by the volunteer onto the Riverfly Partnership's Cartographer database for each of the eight groups. Scores are automatically calculated for each site using the following categories:

1-9 = 1
10 - 99 = 2
100 – 999 = 3
1000+ = 4

An overall score for the sample is calculated by combining the scores for all the groups. This score is compared to a trigger level, set by the Environment Agency. Scores that fall below the trigger could be a sign that there is a pollution incident occurring and follow up is required.

3. Results

3.1 SmartRivers Results

3.1.1 Biotic Indices

Tables 5, 6, 7 and 8 below show the observed Biological Monitoring Working Party (BMWP), Average Score per Taxon (ASPT), Number of Scoring Taxa and WHPT biotic scores calculated for all the surveys. Further information about the biotic indices is included as Appendix 3. Note that autumn 2023 results for Site 1 are much lower than other results for this site, probably as a result of poor sampling due to very high river flows and therefore autumn 2023 data for Site 1 should be treated with caution.

Site No.	Site Name	BMWP								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	73	113	170	97	135	128	127	58	100
2	DS Chew Reservoir	69	41	91	46	52	15	59	27	35
3	20m DS Bridge, Stanton Drew	100	120	111	112	148	79	125	108	134
4	Parsonage Farm	103	103	149	99	174	98	134	-	130
5	Dapps Bridge	90	62	109	88	133	128	101	105	127

Table 5: Observed biological indices scores from Chew SmartRivers sites – BMWP

Site No.	Site Name	WHPT								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	80.7	120.5	171.6	109.6	141.8	131.8	124.9	71.1	102.1
2	DS Chew Reservoir	68.8	41.7	86.7	38.5	45.7	13	54.5	28.8	33.7
3	20m DS Bridge, Stanton Drew	125.2	135.7	134.6	137.9	175.7	102.9	154.10	127	161.3
4	Parsonage Farm	123	113.8	163.9	107.6	189.3	116.3	132	-	136.8
5	Dapps Bridge	93.2	64.1	119.3	93.6	143	142.9	114.7	122.6	130.3

Table 6: Observed biological indices scores from Chew SmartRivers sites - WHPT

Site No.	Site Name	Number of Scoring Taxa								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	12	19	26	17	22	21	20	11	15
2	DS Chew Reservoir	14	9	17	9	9	4	11	7	7
3	20m DS Bridge, Stanton Drew	18	21	21	20	24	17	22	20	22
4	Parsonage Farm	18	17	24	17	27	17	20	-	21
5	Dapps Bridge	18	12	19	14	21	22	17	17	20

Table 7: Observed biological indices scores from Chew SmartRivers sites – Number of Scoring Taxa

Site No.	Site Name	ASPT								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	6.08	5.95	6.54	5.71	6.14	6.10	6.35	5.27	6.67
2	DS Chew Reservoir	4.93	4.56	5.35	5.11	5.78	3.75	5.36	3.86	5
3	20m DS Bridge, Stanton Drew	5.56	5.71	5.29	5.60	6.17	4.65	5.68	5.4	6.09
4	Parsonage Farm	5.72	6.06	6.21	5.82	6.44	5.76	6.7	-	6.19
5	Dapps Bridge	5	5.17	5.74	6.29	6.33	5.82	5.9	6.18	6.35

Table 8: Observed biological indices scores from Chew SmartRivers sites – ASPT

The key for the BMWP water quality categories used in Table 5 is included as Table 9 below.

BMWP Score Range	Water Quality Category	Interpretation
0 -10	Very Poor	Heavily Polluted
11 - 40	Poor	Polluted or impacted
41 - 70	Moderate	Moderately impacted
71 - 100	Good	Clean but slightly impacted
100 +	Very Good	Unpolluted / unimpacted

Table 9: BMWP score range, water quality category and interpretation. Source: www.researchgate.net

3.1.2 Pressure Ratings Results

Table 10, 11, 12, 13 and 14 below shows the pressure ratings calculated for all samples, included in graph format for 2021 in the benchmark reports as Appendix 2.   The key for these tables in included as Table 15.

No.	Site Name	Chemical rating (SPEAR)								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	High	Good	High	Good	Good / High	Good	Good	Mod	High
2	DS Chew Reservoir	Mod	Bad	Good/ High	Good	High	High	Mod	Poor	Good
3	20m DS Bridge, Stanton Drew	Mod	Mod	Mod	Mod	High	Poor	Good	Poor	Good
4	Parsonage Farm	Mod / Good	Good / High	Good / High	High	High	High	High	No sample	High
5	Dapps Bridge	Poor / Mod	Mod	Mod	Good / High	High	Good	Mod	High	Good

Table 10: Pressure ratings for all sites – Chemicals

No.	Site Name	Nutrient "P" (TRPI)								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	No score	No score	UI	UI	UI	No score	UI	No score	No score
2	DS Chew Reservoir	I	UI / SI	I	I	HI	MI	HI	MI	HI
3	20m DS Bridge, Stanton Drew	No score	UI/SI	I	UI	SI	SI	MI	No score	UI
4	At Parsonage Farm	No score	SI / MI	SI	MI	MI	UI/SI	MI	No sample	SI
5	Dapps Bridge	UI	UI	MI	UI	SI	SI	No score	No score	UI

Table 11: Pressure ratings for all sites – Nutrient "P"

No.	Site Name	Organic (Saprobic value)								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	UI	UI	UI	UI / SI	UI	SI	UI	UI	UI
2	DS Chew Reservoir	MI	MI	SI	MI	SI	MI	MI	SI	SI
3	20m DS Bridge, Stanton Drew	UI	SI	SI	SI	UI	UI / SI	UI	SI	UI
4	At Parsonage Farm	SI	SI	UI	SI	SI	SI	UI	No sample	SI
5	Dapps Bridge	SI	SI	UI	SI	UI/SI	SI	UI	SI	SI

Table 12: Pressure ratings for all sites – Organic (Saprobic value)

No.	Site Name	Siltation (PSI)								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	UI	UI / SI	SI	UI	SI	SI	SI	MI	UI
2	DS Chew Reservoir	HI	I	I	HI	HI	HI	HI	I	HI
3	20m DS Bridge at Stanton Drew	SI / MI	MI	MI	MI	SI	MI	MI	MI	UI
4	Parsonage Farm	MI	MI	SI	MI/I	MI	I	MI	No sample	MI
5	Dapps Bridge	I	I	SI	SI	SI	MI	SI	MI	No score

Table 13: Pressure ratings for all sites – Siltation (PSI)

No.	Site Name	Flow (LIFE)								
		Aut 19	Aut 20	Spr 21	Aut 21	Spr 22	Aut 22	Spr 23	Aut 23	Spr 24
1	Shrowle	UI	SI	UI	UI	SI	SI	SI	SI	UI
2	DS Chew Reservoir	MI/I	MI	MI	I	I	HI	I	SI	MI
3	20m DS Bridge at Stanton Drew	UI	SI	SI	SI	SI	SI	SI	SI	UI
4	Parsonage Farm	SI	SI	SI	SI	SI	SI	SI	No sample	SI
5	Dapps Bridge	SI / MI	SI	SI	SI	SI	SI	SI	SI	SI

Table 14: Pressure ratings for all sites – Flow (LIFE)

The key for the pressure ratings categories used in the pressure ratings tables is included as Table 15 below.

Pressure Rating Acronym	Pressure Rating
HI	Heavily Impacted
I	Impacted
MI	Moderately Impacted
SI	Slightly Impacted
UI	Unimpacted

Table 15: Pressure ratings key

3.2 Riverfly Monitoring Initiative Results

The graphs below show the RMI total riverfly scores over time for each of the RMI sites in the Chew catchment. River Chew sites are ordered from upstream to downstream starting with the Chew at Shrowle, upstream of Chew reservoir. The graphs are taken from BART's Riverhub (https://riverhub.co.uk/).
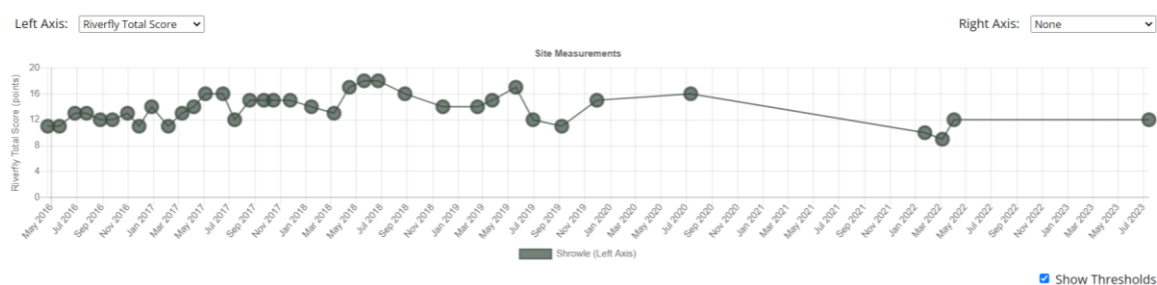
Figure 4 Chew at Shrowle

Figure 5 Chew at Pensford Church
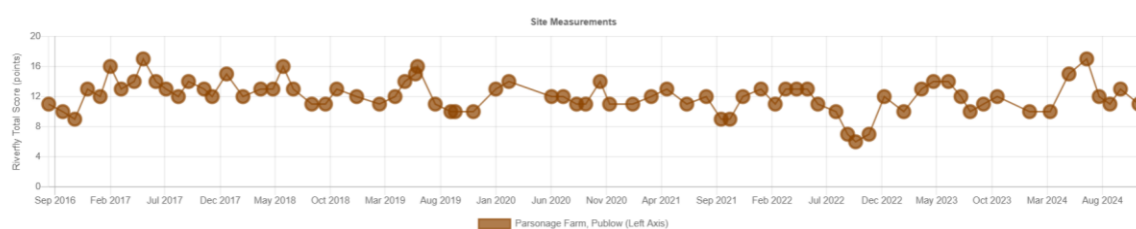
Figure 6 Chew at Parsonage Farm

Figure 7 Chew at Church Farm

Figure 8 Chew at Woollard

Figure 9 Chew at Cradle Bridge

Figure 10 Chew at Uplands Field

Figure 11 Chew at Dapps Bridge

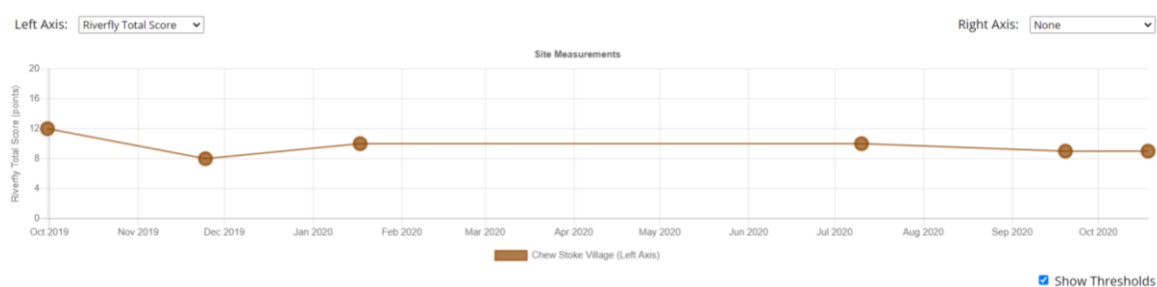Figure 12 Chew Stoke Stream at Chew Stoke Waterfall

Figure 13 Chew Stoke Stream at Chew Stoke Village

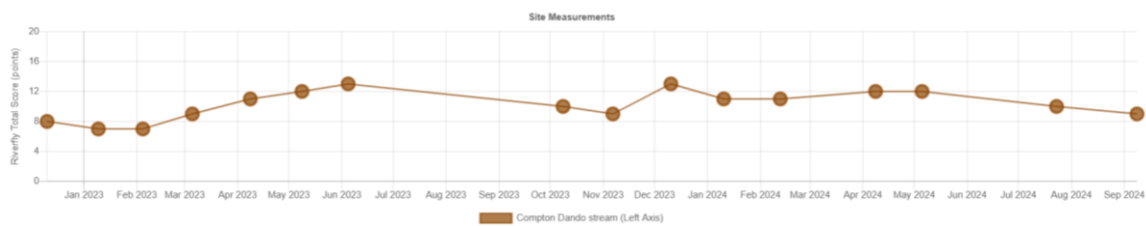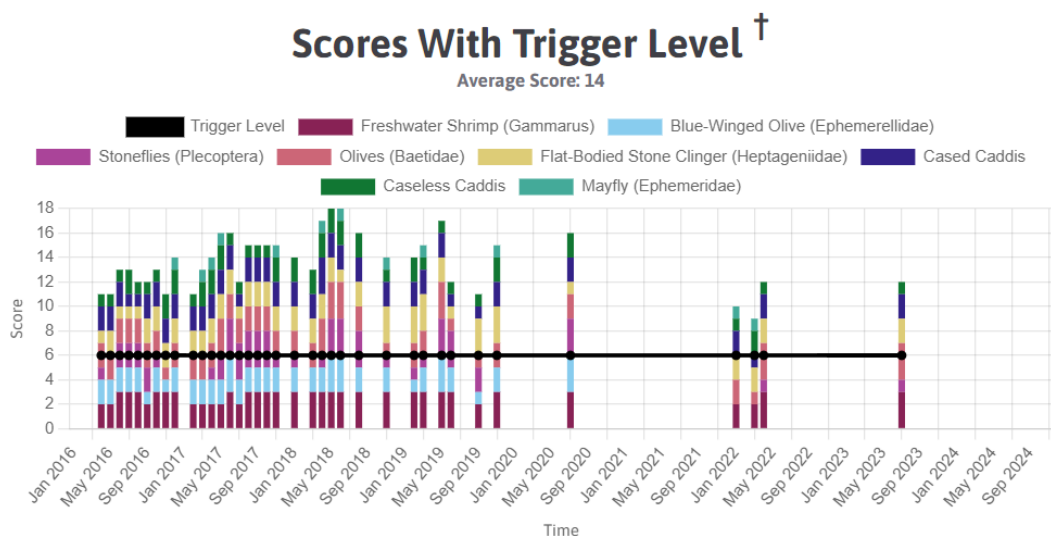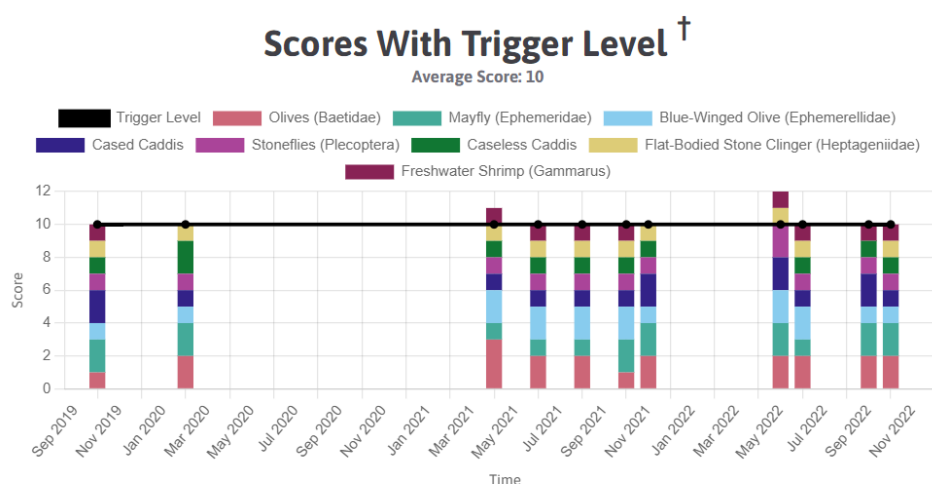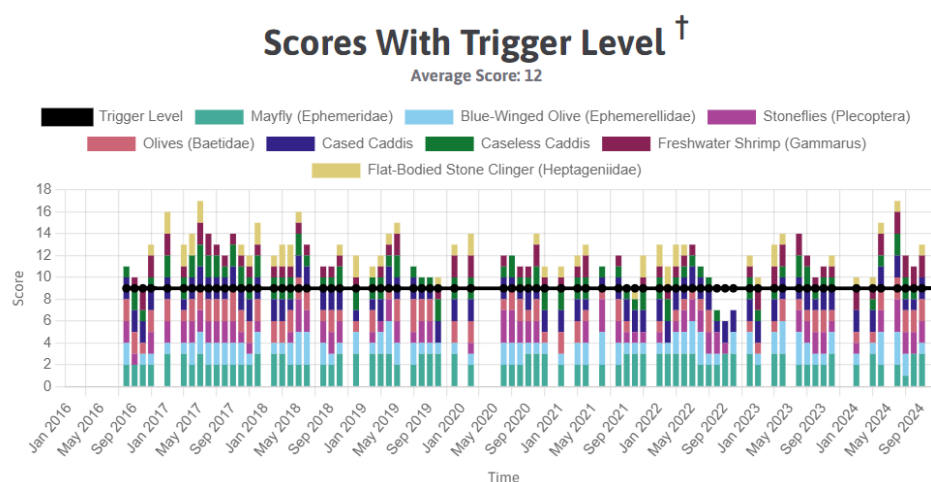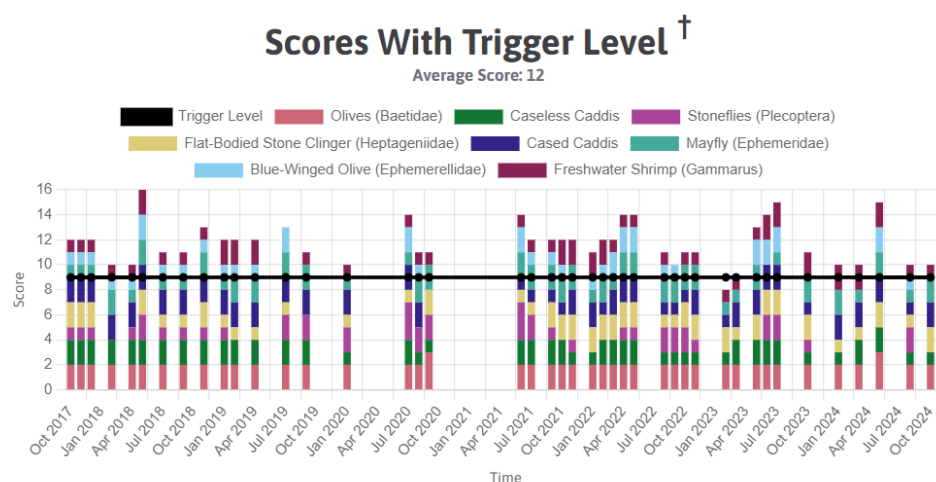Figure 14 Hollow Brook at Bishop Sutton

Figure 15 Compton Dando Stream

The graphs below represent the RMI total riverfly scores over time for each of the RMI sites in the Chew catchment. The graphs are taken from the Riverfly Partnership's Data Platform: Riverfly Data

Figure 16 Chew at Shrowle

Figure 17 Chew at Pensford Church

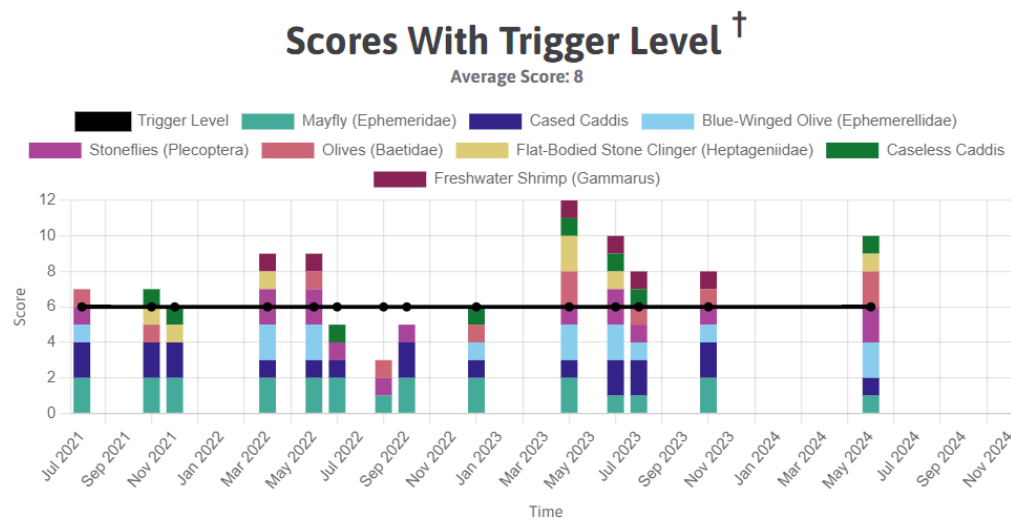Figure 18 Chew at Parsonage Farm

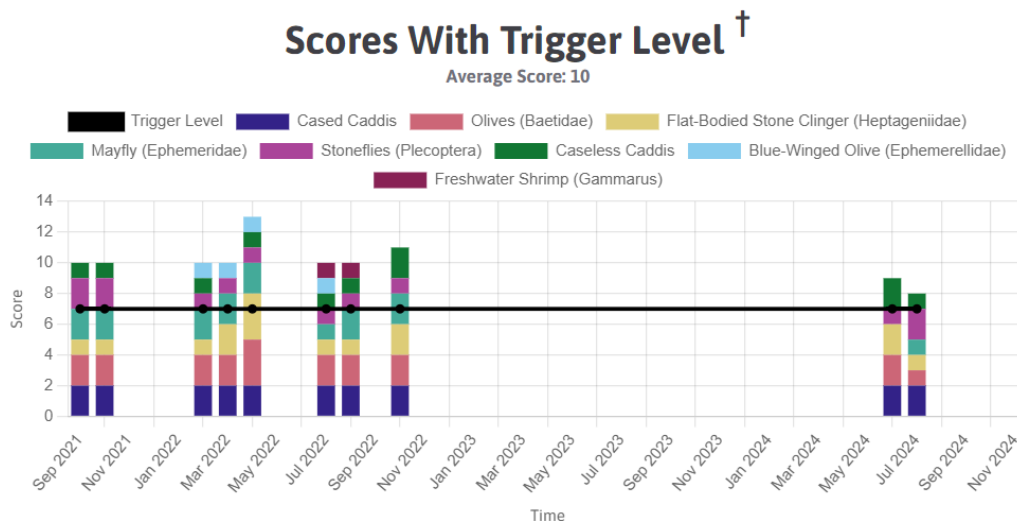Figure 19 Chew at Church Farm

Figure 20 Chew at Woolard

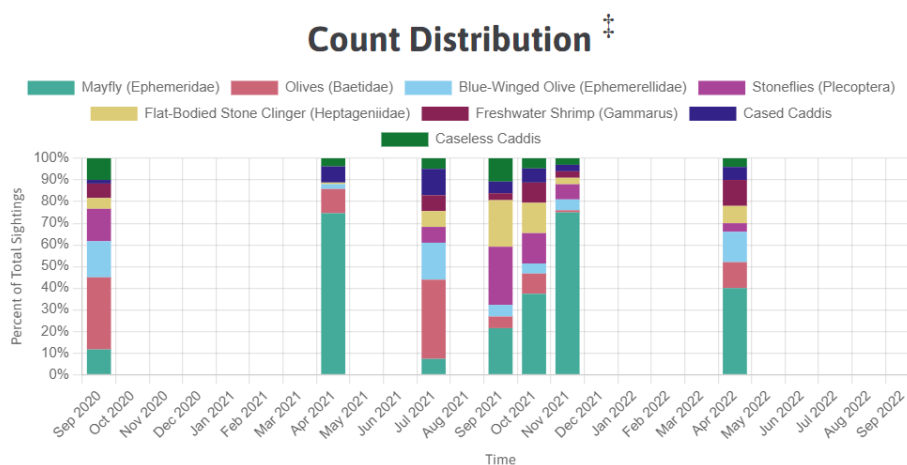Figure 21 Chew at Cradle Bridge
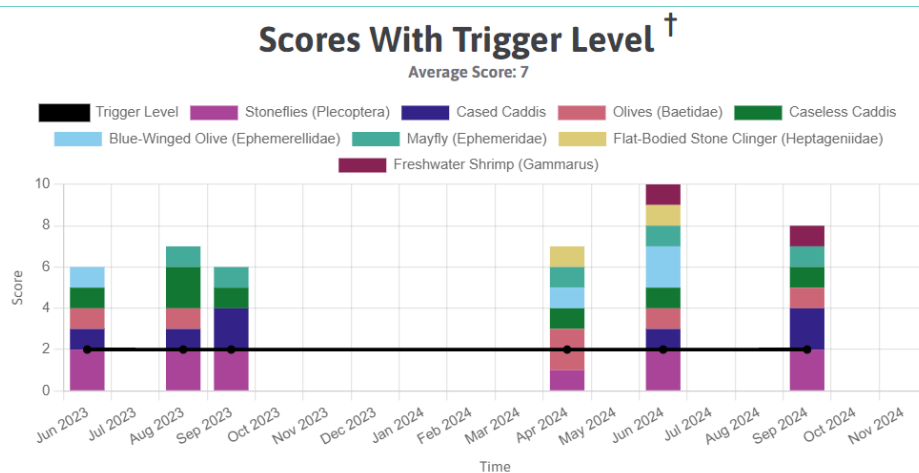

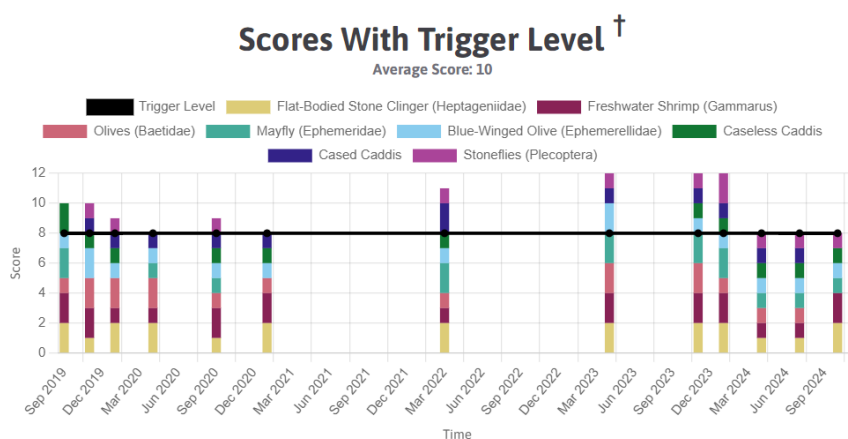Figure 22 Chew at Uplands Field

Figure 23 Chew at Dapps Bridge

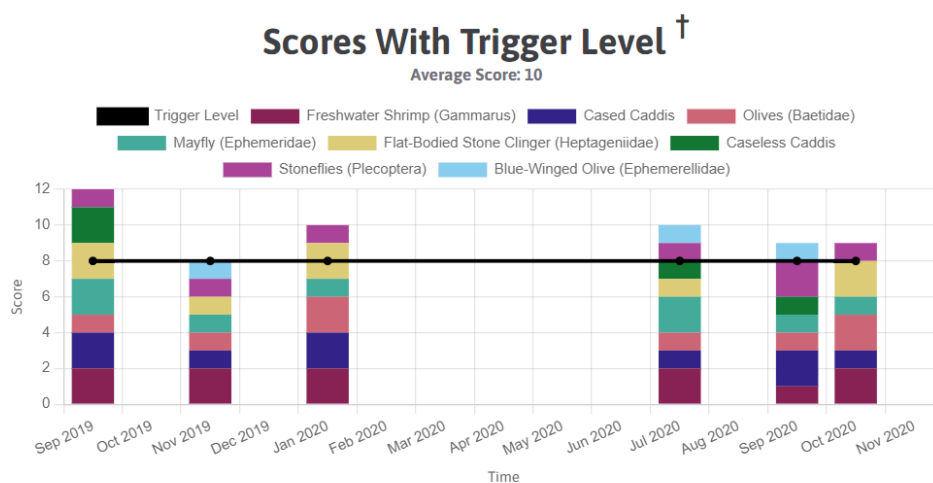Figure 24 Chew Stoke Stream at Chew Stoke Waterfall

Figure 25 Chew Stoke Stream at Chew Stoke Village
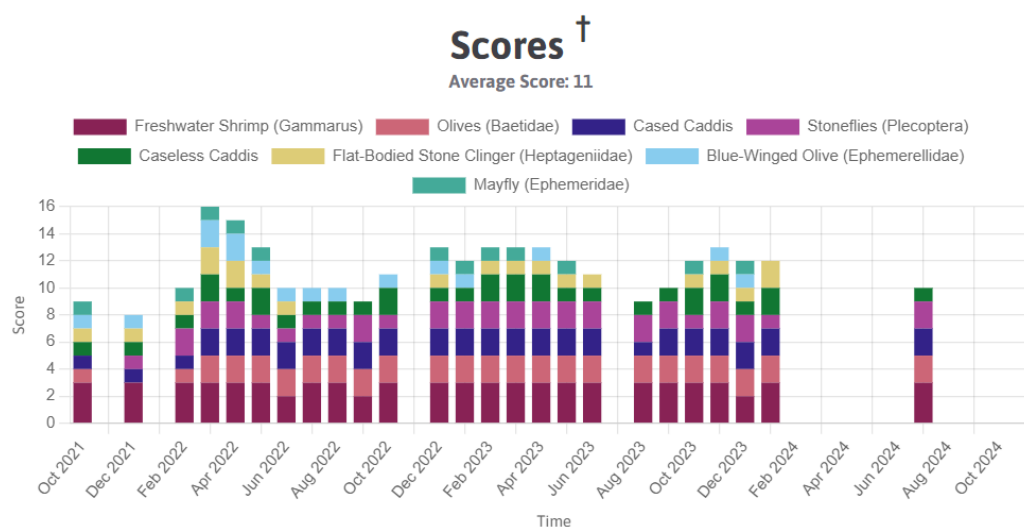
Figure 26 Hollow Brook at Bishop Sutton
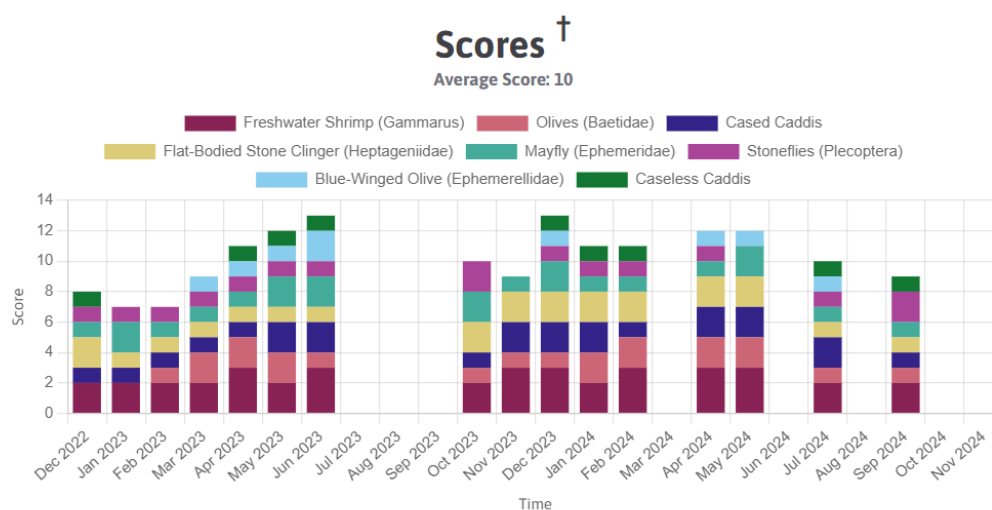

Figure 27 Compton Dando Stream

4. Discussion

4.1 SmartRivers

4.1.1 Site 1: Chew at Shrowle

Site 1 had a good or excellent diversity of macro-invertebrate taxa present in all samples (with the exception of autumn 2023 which had a much lower diversity, probably as a result of poor sampling due to very high river flows and therefore autumn 2023 will not be included in this discussion section). The BMWP scores were good or excellent in all the other samples, although scores did vary considerably. The spring 2021 BMWP score was much higher than the other samples, particularly compared with autumn 2019 and autumn 2021. The spring 2021 BMWP score was the second highest of all the Chew samples at all sites. ASPT scores were also high – close to 6 in autumn 2020 and 2021 and above 6 in all the other samples. Both indices, therefore, suggest good water quality in this location.

The number of scoring taxa (NTaxa) at the site was very variable between samples from 12 in autumn 2019 to 26 in spring 2021. The spring 2021 score was the second highest of all the Ntaxa for the SmartRivers Chew sites. The macro-invertebrate assemblages present at the site indicate that there is a good variety of available habitat types and that water quality in this location is able to support a good diversity of macro-invertebrates.

The notes recorded at the time of sampling show that there was a range of different habitat and flow types available at the site including riffle, run, pool and slack flow types, an unvegetated point bar and a variety of different substrate types. The river was meandering at Site 1 with natural earth banks. A small amount of in stream macrophytes (*apium nodiflorum*) were recorded during each of the surveys. No overlaying silt was recorded at the site apart from a thin layer covering a small percentage of the site in autumn 2022. These features provide natural habitat variation for macro-invertebrates to live within.

The SmartRivers pressure ratings scores were good or high for chemicals in all samples, suggesting chemicals are not an issue at this site. The site was unimpacted or slightly impacted by all the other pressures: organics, nutrients "P", flow and siltation in all samples. No considerable pressure is, therefore, exhibited by the macro-invertebrate communities at this site. The pressure ratings and biological indices suggest that in this location the river is fairly unimpacted. The limited pressures observed at this site are likely due to its location as the most upstream of all the Chew SmartRivers monitoring points. Situated close to the river's source and upstream of Chew Valley Reservoir, it experiences fewer cumulative impacts from downstream activities. However, this section is not without its challenges. It lies downstream of Litton Reservoir and is therefore still subject to significant hydrological modification, as well as receiving effluent inputs from the Harptree sewage treatment works further upstream.

The Upper Chew waterbody (Source to Chew Valley Lake: GB109053021851) is designated a Heavily Modified Waterbody under the Water Framework and is at Poor Status – driven by a classification of Poor status for fish. The reasons for not achieving good status (RNAG's) given by the Environment Agency for fish are barriers to ecological continuity (water industry), invasive non native species (this is a reason for deterioration – RFD), diffuse source pollution from poor agricultural nutrient and soil management (Environment Agency 2025).

4.1.2 Site 2: Chew DS Chew Valley Reservoir

Site 2 had a very limited range of macro-invertebrate taxa present in all samples with the exception of spring 2021 which had a good diversity of macro-invertebrates. The BMWP scores were low for all samples apart from in spring 2021. In autumn 2022 the BMWP score dropped to 15 which was the lowest BMWP score recorded at all the Chew sites. ASPT scores were at the lowest end of the range of all the Chew sites and fell below 5 in 2019 and 2020 and in autumn 2022 it dropped to a very concerning 3.75 and again in autumn 2023 to 3.86. Both indices, therefore, suggest macro-invertebrates assemblages are severely restricted by water quality in this location.

The number of scoring taxa (NTaxa) at the site were again very low, ranging from 4 to 14. As with the ASPT and BMWP scores the highest NTaxa score was in spring 2021.   The macro-invertebrate assemblages present at the site suggest that the habitat is restricted in this location. The notes recorded at the time of sampling show that although there was a range of different flow types available at the site including pool, run and slack flow types, the site was mainly a very slow run habitat, often recorded as slack, with very sluggish, ponded flow and very high levels of silt – above 65%. The site was also very heavily shaded. These features provide very poor habitat variation for macro-invertebrates to live within and are likely to be restricting the macro-invertebrate assemblages in this location.

SmartRivers pressure ratings for chemicals at Site 2 were moderate in 2019 and bad in 2020 but then improved to good in the 2021 samples and high in 2022, suggesting that historic chemical pressures were not impacting on the macro-invertebrates in 2021 and 2022. In spring 2023, however, the chemicals pressure rating fell back to moderate and then down to poor in autumn 2023. The pesticide rating returned to good in spring 2024. These results suggest significant pesticide pressures on this stretch of the river Chew.

All of the other pressure ratings scores were moderate or worse at Site 2 for nearly all of the samples. Siltation appears to be having the most detrimental impact on the macro-invertebrates with six out of the nine samples in the "heavily impacted" category and the remaining three samples "impacted". Flow and nutrients are also of extreme concern. Eight out of the nine samples scored "moderately impacted" or worse for nutrients and eight of the nine samples scored moderately impacted or worse for flow. Organics pressure ratings range from moderately impacted to slightly impacted and the very high saprobic scores - all above 2.0 suggest considerable water quality issues are present here. Experts at WildFish state that SmartRivers saprobric scores above 2 should be flagged as problematic.

The macro-invertebrate communities are, therefore, indicating that there are severe sediment, flow, organics and nutrient "P" issues at this site. The pressure ratings and the biological indices together suggest that in this location the river is severely impacted by these pressures, resulting in a very restricted macro-invertebrate community. The location of Chew Valley Reservoir upstream of the site and the compensation flow concrete gauging weir immediately upstream are likely to be contributing to the pressures on the river Chew at Site 2. This stretch of river is also significantly impounded by Dumpers Lane weir downstream and has become over wide due to livestock encroachment, also causing flows to slow.

4.1.3 Site 3: Chew at Stanton Drew

Site 3 had a good to excellent diversity of macro-invertebrate taxa present in all samples. The BMWP scores were good or excellent in all samples and scores did not vary much between samples apart

from a large drop in scores between spring and autumn 2022. ASPT scores were also high and very consistent apart from a drop in autumn 2022. Both indices, therefore, suggest good water quality in this location.

The number of scoring taxa (NTaxa) at the site ranged between 17 and 24, again very similar scores in all samples with a drop in autumn 2022. The macro-invertebrate assemblages present at the site indicate that there is a good variety of habitat types available. The notes recorded at the time of sampling show that there was a range of different habitat and flow types available at the site including riffle, run and slack flow types, depending on the season, and the water was moving quickly through the main channel and was slow / slack at the edges. A variety of different substrate types was recorded in all the samples. A small amount of in stream macrophytes (*sparganium emersum*) and filamentous algae (*cladophora agg.)* were recorded and mosses (*fontinalis antipyretica*) were also present at the site. These features provide natural habitat variation for macro-invertebrates to live within.

It should be noted that the catchment suffered from drought conditions in summer 2022 and the impact of the summer low flows could have had a detrimental effect on the macro-invertebrate assemblages recorded in the autumn 2022 sample.

The SmartRivers pressure ratings scores were moderate for chemicals in all 2020 and 2021 samples, high in spring 2022 and then again a drop to poor in autumn 2022. The spring 2023 pressure rating for chemicals was good but then dropped to poor again in autumn 2023. Spring 2024 was again good for chemicals. These results suggest that chemicals are an issue at this site, particularly in autumn time. The low flows on the Chew in summer and autumn 2022 could be exacerbating the impact of chemicals at this site in 2022. There was also considerable sediment pressure indicated by the macro-invertebrate communities at this site in most samples (with the exclusion of spring 2022 which was only slightly impacted and spring 2024 which was unimpacted). Flow and organics ratings were either slightly impacted or unimpacted, of little concern, but very concerning nutrient "P" pressure was exhibited in spring 2021 and moderate nutrient pressure was exhibited in spring 2023. The pressure ratings suggest that pressure from siltation and chemicals are of most consistent concern at this site whilst nutrients "P" could be having a significant seasonal impact.

4.1.4 Site 4: Chew at Parsonage Farm

Site 4 had a good to excellent diversity of macro-invertebrate taxa present in all samples. The Parsonage Farm site could not be sampled in autumn 2023 due to high flows and staff absence. The BMWP scores were good or excellent in all samples. The spring scores were much higher than the autumn scores with a noticeable drop in the BMWP scores from spring 2021 to autumn 2021 and from spring 2022 to autumn 2022. ASPT scores were also good in all samples and above 6 in five of the eight samples. Both indices, therefore, suggest good water quality in this location.

The number of scoring taxa (NTaxa) at the site ranged between 17 and 27 with a big drop between spring and autumn 2022 in particular (27 to 17 respectively). The Spring 2022 Parsonage Farm sample had the highest scores out of all the Chew samples for all the biological indices with the exception of ASPT which was third highest (highest was Spring 2023 at Parsonage Farm). The macro-invertebrate assemblages present at the site indicate that there is a good variety of habitat types available. The notes recorded at the time of sampling show that there was a range of different habitat and flow types available at the site including run and pool flow types and a variety of different

substrate types. A small amount of in stream macrophytes (*ranunculus sp.*) and filamentous algae (*cladophora agg.*) were recorded. These features provide natural habitat variation for macro-invertebrates to live within. Slow flows were, however, also recorded at the site and overlaying silt was present on the substrate, noted as thick in some samples. These features are likely to be impacting on the in-stream ecology.

The SmartRivers pressure ratings scores were moderate for chemicals in 2019 and good to high since then, suggesting that chemicals are not currently an issue at this site. Flow and organics ratings were either slightly impacted or unimpacted and of little concern at this site. There was concerning siltation and nutrients "P" pressure exhibited by the macro-invertebrates at the site. Both pressures were shown to be at least moderately impacting on the site in most samples. Siltation was of most concern in autumn 2022 dropping into the impacted category in this sample. The pressure ratings suggest that pressure from siltation and nutrients "P" are of most concern at this site, potentially exacerbated in autumn time.

It should be noted that the catchment suffered from drought conditions in summer 2022 and the impact of the summer low flows could have had a detrimental effect on the macro-invertebrate assemblages recorded in the autumn 2022 sample. The low flows could have exacerbated the impact of the pressures contributing to the increased sediment stress exhibited by the macro-invertebrate communities in autumn.

4.1.5 Site 5: Chew at Dapps Bridge

The diversity of the macro-invertebrate communities found at Site 5 varied considerably between samples. The BMWP scores ranged from moderate to high, with a particularly low score in autumn 2020 and the highest score in spring 2022. Both spring and autumn 2022 scores were higher than found in other years. ASPT scores were all above 5 and in autumn 2021, spring 2022 and autumn 2023 the score was above 6. ASPT scores were noticeably higher from spring 2021 onwards – closer to 6 than 5. They were lowest in autumn 2019 and highest in spring 2022. Both indices, therefore, suggest good water quality in this location, with a possible water quality issue impacting on the macro-invertebrates in autumn 2020.

The number of scoring taxa (NTaxa) at the site ranged between 12 and 22, the scores were very variable between sites and seasons with some very low scores (12 and 14). The average NTaxa score for this site was the lowest of all the Chew sites with the exception of Site 2. The notes recorded at the time of sampling show that there were run and riffle flow types and a range of different substrate types available at the site. The flow was backed up slightly behind a small stone dam at the time of some surveys which was restricting the natural flow and overlaying silt was recorded in all samples. These features are likely to be impacting on the in-stream ecology.

The SmartRivers pressure ratings scores were moderate or on the border of moderate / poor for chemicals from autumn 2019 to spring 2021, suggesting concerning impact from chemicals at this site. Autumn 2021 to autumn 2022 scores were better - good to high for chemicals - but then the spring 2023 pesticide rating was back down to moderate and the autumn 2023 scored high! Chemicals are, therefore, likely to be an issue at this site, although results are clearly very variable. Nutrients, organics and flow ratings were either slightly impacted or unimpacted and of little concern for the majority of samples at this site, with a possible nutrient issue in spring 2021. There was concerning siltation pressure exhibited by the macro-invertebrates at the site in 2019 and 2020, scores improved in 2021 but then the site was moderately impacted again in autumn 2022 and

autumn 2023. It could be that siltation is a pressure exacerbated in autumn, particularly following the low flows of summer 2022. The pressure ratings suggest that siltation and chemicals are likely to be having most impact on the macro-invertebrates at this site.

The Dapps Bridge site is located towards the downstream end of the river Chew approximately 500m US of the large weir in Keynsham Park. The weir can be seen to have a detrimental impact on the river Chew by backing up the water for a large distance and causing slow flows and sediment build up. It is likely that although the river returns to a more natural state at the Dapps Bridge site, the weir may still be having a detrimental impact on the watercourse here, including the build up of overlaying silt. It is also possible that the small stone dam/s that are regularly built by the general public at the Dapps Bridge site may be affecting the flow here and causing sediment to build up.

4.1.6 SmartRivers General Discussion

The Chew SmartRivers results were very variable between sites and even samples. The pressure of most consistent concern at all the sites with the exception of Site 1 (at Shrowle) is siltation. Excessive sediment caused by anthropogenic factors is detrimental to the water quality and ecology of a watercourse, including fish and invertebrates. Impacts on macro-invertebrates include the clogging of gills and the destruction of suitable habitats.

The pressures of least concern at all the sites (with the exception of site 2 which shows concerning impact from all the pressures) are organics and flow. Sites 1, 3, 4 and 5 show little or no impact from organics and flow since 2019.

The River Chew results demonstrate the pressures impacting the macro-invertebrate communities in both seasons over all the survey years. The data does, however, show that some pressures are greater in autumn compared with spring – and that there is seasonal variability. In addition, autumn 2022 data from site 3, site 4 and site 5 suggests that the drought conditions in the catchment in summer 2022 are likely to have had a detrimental impact on the macro-invertebrate communities with greater impacts displayed in a number of the pressures at this time.

The annual SmartRivers summary report from WildFish, which provides an overview of the findings from SmartRivers invertebrate sampling across the country over the previous year, was recently released in November 2024: SmartRivers 2023 data update - Nov 24

WildFish ranks rivers monitored through the SmartRivers programme by combining their chemical, sediment, and phosphorus stress scores to assess overall water quality stress. The River Chew ranks 57th out of 61 rivers, with 61 representing the most stressed - making it the 5th most stressed river nationally (from all rivers that have undergone SmartRivers assessment). This underscores the significant pressures facing rivers within the Bristol Avon catchment and highlights the importance of BART's continued work with partners to protect these watercourses and improve their ecological condition.

4.2 Riverfly Monitoring Initiative

4.2.1 RMI Site by Site Discussion

Riverfly total scores at the Shrowle site ranged between 9 and 18. The vast majority of samples scored between 11 and 16. The highest scores of 16, 17 and 18 were always recorded in spring and early summer. The site was monitored regularly between April 2016 and Nov 2019 and then less regularly between 2020 and July 2023. No samples fell below the trigger level of 6.

All of the eight RMI groups have been recorded at the Shrowle site with Shrimps being the most abundant of the eight RMI groups. Burrowing mayflies were the least abundant of the RMI groups. There was a drop in blue winged olive mayflies and stoneflies after 2020. This could be due to a change in monitor, however, rather than a change in conditions at the site. The RMI data suggests conditions at the site are able to support a good diversity of riverfly groups.

Riverfly total scores at the Chew at Pensford Church site were very consistent and ranged between 10 and 12. The site was monitored regularly between October 2019 and October 2022. No samples fell below the trigger level of 10.

All of the eight RMI groups have been recorded at the Pensford Church site with cased caddisflies being the most abundant of the eight RMI groups. Flat bodied mayflies and shrimps were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of riverfly groups.

Riverfly total scores at the Chew at Parsonage Farm ranged between 6 and 17. The vast majority of samples scored between 11 and 14. Higher scores were generally recorded in spring with the highest scores of 17 recorded in May 2017 and June 2024. The site was monitored regularly between August 2016 and present day. Samples fell below the trigger level of 9 in September 2022 (6) and October 2022 (7).

All of the eight RMI groups have been recorded at the Parsonage Farm site with burrowing mayflies being the most abundant of the eight RMI groups. Flat bodied mayflies were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of Riverfly groups.

BART's regular ARMI riverfly monitor at Parsonage Farm and Secretary of Chew Fly Fishing Club (CFFC) has made a number of observations regards the ecology at this site, concluding that Bristol Water's compensation scheme has had a detrimental effect on both the fish life and the ecology of the river Chew downstream of the lake. Reports from this monitor in 2021 included very low flows, a sticky brown algae (diatom) substance which smothered the bottom of the river and instream macrophytes, a decrease in brown trout in the river and a decrease in riverfly numbers. It should be noted that the catchment suffered from drought conditions in summer 2022 and the impact of the summer low flows could have had a detrimental effect on the macro-invertebrate assemblages recorded. In 2022 the monitor reported extremely low flows in Summer and early autumn, a smell of sewage and very low Riverfly scores. The ARMI Riverfly scores at this site were below the trigger level of 9 for August (7), September (6) and October (7) 2022. The Riverfly score recovered in the December 2022 sample to that expected for this time of year. The trigger level breaches were reported to the Environment Agency and included in their drought investigations.

Riverfly total scores at the Chew at Church Farm site ranged between 8 and 16. The vast majority of samples scored between 10 and 12. Higher scores were generally recorded in spring and early summer with the highest score of 16 recorded only once – in May 2018. The site was monitored regularly between October 2017 and present day. One sample fell below the trigger level of 9 in February 2023 (8).

All of the eight RMI groups have been recorded at the Church Farm site with olive mayflies being the most abundant of the eight RMI groups. Shrimps were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of Riverfly groups.

Riverfly total scores at the Chew at Woollard site ranged between 3 and 12. The vast majority of samples scored between 7 and 10. The highest scores were recorded in spring and early summer. The site was monitored fourteen times between July 2021 and present day. Three samples fell below the trigger level of 6, these were from June 2022 (5), August 2022 (3) and September 2022 (5). This coincides with the drought conditions recorded in the catchment in summer 2022 and also the trigger level breaches recorded at Parsonage farm, just upstream, in the same season. The trigger level breaches were reported to the Environment Agency and included in their drought investigations.

All of the eight RMI groups have been recorded at the Woolard site with burrowing mayflies being the most abundant of the eight RMI groups. Shrimps and casless caddisflies were the least abundant of the RMI groups. The RMI data shows low numbers of each RMI group are generally found at the Woolard site with five of the eight groups having an average abundance of under ten. The RMI data suggests conditions at the site are able to support a moderate diversity of Riverfly groups and that the riverfly groups are sensitive to low flow conditions.

Riverfly total scores at the Chew at Cradle Bridge site ranged between 8 and 13. Six out of the ten samples collected scored a 10. The site was monitored eight times between September 2021 and October 2022 and then there was a gap in monitoring. The volunteer started monitoring again in June 2024. No samples fell below the trigger level of 7.

All of the eight RMI groups have been recorded at the Cradle Bridge site with cased caddisflies being the most abundant of the eight RMI groups. Shrimps were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a moderate to good diversity of riverfly groups.

Riverfly total scores at the Chew at Uplands Field site ranged between 9 and 17. The site was monitored seven times between September 2020 and April 2022. The majority of samples scored 9 or 10. Only one sample scored above 13 – this was the April 2022 score of 17. No samples fell below the trigger level of 6.

All of the eight RMI groups have been recorded at the Uplands Field site with burrowing mayflies being the most abundant of the eight RMI groups. Caseless caddisflies were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of riverfly groups.

Riverfly total scores at the Chew at Dapps Bridge site ranged between 6 and 10. The site was monitored seven times between June 2023 and present day. No samples fell below the very low trigger level of 2. It is suggested that this trigger level is increased to reflect the scores at the site more accurately now we have a regular monitor in place.

All of the eight RMI groups have been recorded at the Dapps Bridge site with stoneflies being the most abundant of the eight RMI groups, still with low numbers however – an average abundance score of 15 over all the samples. Shrimps were the least abundant of the RMI groups with only two individuals found at the site. The RMI data shows low numbers of each RMI group are generally found at the Dapps Bridge site with seven of the eight groups having an average abundance of under ten. The RMI data suggests conditions at the site are able to support a moderate diversity of riverfly groups.

Riverfly total scores at the Chew Stoke Stream at Chew Stoke Waterfall site ranged between 8 and 12. The site was monitored fourteen times between September 2019 and present day. The July 2024 sample fell below the trigger level of 8 (score of 6). Following the trigger level protocol and with the advice of BART the monitor sampled again the next day and recorded a score of 7, still below trigger. The trigger level breach was reported to the Environment Agency's Analysis and Reporting (A&R) Team. The monitor had also noticed high levels of algae at the site smothering the substrate. The A&R contact asked to be kept informed of riverfly scores. The site was monitored again in October 2024 and although lower than usual the score of 8 hit the trigger level threshold. The monitor also reported at this time that the algae had now gone from the site.

All of the eight RMI groups have been recorded at the Chew Stoke Waterfall site with flat bodied mayflies being the most abundant of the eight RMI groups. This is unusual as normally flat bodied mayflies are less commonly found than most of the other groups. Cased caddisflies and stoneflies were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of Riverfly groups.

Riverfly total scores at the Chew Stoke Stream at Chew Stoke Village site ranged between 8 and 12. The site was monitored six times between September 2019 and October 2020. No samples fell below the trigger level of 8.

All of the eight RMI groups have been recorded at the Chew Stoke Village site with shrimp being the most abundant of the eight RMI groups. Blue winged olives were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of riverfly groups.

Riverfly total scores at the Hollow Brook at Bishop Sutton ranged between 8 and 16. The site was monitored regularly between October 2021 and present day. The highest scores of 15 and 16 were collected in March and April 2022. No samples fell below the trigger level of 6.

All of the eight RMI groups have been recorded at the Hollow Brook site with shrimps being the most abundant of the eight RMI groups with a fairly high average abundance score of 111. Burrowing mayflies were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of riverfly groups.

Riverfly total scores at the Compton Dando Stream ranged between 7 and 13. The site was monitored regularly between December 2022 and present day. No samples fell below the trigger level of 7. The Compton Dando riverfly site was set up in summer 2022 but could not be sampled until December 2022 due to very low river levels.

All of the eight RMI groups have been recorded at the Compton Dando Stream site with shrimps being the most abundant of the eight RMI groups. Caseless caddis flies were the least abundant of the RMI groups. The RMI data suggests conditions at the site are able to support a good diversity of Riverfly groups.

4.2.2 RMI General Discussion

The drought conditions of summer 2022 affected many of the rivers in the catchment and the RMI data from sites such as those on the Chew helped to inform the Environment Agency's drought investigations. Chew sites showing clear drought impacts include the Compton Dando Stream site, the Chew at Woolard and the Chew at Parsonage Farm site. The Compton Dando Stream site could not be sampled in summer 2022 due to very low flows. The RMI volunteer at the Parsonage Farm site reported extremely low flows in summer and early autumn 2022, a smell of sewage (reported to EA) and very low Riverfly scores. The RMI scores at this site were below the trigger level of 9 for August (7), September (6) and October (7) 2022. The Riverfly score recovered in the December 2022 sample to that expected for this time of year.

The taxon recorded at the Chew riverfly sites varies between sites and seasons. It has, however, been noted that Chew sites have low numbers of shrimps compared to other riverfly sites in the catchment. Analysis of national data over the last five years using the Riverfly Partnership's data hub showed that the average abundance score for shrimps nationally was 189 – by far the highest abundance score of all the eight groups. The average abundance score for shrimps in the Bristol Avon catchment over the last five years was 82 – again the highest abundance score of all the eight groups. The average abundance score for shrimps in the Chew catchment over the last five years was 13, considerably lower than both the national average and the Bristol Avon average.

Further analysis of national data over the last five years showed that the group with the highest abundance score on the Chew was Ephemeridae – the burrowing mayfly. The average abundance score of the burrowing mayfly on the Chew was 51. The national average abundance score for the burrowing mayfly was 10 and the average abundance score for the Bristol Avon was 15, showing that conditions on the Chew are favourable for the burrowing mayfly Ephemeridae.

5. References

BS EN ISO 10870:2012 Water quality - Guidelines for the selection of sampling methods and devices for benthic macro-invertebrates in fresh waters

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RiverHub Data Platform 2024: https://riverhub.co.uk/

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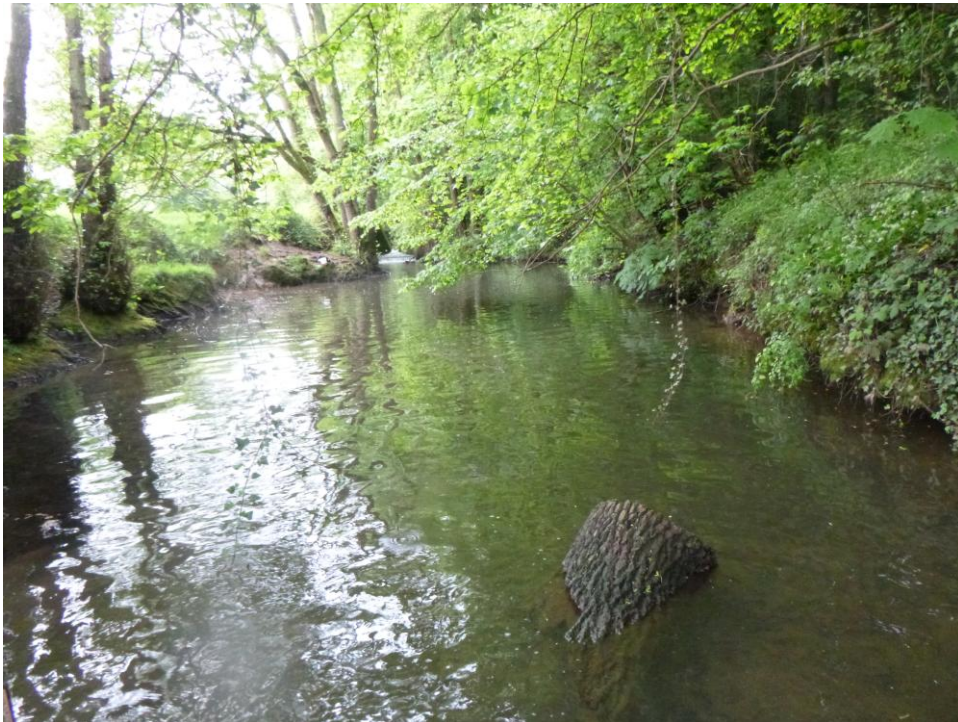
6. Appendices

Appendix 1 – Site photos

Macro-invertebrate site 1: At Shrowle, Spring 2022

Macro-invertebrate site 1: At Shrowle, Autumn 2022

Macro-invertebrate site 2: DS Chew Reservoir, Spring 2022

Macro-invertebrate site 2: DS Chew Reservoir, Autumn 2022

Macro-invertebrate site 3: 20m DS Bridge at Stanton Drew, Spring 2022

Macro-invertebrate site 3: 20m DS Bridge at Stanton Drew, Autumn 2022

Macro-invertebrate site 4: At Parsonage Farm, Spring 2022

Macro-invertebrate site 4: At Parsonage Farm, Autumn 2022

Macro-invertebrate site 5: At Dapps Bridge, Spring 2022

Macro-invertebrate site 5: At Dapps Bridge, Autumn 2022