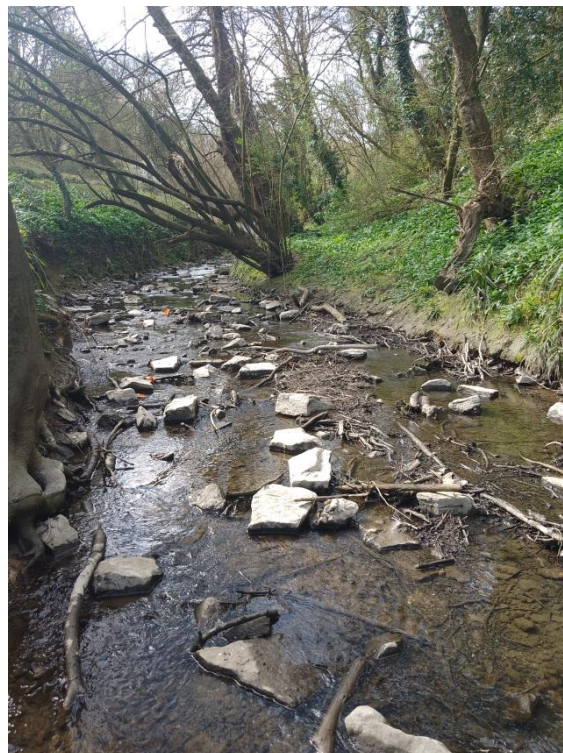# South Bristol Rivers Macro-invertebrate Monitoring Summary Report

June 2025

Version history

Revision	Date	Description	Author(s)	Reviewer(s)	Approval
0.0	June 2025	Final	JG	SH	SH

1. Introduction and Site Locations

Bristol Avon Rivers Trust secured funding from the John Spedan Lewis Foundation to carry out SmartRivers macro-invertebrate monitoring in South Bristol throughout 2024 and 2025. SmartRivers, led by WildFish, is a water quality monitoring initiative that uses species-level macro-invertebrate sampling to identify and better understand the pollutants impacting river health.

BART's freshwater ecologist collected macro-invertebrate samples at five sites in autumn 2024. The sampling was repeated at the same sites in spring 2025. The purpose of the monitoring was to establish a baseline assessment of the macro-invertebrate assemblages in the project area. This report covers the findings of the macro-invertebrate surveys.

Figure 1 below shows the location of the sites on the Ashton Brook, Pigeonhouse Stream, Malago Brook, Colliter's Brook and Brislington Brook. Appendix 1 includes further information on each of the sites including the substrate type and grid reference. Appendix 2 includes photos of each survey site.

Figure 1 Monitoring site locations

2. Methodology

A macro-invertebrate sample was collected in autumn 2024 and again in spring 2025 using the standard three minute kick sample and one minute stone search methodology. The sampling method conformed to: BS EN ISO 10870:2012 Water quality - Guidelines for the selection of sampling methods and devices for benthic macroinvertebrates in fresh waters (BSI 2012).

Each sample was placed in a labelled bucket 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 *u*m 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 WildFish SmartRivers cartographer database for data analysis.

3. Results

SmartRivers Pressure Rating scores are included in table 1 below.

Site Name	Number of scoring taxa		BMWP		Chemicals (SPEAR)		Nutrient "P" (TRPI)		Organic (Saprobic value)		Siltation (PSI)		Flow (LIFE)	
	Aut	Spr	Aut	Spr	Aut	Spr	Aut	Spr	Aut	Spr	Aut	Spr	Aut	Spr
Malago Brook at Malago Drive	15	11	77	50	MI	MI	I	MI	SI (1.89)	UI (1.3)	I	I	MI	MI
Ashton Brook at Park and Ride	15	12	72	61	I	MI	SI	UI	SI (2)	SI (1.99)	MI	SI	SI	SI
Colliter's Brook at Yew Tree Farm	21	16	113	85	I	SI	SI	UI	SI (1.89)	SI (1.92)	SI	UI	SI	UI
Pigeonhouse Stream at Crox Bottom	13	13	50	48	HI	HI	MI	I	MI (2.42*)	MI (2.55*)	HI	I	HI	I
Brislington Brook at Nightingale Valley **	8	8	27	27	HI	HI	**	**	SI (2.01*)	SI (2.01*)	MI	MI	SI	UI

Table 1 – South Bristol SmartRivers Overview

*Experts at WildFish state that SmartRivers saprobric scores above 2 should be flagged as problematic

** Experts at Wildfish state that at WHPT NTAXA below 10 the TRPI scores should be discounted (and other metrics treated with caution) as the invertebrate community is too poor to calculate scores. The WHPT NTAXA was below 10 for both of the Brislington Brook samples

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

Table 2 – Pressure Ratings Key

Site	Season	BMWP Score
Colliter's Brook	Autumn	113
Colliter's Brook	Spring	85
Malago Brook	Autumn	77
Ashton Brook	Autumn	72
Ashton Brook	Spring	61
Malago Brook	Spring	50
Pigeonhouse Stream	Spring	48
Pigeonhouse Stream	Autumn	50
Brislington Brook	Autumn	27
Brislington Brook	Spring	27

Table 3 – BMWP scores rated from highest score to lowest score

4. Discussion and recommendations

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 considerably between sites.

BMWP is a procedure for measuring water quality using species of macro-invertebrates as biological indicators. The method is based on the principle that different aquatic invertebrates have different tolerances to pollutants. Table 3 ranks the South Bristol samples based on their BMWP scores from high scoring (indicating good water quality) to low scoring (indicating bad water quality). Each sample site is discussed in turn below.

Colliter's Brook

The Colliter's Brook samples had the greatest diversity of macro-invertebrates present (21 scoring taxa in autumn and 16 in spring) and the highest BMWP scores (113 and 86) compared to the other sites. These scores indicate that conditions at the Colliter's Brook site were able to support a good range of macro-invertebrates. Habitat conditions at this site were good with a good variety of substrate types (cobbles, pebbles, gravel, sand, silt and clay), a mix of flow types (riffle, run and pool) and a point bar located on the RHB pinching the channel in this location.

The SmartRivers pressure scores shown in table 1 support these findings with scores of unimpacted or slightly impacted for all pressures with the exception of chemicals in autumn which scored "impacted". There are a number of possible sources of chemicals in watercourses including point source pollution from road run off, leachate from former landfill sites and diffuse pollution from pesticides, herbicides or fungicides applied to agricultural land. **Further investigation into the water quality issues on the Colliter's Brook is recommended. This should involve a desk top study looking at current data as well as targeted water quality monitoring if necessary.**

Malago Brook

The Malago Brook sample site was located on a stretch of the brook where BART had previously undertaken restoration works. Berms were seen to be pinching the channel nicely at the survey site with good riffle and run flow recorded in this location. Thick overlaying silt was, however, was ~~also~~ recorded at the site. The macro-invertebrate assemblages found were more limited in the spring sample than in the autumn sample (11 scoring taxa and 15 scoring taxa respectively) and the BMWP water quality score was also much lower in spring (50 compared with 77). As well as a low diversity of taxa in spring, the taxa were also present in very low numbers. For example, of the 11 taxa only three had abundances over four - shrimps (*Gammarus pulex)* and two caseless caddis fly families (*Agapetus fuscipes* and *Hydropsyche siltalai*).

The SmartRivers pressure scores showed that four of the five pressures were having a concerning impact on the macro-invertebrates in this location. The pressure of least concern at this site was organics. Although restoration works have likely improved the habitat at this site, the macro-invertebrate communities are still restricted by the water quality issues here. **Further investigation into the water quality issues on the Malago Brook is recommended – this should involve a desk top study looking at current data as well as targeted water quality monitoring and a wet weather survey if necessary.**

Ashton Brook

The Ashton Brook site had very poor habitat conditions recorded on the survey form. The substrate was recorded as 80% silt, the banks were very steep and the flow was recorded as a very slow (nearly slack) run. As with the Malago Brook site the macro -invertebrate assemblages found in the Ashton Brook were fairly limited and most taxa were present in low numbers. For example in the autumn sample, although 15 scoring taxa were recorded, only three had abundances over ten – shrimps, worms (Oligochaeta) and leeches (*glossiphonia complanata*). In spring, out of the 12 scoring taxa only shrimps, non biting midge larvae (*prodiamesinae*) and fly larvae(*eloeophila sp*) had abundances over ten. With the exception of shrimps which score 5 (midway) on the BMWP water quality scale, these taxa are all pollution tolerant.

The SmartRivers pressure scores show that chemicals are the pressure of most concern at this site. Siltation was also flagged as an issue of concern in the autumn sample – the heavy siltation at this site would support this finding. **Further investigation into the chemical water quality issues and heavy sedimentation on the Ashton Brook is recommended – this should involve a desk top study looking at current data as well as targeted water quality monitoring and a wet weather survey if necessary.**

Pigeonhouse Stream

The Pigeonhouse Stream had a very restricted diversity of macro-invertebrates present in both samples. Only 13 scoring taxa were recorded in each sample and BMWP scores were low for both samples. The surveyor recorded sewage fungus present on stones and a strong smell of sewage during both spring and autumn sampling. There was a good range of substrate types (boulders, cobbles, pebbles, sand and silt) present at the site and a large riffle habitat was present, although overlaying silt was recorded on the substrate.

The SmartRivers pressure scores showed a concerning impact on the macro-invertebrates from all five pressures. Chemicals scored heavily impacted in both seasons and siltation and flow scores were both heavily impacted in autumn and impacted in spring. The Pigeonhouse Stream had the highest Saprobic values of all the sites suggesting significant organics issues here. **Further investigation into the water quality issues on the Pigeonhouse Stream is recommended – this should involve a desk top study as well as further macro-invertebrate monitoring, targeted water quality monitoring and a wet weather survey if necessary.**

Brislington Brook

The Brislington Brook samples had the lowest diversity of macro-invertebrates present of all the sites (only 8 scoring taxa in each sample) and very low BMWP scores (27 in both samples). These scores indicate that conditions at the Brislington Brook site are not able to support a good range of macro-invertebrates. The habitat at the Brislington Brook site was good with riffle and run habitats recorded, good substrate composition and light shading present. It is, therefore, likely that significant water quality issues are impacting the Brislington Brook site and restricting the macro-invertebrate communities here.

The SmartRivers pressure scores support these findings and the heavily impacted chemical scores for both autumn 2024 and spring 2025 indicate that chemicals are the greatest pressure here. Sediment is also likely to be an issue in this location with a siltation score of moderately impacted for both

seasons. Experts at Wildfish state that at sites with WHPT NTAXA below 10 the TRPI (Phosphate) scores should be discounted (and other metrics treated with caution) as the invertebrate community is too poor to calculate scores. The WHPT NTAXA was below 10 for both of the Brislington Brook samples.

Further investigation into the water quality issues on the Brislington Brook is recommended – this should involve a desk top study as well as further macro-invertebrate monitoring, targeted water quality monitoring and a wet weather survey if necessary.

5. References

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

6. Appendices

Appendix 1

River	Site name	Grid reference	Habitat composition
Malago Brook	Malago Drive	ST 58477 70768	Cobbles 20% Pebbles 30% Gravel 30% Silt 20%
Ashton Brook	Park and Ride 1	ST5581370662	Gravel 10% Sand 10% Silt 80%
Colliter's Brook	Yew Tree Farm	ST 55933 69738	Cobbles 40% Pebbles: 30% Gravel: 10% Silt: 10 Clay: 10
Pigeonhouse Stream	At Crox Bottom	ST 58190 69104	Boulders 10 Cobbles 20 Pebbles 20 Gravel 20 Sand 10 Silt 20
Brislington Brook	At Nightingale Valley	ST 62150 71812	Cobbles 40 Pebbles 10 Gravel 20 Sand 15 Silt 15

Appendix 2 – Site photos

Malago Brook

Ashton Brook

Colliter's Brook

Pigeonhouse Stream

Brislington Brook