Sid Valley Biodiversity Group

Report on the water quality of the River Sid, its tributaries and Bickwell Brook

Introduction to the Sid Catchment

The Sid rises at Crowpits Covert (OS grid ref. SY138963) just N of the Ottery St. Mary to Seaton road, 800m W of the Hare and Hounds at Putts Corner. This covers about 40Km2.

The river has a calculated mean daily discharge of 0.574 m3/sec but is very variable in view of the rapid response to rainfall.

From its source, at 206m. OD, the river flows S for 10.5 km. The average gradient is 20m per Km [in comparison, the Otter gradient falls 6m per Km.]

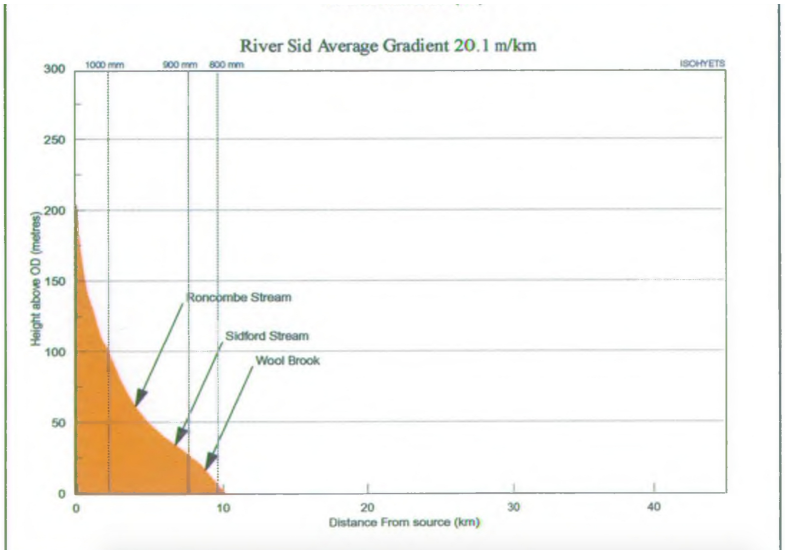


Fig 1 River Sid gradient

As a consequence of the steep gradient, the river has the energy necessary for rapid erosion, exacerbated by anthropogenic intervention such as straightening the river.

Photo 1 The Ham looking up stream showing the river's straightened west bank and the new Alma Bridge Oct 2020

Historically, The Ham was a marshy area to the E of the current river channel and part of the flood plain.

The valley is deeply incised with many very steep sided inaccessible watercourses called Goyles, which feed five main tributary streams.

The predominant rock type is Triassic mudstone which gives rise to red clay soils. Both bedrock and soils have low permeability leading to extreme run off after heavy rainfall.

Permeable greensand overlies the mudstone; a spring line around the valley delineates the junction between the two. Broadly speaking, the spring line is marked by a change in vegetation. The greensand is populated with deciduous woodland, and coniferous plantations but the mudstone is farmland, largely pastoral with some arable crops.

The greensand area is designated a Nitrogen Vulnerable Zone [NVZ] which attracts more stringent regulations concerning application of fertilisers, slurry containment and use.

Permeable bright red Otter sandstone underlies the Triassic mudstone and is restricted to the lower catchment in Sidmouth, visible by the Millenium walkway to the west of the town and by the new Alma Bridge in the East. See Photo 1.

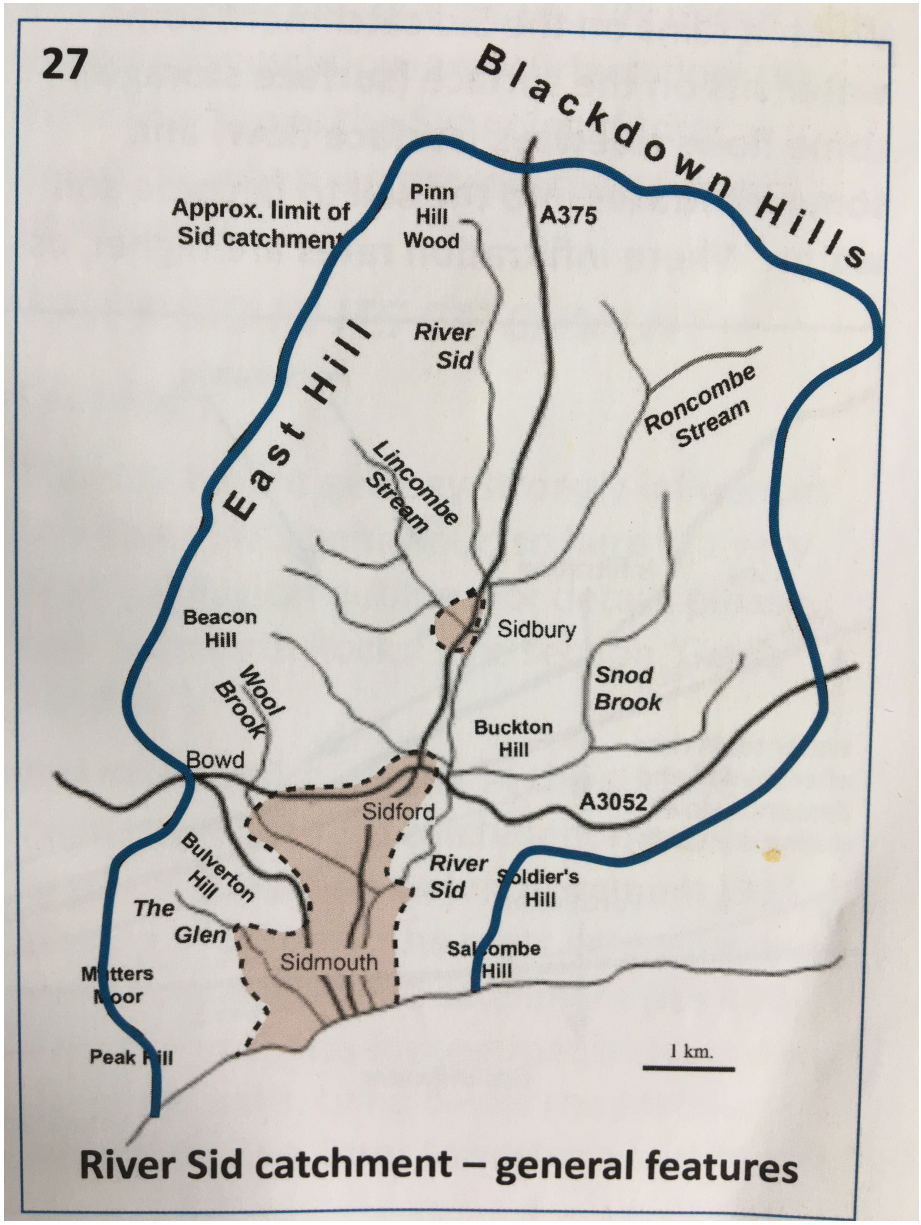


Fig 2 Sidmouth's River by Dr. Roger Trend

Sidmouth Town is built on the flood plain and requires flood protection. A robust training wall on the west bank, clearly visible from the ford, confines the river. Numerous weirs slow the river's flow. The latest weir to be built was the 2.5m high School Weir [1974], part of the large flood alleviation scheme planned after extensive flooding in the 1960s. This barrier prevents the passage of migratory fish and eels to the detriment of the river's biodiversity.

Photo 2 School Weir fish and eel barrier

Monitoring water quality

Water quality is important in sustaining a healthy web of life across the valley.

In September 2015 the Environment Agency [EA] ceased monitoring on the River Sid itself. After eight years it is pleasing that they have started again and monitored at Sidmouth, School Weir in Jan. Feb and Mar. 2023.

https://environment.data.gov.uk/water-quality/view/sampling-point/SW-RSN0947

Our data fills a gap and will continue to do so as EA monitoring will be in limited locations.

Burscombe Brook, a tributary of the Sid has been EA monitored since 2021

Period of Data collection

This report is based on data collected monthly in eleven sites from Spring 2021 - Spring 2023 as part of the West Country Rivers Trust Citizen Science Investigation [WRT CSI] In some locations monitoring began in 2020 but Covid intervened and we stopped taking measurements for 4 months. All post Covid data is shown in Appendix 1.

Monitoring sites

These include four locations on the River Sid, and one location on each of five tributary streams close to their confluence with the Sid:

Roncombe Stream, Lincombe Stream, Snod Brook, Burscombe Brook and Woolbrook,

The Woolbrook is monitored on the same day in two locations, at its confluence with the Sid a Lymebourne and just S of the Exeter Road.

Bickwell Brook, a small stream draining the west side of the valley that discharges directly onto the Town Beach, is monitored in Glen Goyle S of Cotmaton Road.

Occasional spot monitoring occurs at Fortescue and other locations where problems have arisen.

Salcombe Mouth was added to our monitoring sites in May 2023 when a new volunteer joined us.

Details of monitoring sites are posted on our website. https://sidvalleybiodiversity.org

Sid catchment sampling sites

1 Plyford

2 Roncombe Stream

3 Lincombe Stream

4 Sid at Sidbury

5 Snod Brook Harcombe

6 Snod Brook Sidford

7 Burscombe Brook

8 Sid at Sidford bridge

9 Woolbrook at Stowford

10 Woolbrook at Lymebourne

11 Sid at school weir

12 Bickwell Brook at Broadway

13 Bickwell Brook at Glen Goyle

14 Fortescue

Fig 3 Monitoring sites [no monitoring at site 10]

Our monthly surveys

In order to understand our watercourses, we record features such as river channel width, water depth, rate of river flow, the character of the river bottom, potential sources of

pollution, land use on the adjacent banks., presence of Invasive species such as Himalayan balsam and Japanese Knotweed.

Wild life present in and around the water e.g. wagtails, dippers, kingfishers, water measurers, fish and otters.

[WRT Survey Sheet https://wrt.org.uk/wp-content/uploads/2022/01/CSI-Survey-Form-2021.pdf

This report is limited mainly to the discussion of 4 parameters, namely temperature, total dissolved solids [TDS], turbidity and phosphate.

Temperature

This changes with the seasons, the range is 6C – 17C approx. The highest readings are usually in July and August.

Temperatures of up to 18C have been reached on Lincombe and Burscombe Brooks and 20C recorded on Bickwell Brook.

A rise in temperature brings about a decrease in the amount of oxygen dissolved in the water at a time when aquatic organisms demand additional oxygen.

Heat can cause fish to spawn and hatch out of season. Some shading by watercourses helps to protect against heat.

Toxic chemicals e.g. cadmium zinc and lead dissolve more easily in warmer water and aquatic creatures are less able to withstand the effect of poisons.

In the long term, our data on temperature may reveal the effect of climate change.

Total Dissolved Solids [TDS]

The quantity of dissolved chemicals is directly related to the conductivity of the water. The more minerals, salts and metals that are dissolved in the water the more conductive it becomes and the higher the reading. Some pollutants such as oil can lower conductivity.

Fig 3 Probe for monitoring Temp. and TDS

Natural sources of dissolved solids include calcium, magnesium and potassium from rocks and soils. The natural level of TDS will be influenced by rock and soil types in the catchment together with the length of time the water has been in contact with the land.

Man made sources include farm run off from fertilisers, pesticides and herbicides and urban run off from vehicles, road abrasion, garden chemicals and corroded metals.

Rainwater falling on 28/9/21 had a TDS of 12 ppm. Sid Lane tap water tested in Oct. 2021 was 220ppm [150 - 250ppm is rated as good drinking water] Seawater is around 35,000ppm.

Sudden drops in river water TDS appear to be directly related to heavy rainfall but in times of drought the dissolved solids can be concentrated and readings elevated.

Plyford, in the upper catchment, has the lowest TDS readings not exceeding 70ppm followed by Sidbury, rarely exceeding 150ppm in contrast the Sid at Sidford and School Weir are usually above 165ppm reaching 200ppm on a few occasions.

Two Sid tributaries of particular concern are Burscombe Brook and Woobrook ranging from above 200 to 250ppm. Both only dip below 200ppm during times of heavy rainfall. The highest recorded TDS on Burscombe was 288ppm and on Woolbrook 270ppm.

Turbidity

Turbidity is a visual measure of water clarity. We test this by looking down through the water sample collected in a measuring cylinder at what is called a secchi disc [20 cm disc with alternating black and white quadrants] placed at the bottom. The muddier the water the lower the volume of water needed to hide the disc.

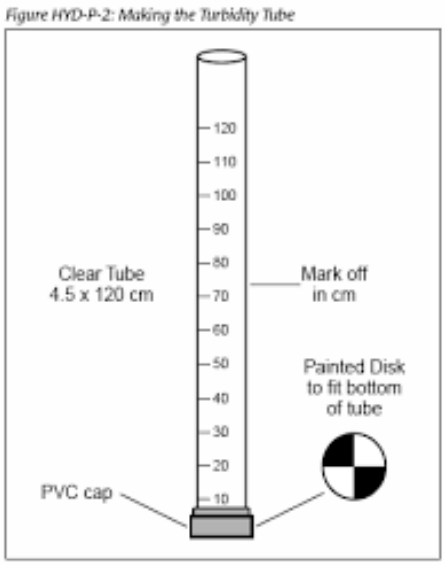


Fig 4 Turbidity monitor - measuring cylinder with secchi disc

In dry weather the Sid is very clear but after rainfall brown soil muddies the water. After heavy rainfall, red soil from our hillsides flows into the river and out to sea. The soil, which sustains us, is steadily being lost. Not only a problem for farmers but for biodiversity and our food supply.

Mud suspended in the water means less light reaches aquatic plants diminishing their ability to photosynthesize and grow. Mud which settles on the river bottom smothers the stones and gravel, compromising aquatic organisms' ability to breathe and spoiling the clean gravels where fish spawn. Particles of mud can contain unwelcome chemicals from pesticides and fertilizers.

Photos 3 and 4 below show the contrast in turbidity at School Weir.

School Weir 3rd June 2021 after a dry period

School Weir 13th May 2021 after heavy rain

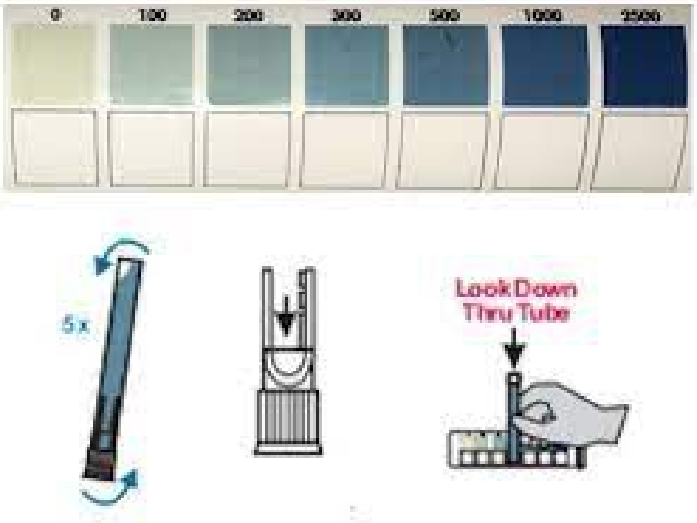
Phosphates

Phosphate occurs naturally within the river ecosystem, but in low levels under 100ppb. Higher levels may indicate anthropogenic input.

Phosphates are essential for plant and animal growth. But human activities can add excessive amounts to the environment. Algae respond with rapid growth in still water areas and this prevents light reaching aquatic plants. and lowers oxygen levels, bad news for fish and most aquatic invertebrates.

We test with a phosphate indicator strip and a colour chart. The indicator strip is put into a tiny test tube with a 10ml. water sample; the test tube is turned up and down 5 times. The indicator strip turns blue. The shade will vary according to the amount of phosphate present.

Fig 5 Phosphate monitoring equipment



O - 100ppb normal

200 – 300 ppb high,

500ppb - 2500ppb too high

Main sources of phosphates in the Sid Valley are agricultural e.g. fertilisers and slurry and urban sources such as cleaning products. We can all select phosphate free cleaning products to prevent so much phosphate reaching our coastal environment where it can promote algal blooms. Phosphate is necessarily added to treated water because it protects old lead pipes from corrosion which otherwise might contaminate our drinking water. Both Woolbrook and Burscombe Brook have unacceptably high phosphate levels. Woolbrook readings have been known to exceed 500ppb and Burscombe Brook readings reach 500ppb.

Pollution Incidents

In 2021, one of our volunteers alerted the EA to problems on Weston Stream,

because of an over flowing slurry pond. The EA confirmed that the situation had been rectified.

There have been a number of urban pollution incidents on the Woolbrook

5th April 2020 – Sewage related contaminated run-off caused by damaged to a South West Water asset by a Third Party

24th January 2022 – Discoloured water seen at night, polluter and contamination not identified

9th March 2022 – Inadequate control and containment of Commercial Waste This occurred at Lidl

[Source: EA]

Bridge Works, Fortescue,. Pollution of River Sid with sediment from Fortescue to its mouth due to bridge construction.

Photo 5 River gravel smothered with sediment

The EA stopped the building works until the constructors, Mac Plant, had put sediment traps in place as conditioned in their permit.

Photo 6 Fortescue Bridge works

Diffuse pollution from nutrient rich run off from fields which eventually drains into the water system is an on going issue.

Photo 7 Nutrient rich run off full of algae drains across the Muttersmoor Road and into Bickwell Brook.

Summary of Findings

1. Temperature

The catchment range was typically 6C – 17C but 18C have been recorded on Lincombe Stream and Burscombe Brook and 20C on Bickwell Brook in Glen Goyle. The highest readings are usually in July and August. A future consideration might be tree planting to provide shading on some river stretches to protect river life.

2. Total Dissolved Solids [TDS]

Plyford, in the upper catchment, has the lowest TDS readings not exceeding 70ppm followed by Sidbury, rarely exceeding 150ppm, in contrast, the Sid, at Sidford and School Weir are usually above 165ppm reaching 200ppm on a few occasions. It is to be expected that TDS would increase as the water travels downstream and there are more opportunities for chemicals, whether natural or man made, to dissolve in the water. Two Sid tributaries of particular concern have TDS levels considerably above the main river. . Burscombe Brook and Woobrook generally range from 200 ppm to 250ppm. Both only dip below 200ppm during times of heavy rainfall. The highest recorded TDS on Burscombe was 288ppm and on Woolbrook 270ppm.

3. Turbidity

The clarity of our fast flowing river water is an attractive feature of the river and of benefit to river life. However, after rainfall, soil is easily lost from both eroded riverbanks and our steep hillsides. Land management is important, as are hydrological interventions to slow the rate of erosion. These could also benefit biodiversity.

4. Phosphates

Generally, phosphate readings in the catchment are low but the Snod has some high readings and the Woolbrook and Burscombe Brook readings are often unacceptably high. Woolbrook readings have exceeded 500ppb occasionally and Burscombe Brook readings reach 500ppb. These streams also have high TDS and the two could be related.

What's next?

Continue with our monthly monitoring programme which may reflect changes related to global warming and will give us data to justify interventions to improve water quality and river habitat. This might include bank restoration to reduce soil run off and provide additional river edge vegetation habitat and planting to provide shade especially in streams where water temperature might be detrimental to river organisms.

Volunteers have recently trained to carry out River Fly Surveys. This is a nationwide programme which involves kick sampling a river bed in a defined locality to discover the presence and abundance of eight indicator species, mainly the laval forms of flies, from these data a score is given. Performed in one locality regularly over time, it allows us to note any changes to this river fauna. This will be a useful addition to our data set.

A closer investigation of Woolbrook and Burscombe Brook has begun. Electrofishing surveys conducted in 2014 and 2023 found there were no fish in the Lower Woolbrook.

As a result of our observations, the urgent necessity for remediation to temper rapid run off has become clear. To this end we now have a catchment advisor, Simon Browning, who works for the rivers Trust. He has identified 125 hot spots, both urban and rural, where run off is especially intense and interventions might result in water being held for longer on the land meaning a reduction in its erosive power and greater drought resilience.

in terms of our monitoring, in future years it might be possible to extend the range of tests available to Citizen Scientists and to work more closely with the professionals. CaSTCo [Catchment systems Thinking Cooperative] is a national pilot project funded by Ofwat to trial the potential to give citizen scientists more robust training endorsing the reliability of their results so enabling a closer working relationship with professionals such as EA officers.

We have made contact with our new EA officer Chris Angell hope to develop a good working relationship with him.

A huge debt of gratitude is owed to our team of water monitors, listed in Appendix 2. Their data is the basis for this report and continues to contribute to our understanding, protection and improvement of the catchment.

Thanks to the West Country Rivers Trust who organise and run the Citizen Science Investigation programme across SW England, the East Devon Catchment Partnership [EDCP] who support catchment projects in East Devon, advise and bring stakeholders together and East Devon Area of Outstanding Natural Beauty [ED AONB] who support initiatives to improve our environment and provide information about the area and networking opportunities.

Appendix 1

Data from Sid Valley monitoring sites

Key

RAIN None - no rain in the last 24 hours prior to monitoring.

LR – Light Rainfall/showers

HR –Heavy Rainfall

TEMP – temperature of the water measured in degrees Centigrade

TDS - Total Dissolved Solids Measured in parts per million - ppm

TURB – turbidity of the water - a function of how much suspended sediment is present measured in Nephelometric Turbidity Units (NTU). Normally the Sid is less than 12NTU but it increases considerably after heavy rain.

PHOS – phosphate, concentration measured in parts per billion - ppb

Classification

NORMAL O - 100ppb

HIGH 200 – 300 ppb

TOO HIGH 500ppb - 2500ppb

River Sid Monitoring Locations

Plyford SY 14129 94671

Date	Rain	Temp C	TDS ppm	TURB NTU	PHOS ppb
31/3/23	HR	10.4	55	19	0
25/2/23	None	6.7	70	<12	0
29/1/23	None	8.7	72	<12	0
1/12/22	None	9.8	67	<12	0
				<12	0
9/10/22	None	13.1	69	<12	0
26/8/22	None	14.5		<12	0
27/6/22	LR	13	69	<12	0

23/5/22	LR	12.3	65	<12	0
21/4/22	None	10.6	50	<12	0
31/3/22	LR	9.7	69	<12	0
22/2/22	LR	10.2	70	<12	0
18/1/22	None	9.2	66	<12	0
18/12/21	None	9.2	69	<12	100
14/11/21	None	10.5	70	<12	0
10/10/21	None	11.6	53	<12	0
23/8/21		15	69	<12	0
18/7/21	None	14.5	70	<12	0
26/6/21	LR	13.1	56	<12	0
6/5/21	HR	10.3	56	<12	100
9/4/21	None	12.2	141	<12	100

Sidbury SY14067 9180

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS. ppb
31/5/23	None	12.7	163	<12	0
31/3/23	HR	11.1	79	40	100

25/2/22	None	6.7	70	<12	0
29/0122	None	8,5	151	<12	0
1/12/21	None	9.7	136	<12	0
9/10/22	None	14.4	156	<12	0
26/8/22	None	16	-158	<12	0
27/6/22	LR	14.4	147	<12	100
23/5/22	LR	13.4	138	<12	0
21/4/22	None	12.3	147	<12	0
31/3/22	LR	9.8	152	<12	0

22/2/22	LR	10.3	160	<12	0
18/1/22	None	9.2	66	<12	100
18/12/21	None	9.3	144	<12	100
14/11/21	None	10.5	146	<12	0
19/10/21	None	14.7	133	<12	100
9/9/21	LR	16.8	122	<12	100
	-				
24/7/21	HR	16.3	133	<12	100
2//7/21	None	15.6	144	<12	100
6/6/21	None	16.1	148	<12	0

Sidford SY13732 89937

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS. Ppb
2/4/23	HR	9	185	15	0
6/3/23	None	7.6	184		
				<12	0
30/1/23	None	10.8	188		
				<12	0
26/11/22	LR	10.8	152	<12	0
13/1022	LR	14.1	205		
3/9/22	None	17.1	203	<12	100
29/7/22	None	18.1	203	, <12	-
22/6/22	None	17.4	193	, <12	0
25/4/22	None	15	180	<12	100
31/3/22	LR	10	198	<12	100
27/2/22	None	8.2	177	>12	0
31/12/21	LR	12.4	154	14	100
24/11/21	None	9.1	127	<12	100
31/10/21	HR	13.7	196	52	100

25/9/21	None	16.8	200	<12	200
30/8/21	None	14.8	181	<12	100
20/6/21	LR	15.8	152	<12	100
25/5/21	HR	10.1	127	<12	100
29/4/21	LR	9.1	184	<12	100

Sidmouth School Weir SY12778 87884

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS. ppb
9/5/23	HR	12.6	128	25	0
16/4/23	LR	11	151	<12	100
5/3/23	None	7.4	193	<12	0
8/2/23	None	5.5	182	<12	0
2/1/23	HR	8.7	145	<12	0
3/12/22	None	8.1	192	<12	100
4/11/22	LR	12.5	158	25	0
13/10/22	LR	13.8	181	<12	100
19/9/22	LR	13.4	178	<12	100
5/8/22	None	16.1	187	<12	200
18/7/22	None	15.9	192	<12	300
6/6/22	None	15.8	181	>12	100
10/5/22	LR	15.3	187	>12	100
3/4/22	LR	8.4	191	<12	100
3/3/22	HR	9.8	103	110	100
7/2/22	LR	8.5	164	<12	100
12/1/22	None	7.8	166	<12	100
7/12/21	HR	8.5	132	240	100
3/11/21	None	9.4	153	<12	100
5/10/21	HR	14.5	130	25	0
7/9/21	None	16.2	182	<12	0
4/8/21	None	17.3	188	<12	0
6/7/21	LR	16	153	19	0
3/6/21	LR	14.2	188	<12	0

6/5/21	LR	9.5	177	<12	100
7/4/21	LR	7.2	187	<12	100

Sid tributaries monitoring locations

Roncombe SY14238 92217

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS. ppb
31/5/23	None	12.8	183	<12	100
30/4/23	LR	13.4	131	<12	0
31/3/23	HR	11.1	79	40	100
25/2/23	None	7	162	<12	0
29/1/23	None	7.6	161	`, <12	0
1/12/22	None	9.3	144	`<12	100
9/10/22	None	13.2	165	<12	100
26/8/22	None	16.1	175	19	100
27/6/22	LR	14.7	165	<12	100
23/5/22	LR	13	151	<12	100
21/04/22	None	11.2	161	<12	0
31/3/22	LR	8.6	163	<12	0
22/2/22	LR	9.8	140	<12	0
18/1/22	LR	8.1	149	<12	100
18/12/21	None	9.2	150	>12	100
14/11/21	None	11	154	<12	100
10/10/21	None	14.6	140	<12	100

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS. ppb
31/5/23	None	14.3	196	<12	0
30/4/23					
31/3/23	HR	11.1	84	75	100
25/2/23	None	7.2	180	<12	0
29/1/23	None	7.8	181	, 12	0
1/12/22	None	9.4	154	15	0
9/10/22	None	14.4	156	<12	0
26/8/22	None	17.5	158	<12	0
27/6/22	LR	16.8	159	<12	0
23/5/22	LR	15.4	161	<12	0
21/4/22	None	13.8	172	35	0
3/3/22	LR	10.5	180	<12	0
22/2/22	LR	10.4	134	<12	0
18/1/22	None	7.5	167	<12	0
18/12/21	None	9.2	168	<12	100
14/11/21	None	11.2	174	<12	0
10/10/21	None	15.5	158	<12	100
9/9/21	LR	17.7	148	20	100
24/721	HR	18.4	161	<12	100
2/7/21	None	18.2	163	<12	0
6/621	None	17.7	173	33	100

Lincombe SY13850 91855

Burscombe Brook SY13205 90284 site moved to SY12976 90408 for May 22 because of inaccessibility of original site

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS. ppb
12/4/23	HR	10.1	185	15	0
6/3/23	None	9.6	242	<12	0
30/1/23	None	10.6	266	<12	0
28/11/22	LR	12.1	288	<12	100
13/10/22	LR	15.7	225	<12	300
3/9/22	None	15.8	229	<12	100
29/7/22	None	18.2	232	<12	200
22/6/22	None	17.4	225	<12	100
01/5/22	LR	11.5	234	<12	200
31/3/22	LR	9.8	247	<12	300
27/2/22	None	9.7	234	<12	100
31/12/21	LR	12.4	212	17	200
24/11/21	None	11	190	12	200
31/10/21	HR	13.2	143	75	500
25/9/21	Hone	15.4	217	<12	300
30/8/21	None	14	201	<12	300
31/07/21	LR	15.1	221	<12	0
20/6/21	LR	14.8	224	13	100
25/5/21	HR	10.5	190	16	200

Snod Brook SY 1409190064

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS. ppb
5/4/23	LR	11.4	171	<12	100
24/1/23	None	5.8	192	<12	100
25/10/22	LR	14.7	200	<12	200
3/3/22	HR	10.4	116	35	200
17/2/22	None	10.7	172	<12	200
2/1/22	LR	12.4	156	<12	200
25/9/21	-	16.2	180	<12	300
15/8/21	None	17.1	180	<12	100
13/6/21	None	16.1	171	<12	100
7/5/21	None	11.3	170	<12	300
7/4/21	None	8.6	195	<12	100

Upper Woolbrook SY 11520 89626

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS ppb
8/5/23	HR	14.5	185	15	500
11/4/23	HR	12.1	92	>240	200
4/3/23	None	9.1	263	<12	300
8/2/23	None	9.8	241	<12	500
9/1/23	HR	10.2	165	13	200
3/12/22	None	10	236	<12	300
8/11/22	HR	13.6	190	<12	300
7/10/22	LR	14.8	276	<12	200
4/8/22	None	17	264	<12	2,500
12/7/22	None	117.7	259	<12	1000
3/6/22	None	14.7	260	<12	500
11/5/22	HR	15	239	75	500
4/4/22	LR	11.7	244	<12	500
3/3/22	HR	10,3	139	65	500
26/1/22	None	9.5	233	<12	500
5/1/22	None	8.5	224	<12	500
29/11/21	LR	9.2	223	<12	500
29/10/21	HR	14.4	135	37	200
29/9/21	HR	14.7	199	13	300
29/8/21	None	15.7	247	<12	500
28/7/21	LR	17.1	231	<12	100
17/6/21	LR	15	240	<12	100

Lower Woolbrook SY12970 88672

DATE	RAIN	TEMP C	TDS ppm	TURB NTU	PHOS ppb
28/5/23	HR	13.2	188	<12	300
11/4/23	None	11.1	261	<12	100
4/3/23	None	7.3	270	<12	300
2/2/23	None	10.1	251	<12	200
7/1/23	HR	10.5	143	200	100
3/12/22	None	8.8	244	<12	500
4/11/22	LR	13.1	228	<12	300
8/10/22	None	14.1	261	<12	500
4/9/22	LR	17.7	264	<12	500
4/8/22	None	17.4	255	<12	1000
6/7/22	None	16.3	265	<12	1000
3/6/22	None	14.7	267	<12	200
11/5/22	HR	14.8	154	30	300
2/4/22	None	7.4	263	<12	300
3/3/22	HR	10.4	163	70	200
7/2/22	LR	9.8	249	<12	500
12/1/22	None	8.8	223	<12	100
7/12/21	HR	9	167	175	300
3/11/21	None	10.6	226	<12	0
6/10/21	LR	15.5	210	<12	200
7/9/21	None	16.5	265	<12	0
4/8/21	None	17.5	254	<12	0
6/7/21	LR	15.8	223	<12	0
3/6/21	LR	11.6	259	<12	0
6/5/21	LR	10	258	<12	100
91/4/21	None	11.1	261	<12	100

Bickwell Brook at Glen Goyle SY12012 87493

DATE	RAIN	TEMP C	TDS ppm	TRUB NTU	PHOS ppb
29/4/23	HR	11.5	164	<12	200
31/3/23	HR	11.3	106	<12	0
28/1/23	None	-	136	<12	100
30/11/22	Nine	11.5	139	<12	100
28/10/22	None	16	162	<12	200
31/8/22	None	19.5	172	<12	500
31/7/22	None	19.6	173	<12	500
26/6/22	None	15	188	<12	300
11/5/22	HR	14	161	<12	200
31/3.22	HR	7.7	177	<12	200
27/2/22	None	10	150	<12	100
24/1/22	None	9.1	176	<12	100
6/12/21	HR	8.8	153	<12	200
27/10/21	LR	15.3	152	<12	300
13/8/21	LR	18	170	<12	200
1/7/21	LR	14.6	174	<12	100
28/5/21	None	14.6	153	<12	100
27/4/21	None	11.7	170	<12	0

Appendix 2

River Monitors
Vera Arnold
Barry Curwen [new team member]
Ed Dolphin [new team member]
Stefan Drew
Clare Eastland
Maureen Hackett
Jan Metcalf
Roger White
James Wright