The Yealm Dippers©

Monitoring water quality on the River Yealm and its tributaries in collaboration with the Westcountry Rivers Trust

1st July 2022 to 30th Jan 2023

The Yealm Estuary to Moor Project (YEM) is coordinating volunteers on behalf of the Westcountry Rivers Trust (WRT) Citizen Science Investigation (CSI), studying long term river health on the River Yealm. This group of volunteers, known as the "Yealm Dippers", has been trained and supported by WRT, with added support from the Parish Councils of Wembury, Newton Ferrers, Noss Mayo, Yealmpton, Brixton and Sparkwell, plus one anonymous donor. Comments and opinions in this report are not necessarily shared by these organisations.

Training By Lydia Ashworth, WRT on 13 July 2022

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A. The Yealm Dippers

The "Yealm Dippers" volunteer group are coordinated by the Yealm Estuary to Moor project (http://www.yemcorridor.com/) as part of the West Country Rivers Trust (WRT) Citizen Science Investigation (CSI).

Within our group, from 1st July 2022 to 30th Jan 2023, 33 active volunteers have included Debby Cotton, Carl Gibbard, Karen Shacklock, Surf Steve, Jonny Rae, Simon Pearson, Theresa Henning, Diane Castle, Alice Lewthwaite, Alex Whish, Bill Thom, Linda Durman, Roger Durman, Samuel Whitfield, Ray and Gill Moorhouse, Giles Ebbutt, Kate Guest, Ben Tutty, Neil Tugwell, Charles Weston-Baker, Jamie Howourth, Glen Peacham, Clare Lee, Helen Webb, Julia Bertram, Peter Johnson, Rory Anderson, Ilona Colton, Alexander Parr, Peter Brown, Jane Pennington and Tony Hawkins. In July 2022, most of our team received training from Lydia Ashworth, Evidence and Engagement Officer for the WRT (https://wrt.org.uk/project/become-a-citizen-scientist/).

Recorded results are logged on WRT's "Cartographer" website (https://cartographer.io/case-studies/wrt/).

The support and advice given to us by WRT's Lydia Ashworth, Holly Pearson, Simon Browning and Nicola Rogers has been invaluable. The interest and encouragement offered by Environment Agency officers, especially Rob Price and Robin Hooper, are also appreciated.

B. Monitoring sites

From 1st July 2022 to 30th Jan 2023, a total of 126 sets of entries have been successfully uploaded to WRT's Cartographer website by a total of 33 volunteers who monitored 24 sites through the Yealm catchment (Table 1).

Sample sites are illustrated in Figure 1, detailing five sites labelled using blue on the main River Yealm, the remaining 19 sites on tributaries labelled in white. The numbers, names and locations of all sites are listed in Table 2.

C. Water quality measures

Each set of entries onto the WRT Cartographer website include measures of temperature, turbidity, total dissolved solids and phosphate. Any evidence of pollution sources, recent pollution events, wildlife and problem plants are also recorded.

WRT give the following explanations of why monitored:

(i) Temperature: "*Temperature is a vital parameter within the river ecosystem. It controls many of the aquatic species life cycles. Temperature fluctuates with the seasons; however, you do get variation within that, particularly in small rivers and streams. Another important reason to measure temperature is to track the impact of our warming climate on our waterbodies".*

(ii) Turbidity*: "Turbidity is a measure of the optical clarity of the water. The more suspended particles in the water the lower the clarity and the higher the turbidity. You will often find your waterbody gets more turbid after heavy rainfall due to soil running off the fields and sediment being mixed into the water column. This loss of topsoil is both a problem for farmer and river. It can often contain chemicals from the fertiliser and pesticides used on the land. An increase in sediment level on the substrate of the river can cause smothering of habitat by removing light and oxygen. Aquatic wildlife such as the less mobile invertebrates and fish eggs struggle to survive in low oxygen conditions and without light, plants are unable to grow. It is a good idea to sample your river after different weather conditions to understand how it responds to rainfall or drought".*

(iii) Total dissolved solids*: "Total Dissolved Solids (TDS) 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 gets. Low levels of dissolved solids in waters such as those on Dartmoor near to the source of the river are a result of very low levels of input from the surrounding landscape. As the river runs down to the sea it collects material from many different inputs, some natural and some man-made such as farms, sewage plants, factories and residential areas. This typically increases the amount of solids dissolved in the water leading to a higher reading. Harmful pollution from things like sewage, slurry and factory discharge will usually elevate your TDS reading. However, some pollutants such as oil can lower conductivity; therefore it should be used as a general indicator of water quality not a specific measure of toxicity. Geology will influence the normal level of conductivity in a watercourse (e.g. Areas dominated by granite generally give a lower conductivity than those with limestone). Regular monitoring will allow the detection of changes in conductivity which can indicate pollution".*

(iv) Phosphate*: "Phosphate occurs naturally within the river ecosystem, but in very low levels under 0.05 mg/l. Therefore, higher levels may indicate anthropogenic input. Phosphate is found in animal and human waste, cleaning chemicals, industrial runoff and fertiliser so this can be a good indicator of pollution. Having raised levels of phosphate can lead to increases in plant growth within the watercourse. This leads to a depletion of oxygen due to the plant's aerobic respiration during the night. Without oxygen aquatic species cannot survive and the river ecosystem collapses. It is important to note that phosphate is taken up by plants. You may get a low reading but high plant growth, indicating eutrophication".*

(v) *Pollution sources and evidence of recent pollution: " e.g. litter or oil".*

(vi) *Wildlife: " as indicators of ecosystem health".*

(vii) *Problem plants: "often invasive, such as may cause issues for the biodiversity of the watercourse by shading out other plant species".*

D. Upper safe limits

Acceptable levels for temperature and chemical measure vary according to circumstances. In general, our interpretation to date is based upon the following guidelines:

(i) Temperature (°C): Survival in, and passage through, estuaries and rivers by returning adult salmon are influenced by temperature, especially where other water quality parameters are critical. Studies indicate that brown trout and Atlantic salmon are stressed, with long-term consequences for the population, at temperatures above 19.5 °C and 22.5° C, respectively (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291742/scho1008boue-e-e.pdf).

Given the above, we consider that the upper safe level (USL) for temperature is 19.5 °C.

Turbidity (NTU): Turbidity is recorded here in Nephelometric Turbidity Units (NTU). The relationship between NTU and suspended solids is as follows: 1 mg/l (ppm) is equivalent to 3 NTU. Therefore, 300 mg/l (ppm) of suspended solids is 900 NTU.

A review of literature indicates that NTU values of >100 are unsafe for most aquatic life.

The European Union (EU) Freshwater Fish Directive's Guideline Standard is an annual mean of 25 mg/l, and which guideline standard is used by the U.K. Environment Agency to help set controls on discharges of inorganic material from quarries, open caste coal sites, and mines. This EU standard of annual average 25 mg/l = 75 NTU.

Given the above, we consider that the upper safe level (USL) for turbidity is 75 NTU = 25 mg/l.

(i) Total dissolved solids (ppm): One thousandth of a gram is one milligram and 1000 ml is one litre, so that 1 ppm = 1 mg per litre = mg/litre.

The U.S. Environmental Protection Agency (EPA) Secondary Regulations advise a maximum contamination level of 500mg/L (500 ppm) for total dissolved solids (TDS). When TDS levels exceed 1000mg/L it is considered unfit for human consumption. Most commonly, high levels of TDS are caused by the presence of potassium, chlorides and sodium. Changes in the amount of dissolved solids determines the flow of water in and out of an organisms cell, thereby affecting growth or causing death. A level of 400ppm = 400 mg/l is recommended for most freshwater fish.

Given the above, and that TDS levels vary between catchments according to natural geology etc, whilst we are still getting to know our river, we consider that the upper safe level (USL) for total dissolved solids is 300 ppm = 300 mg/l.

(ii) Phosphate (ppb): One millionth of a gram is one microgram and 1000 ml is one litre, so that 1 ppb = 1 microgram per litre = µg/litre = 0.001 mg/l.

In 1986, the U.S. Environmental Protection Agency (EPA) recommended phosphate levels of no more than 0.1 mg/l (100 ppb) for streams that do not empty into reservoirs; no more than 0.05 mg/l (50 ppb) for streams discharging into reservoirs; and no more than 0.024 mg/l (24 ppb) for reservoirs.

The above recommendations are consistent with the ranges on diagnostic colour chart for WRT's CSI test kit as follows:
0 – 100 ppb: OK
200 – 300 ppb: HIGH
500 – 2500 ppb: TOO HIGH

Given the above, we consider that the upper safe level (USL) for phosphate is 100 ppb = 0.1 mg/l.

E. Measurements of water quality in the main channel

Figures 2 and 3 illustrate findings for water quality recorded from 1st July 22 to 30th Jan 23 at five sites in the main channel of River Yealm. Those sites range from Cornwood (Slade Mill) towards the top of river, to Popple's Bridge in the middle reaches, and then on down to Yealm Bridge just above Yealmpton. The Borough is within Yealmpton and Puslinch Bridge below Yealmpton, Puslinch being on the last stretch of fresh water before the river joins our estuary (Figure 1).

Findings show how average values of temperature, turbidity, total dissolved solids and phosphate all increased from the top to bottom of river (Figure 2).

Maximum values of temperature exceeded safe upper levels during summer at both the top and bottom of river (Figures 2 and 3).

Values of turbidity and phosphate each exceeded upper safe levels at the bottom of river, especially below Yealmpton at Puslinch; but at different times, such that peaks in turbidity occurred when phosphate was low, and vice versa (Figures 2 and 3).

Figure 4 illustrates river water level at Puslinch, recorded from 1st July 22 to 30th Jan 23. Comparison with Figure 3 shows how phosphate exceeded the upper safe level at Puslinch for extended periods during the summer and autumn, always when water levels were low (Figures 3 and 4).

This suggests that rainfall and high water levels were in general associated with increased turbidity, but which acted to dilute phosphate levels.

F. Measurements of water quality in tributaries

Figures 5, 6, 7 and 8 illustrate findings for water quality recorded from 1st July 22 to 30th Jan 23 at 17 sites on tributaries to the River Yealm. Those sites represent tributaries such as include Wembury

Stream, Cofflete Stream, Silverbridge Lake, the Piall River, Newton Stream and Noss Mayo Stream (Figure 1).

Focussing upon sites where average values based upon at least three measures exceeded upper safe limits (USL), findings show how (i) in Ridgecott Lake, the River Piall and Lee Mill Stream, turbidity was consistently above the USL throughout the six months of measurement (Figure 6); (ii) in Newton Stream @ Bridgend, total dissolved solids in exceeded the USL during October and November 2022 (Figure 7); (iii) in Ridgecottt Lake and Silverbridge Lake, including at Wembury Stream @ beach footbridge, phosphate exceeded the USL from July to October or November 2022; and (iv) in both Newton and Coffin Streams @ Bridgend, and/or the Noss Mayo Stream @ tidal car park, phosphate consistently exceeded the USL throughout all six months of measurement (Figure 8).

G. Pollution event of 05 December 2023

Early on 5th December, an unusually high water flow saturated with kaolin-like material was seen above Quick Bridge on the River Piall in Cornwood Parish. The source was soon identified as being from the direction of Headon China clay works. Leaving deposits more than 15 cm deep on the Piall, the River Yealm was discoloured along its entire length, the river bed covered with kaolin-like material for many miles downstream, depriving plant and animal life of both light and oxygen.

Drawing primarily upon evidence submitted by our CSI volunteers, a report 28 pages long with more than 30 photographs that detail the likely source, smothering for more than one month after the event, plus associated fish mortality, was drafted on behalf of River Yealm Water Quality Group, comprised of nominated representatives from each of the riparian parish councils that border our river (Brixton, Yealmpton, Newton & Noss, Sparkwell and Cornwood). That report helped inform those councils towards making representations to the Environment Agency, and which report was subsequently collected by the Environment Agency with an associated witness statement. A selection of photographs from that report are presented in Figure 9.

H. Wildlife and associated observations

In no particular order, wildlife observed has included swans, geese, duck, oyster catchers, egrets, kingfisher, woodpeckers, dragon flies, damsel flies, dippers, wagtails and fish.

We have no recording of otters or mink, but which are thought to be present. We therefore plan a future survey to establish where they are. We are also planning a “River Fly” survey of aquatic invertebrate diversity throughout the length of river, as a direct measure of ecological health which we then map against pollutant concentrations and habitat status, including as a reference for future improvements.

I. Summary highlights

- Since training in July 2022, 126 entries have been successfully uploaded to WRT’s Cartographer website by a total of 33 volunteers who are monitoring 24 sites through the Yealm catchment, summarised in Table 1 below.
- As such, our local community of local citizen scientists, the “ Yealm Dippers”, can certainly take pride in having made an excellent start towards helping to establish the scale and location of background water quality issues through our Yealm catchment.
- It is “early days” yet, as we get to know our river. Six months of data are not sufficient to establish issues with certainty. To date, however, water quality measured as temperature, turbidity, total dissolved solids and phosphate have each exceeded safe upper levels in the main River Yealm, with a progressive deterioration downstream.
- As one might expect, rainfall and water level affected each of these measures differently, higher water levels being associated with higher turbidity but lower phosphates. That higher turbidity

may result from land runoff and/or licenced industrial discharge, such as from China clay workings. Reduced phosphate upon high water levels suggest dilution by rainwater of other sources.

- The influence of water level establishes that there will be significant variation both within and between years, according to the weather and climate change. We will need at least 12 months data before beginning to understand associated variations in space and time through our catchment.
- Meanwhile, data to date suggest likely issues in turbidity in Ridgecott Lake, the River Piall and Lee Mill Stream (Figure 7). In addition, there would appear to be issues with total dissolved solids and/or phosphate in both Newton Stream and Noss Mayo Stream (Figures 7 and 8).
- Future more targeted sampling, in association with data now coming on stream from our new continuous water monitor, will help us to resolve the degree to which such issues may derive from industrial parks, sewage treatment works, land run-off and other sources (Figure 9).
- Future surveys throughout our catchment are being planned for otters and aquatic invertebrate diversity ("River Fly").
- Drawing primarily upon evidence submitted by our CSI volunteers, the report on pollution event of 05 December 2022, has gone a long way towards helping establish the likely nature, source and consequences of pollution then. Both WRT and the EA have thanked us for that report, impressing how this and other of our work exemplifies the power of citizen science.
- We have much to look forward to, as we build our evidence base, whilst we further develop working collaborations towards helping the River Yealm back into better health.

For further information, contact Tony Hawkins: River Coordinator for Yealm Estuary to Moor Project (Email: yemriver@gmail.com).

Figure 1. Sample sites through the Yealm catchment, with names and locations as listed in Table 2. Sites in blue are on the main river, whereas sites in white are on tributaries.

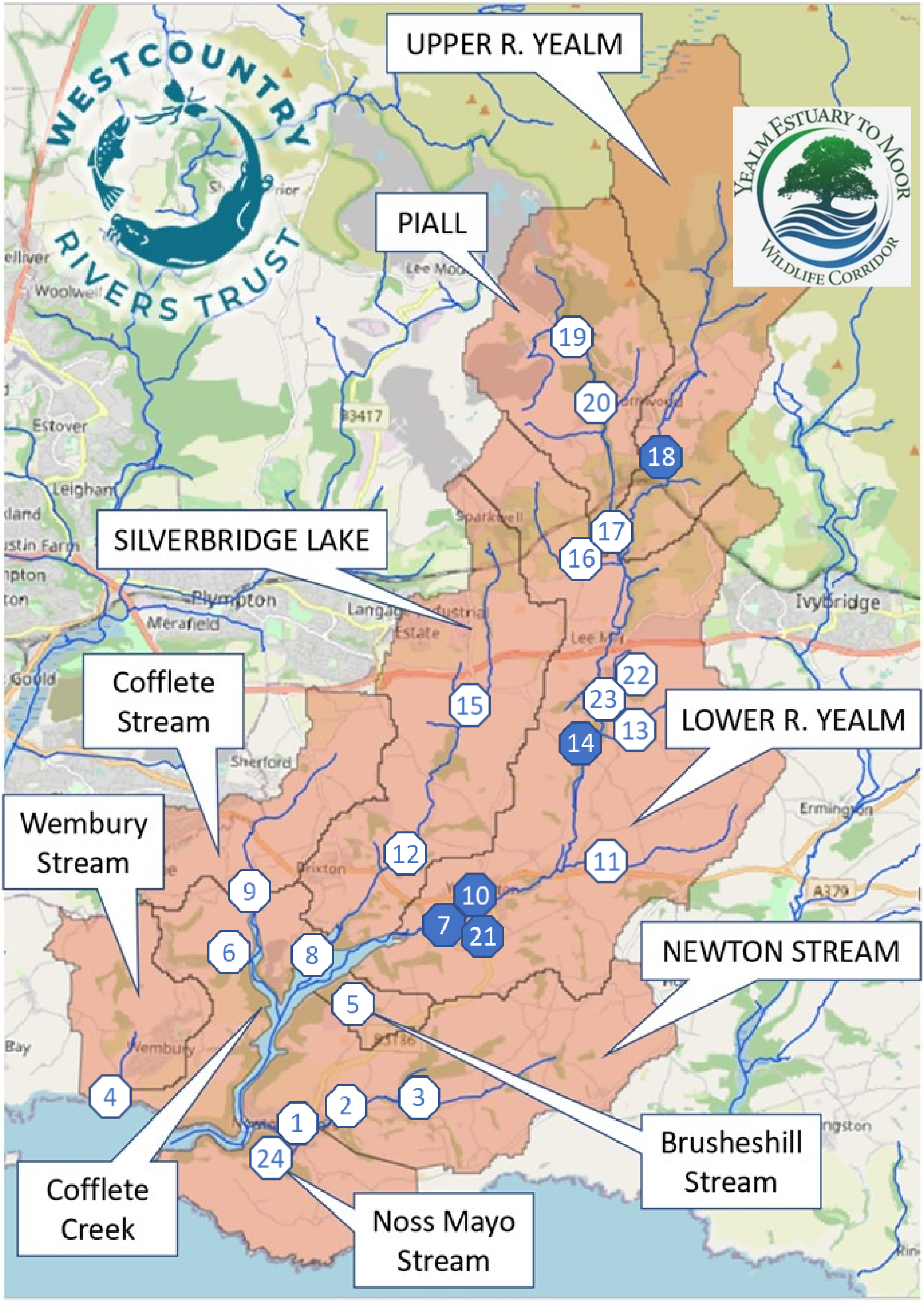

Figure 2. Average, maximum and minimum values of temperature, turbidity, total dissolved solids and phosphate at five sites in the main channel of River Yealm, recorded from 1st July 22 to 30th Jan 23. Solid horizontal red lines illustrate the upper safe levels (USL). Dashed blue lines illustrate trendlines fitted using linear regression.

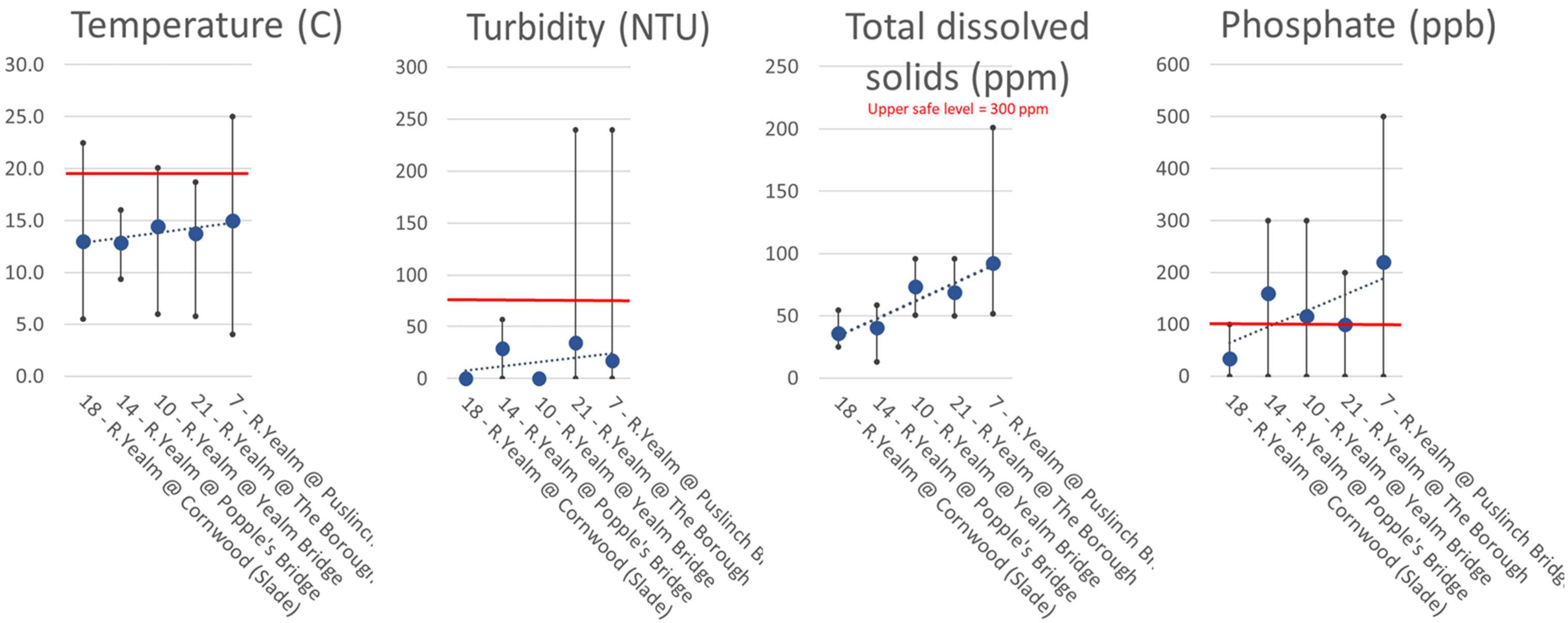

Figure 3. Temperature, turbidity, total dissolved solids and phosphate at five sites in the main channel of River Yealm, recorded from 1st July 22 to 30th Jan 23. Dashed horizontal red lines illustrate the upper safe levels (USL).

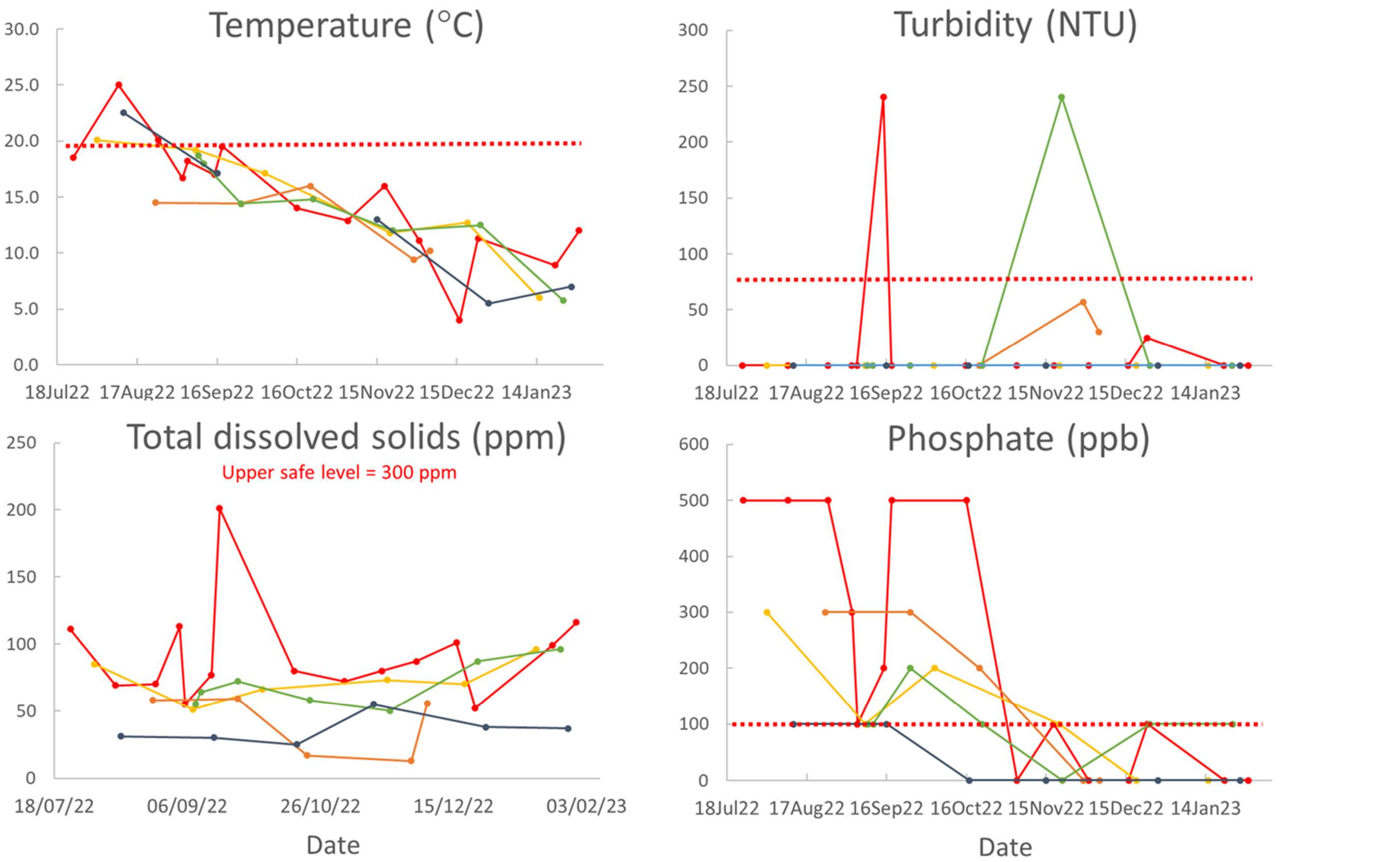

Figure 4. Height of River Yealm at Puslinch Bridge Gauging Station, recorded from 1st July 22 to 30th Jan 23.

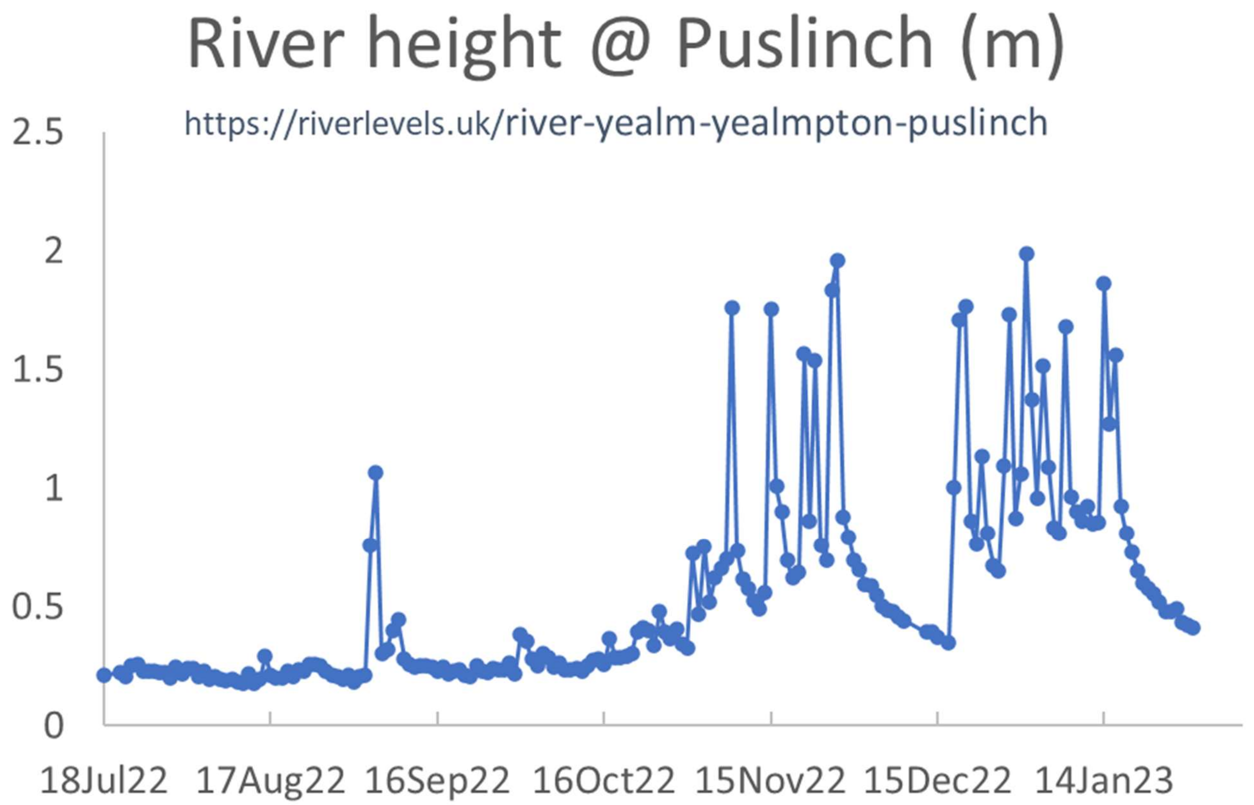

Figure 5. Average, maximum and minimum values of temperature, turbidity, total dissolved solids and phosphate at sites on tributaries to the River Yealm, recorded from 1st July 22 to 30th Jan 23. Sites are grouped according to the main tributaries . Solid horizontal red lines illustrate the upper safe levels (USL).

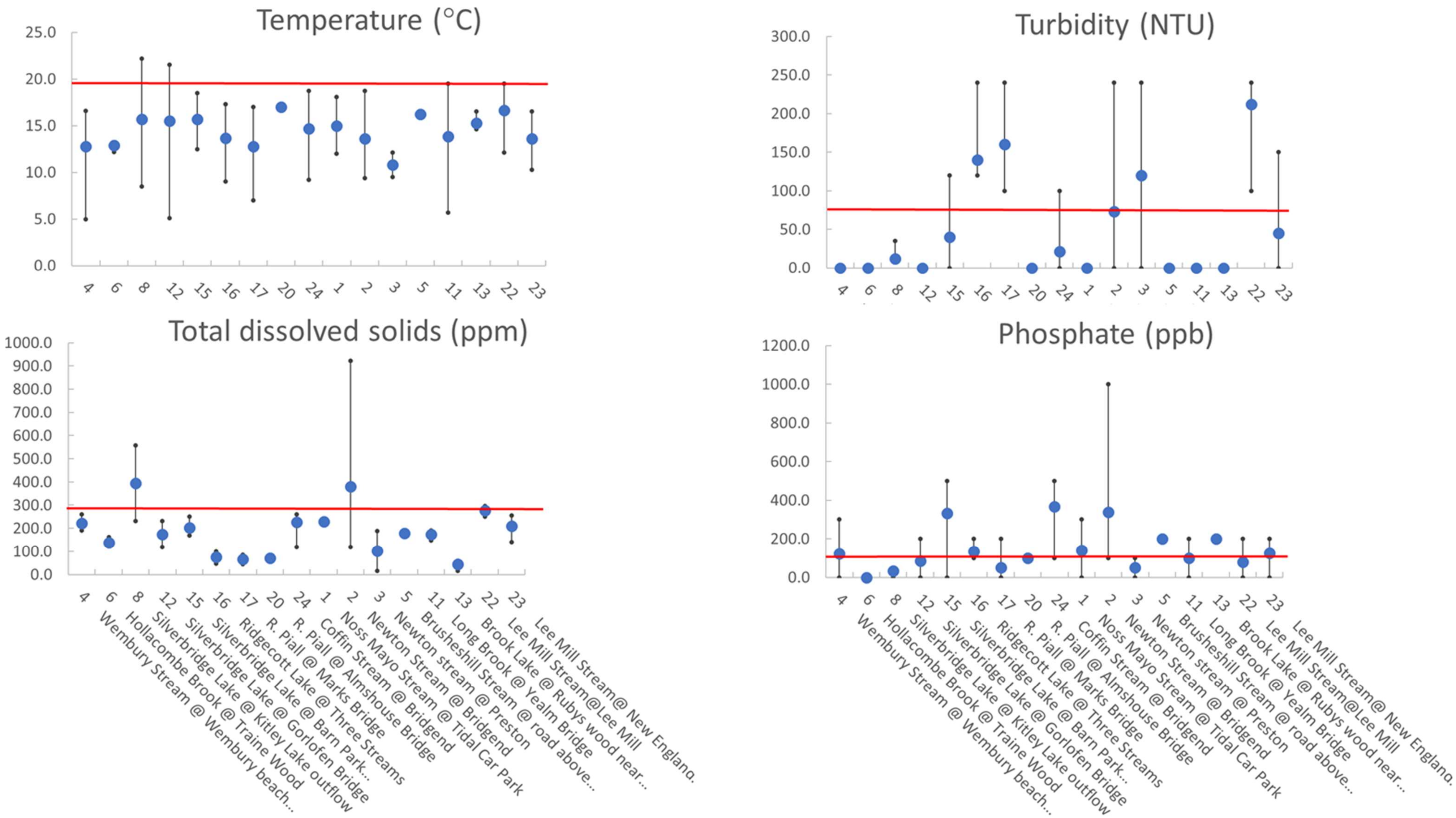

Figure 6. Turbidity at sites in tributaries to the River Yealm, recorded from 1st July 22 to 30th Jan 23. Sites included are those where average values based upon at least three measures exceeded upper safe limits (Figure 5 and Table 1). The dotted horizontal red line illustrates the upper safe level (USL).

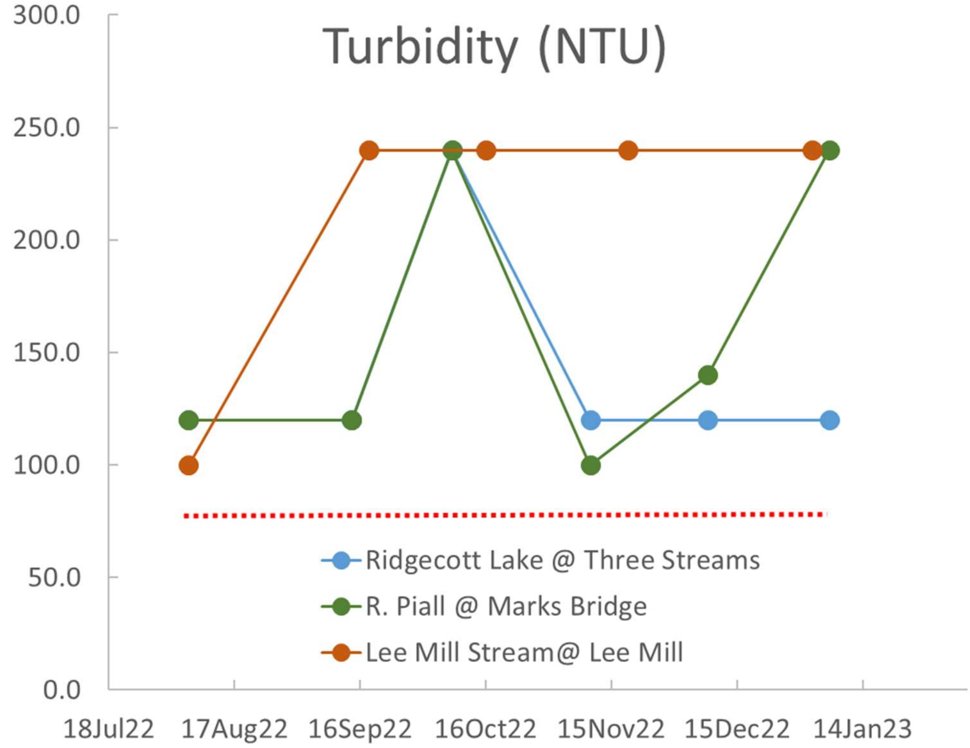

Figure 7. Total dissolved solids at Newton Stream, Bridgend, a tributary to the River Yealm, recorded from 1st July 22 to 30th Jan 23. This site was the only one with an average value based upon at least three measures that exceeded upper safe limits (Figure 5 and Table 1). The dotted horizontal red line illustrates the upper safe level (USL).

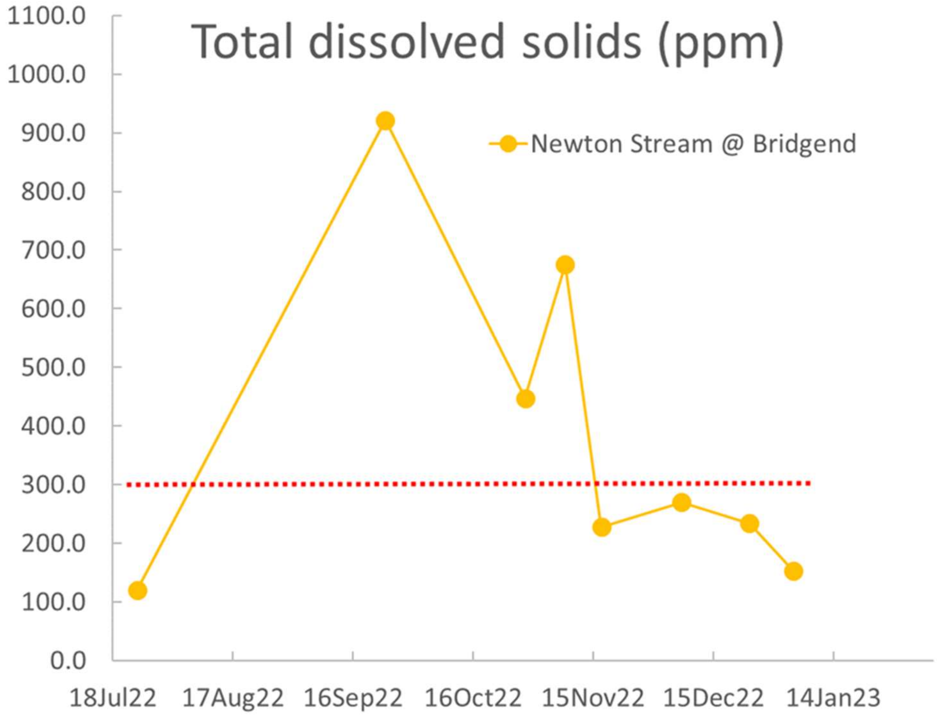

Figure 8. Phosphate at sites in tributaries to the River Yealm, recorded from 1st July 22 to 30th Jan 23. Sites included are those where average values based upon at least three measures exceeded upper safe limits (Figure 5 and Table 1). The dotted horizontal red line illustrates the upper safe level (USL).

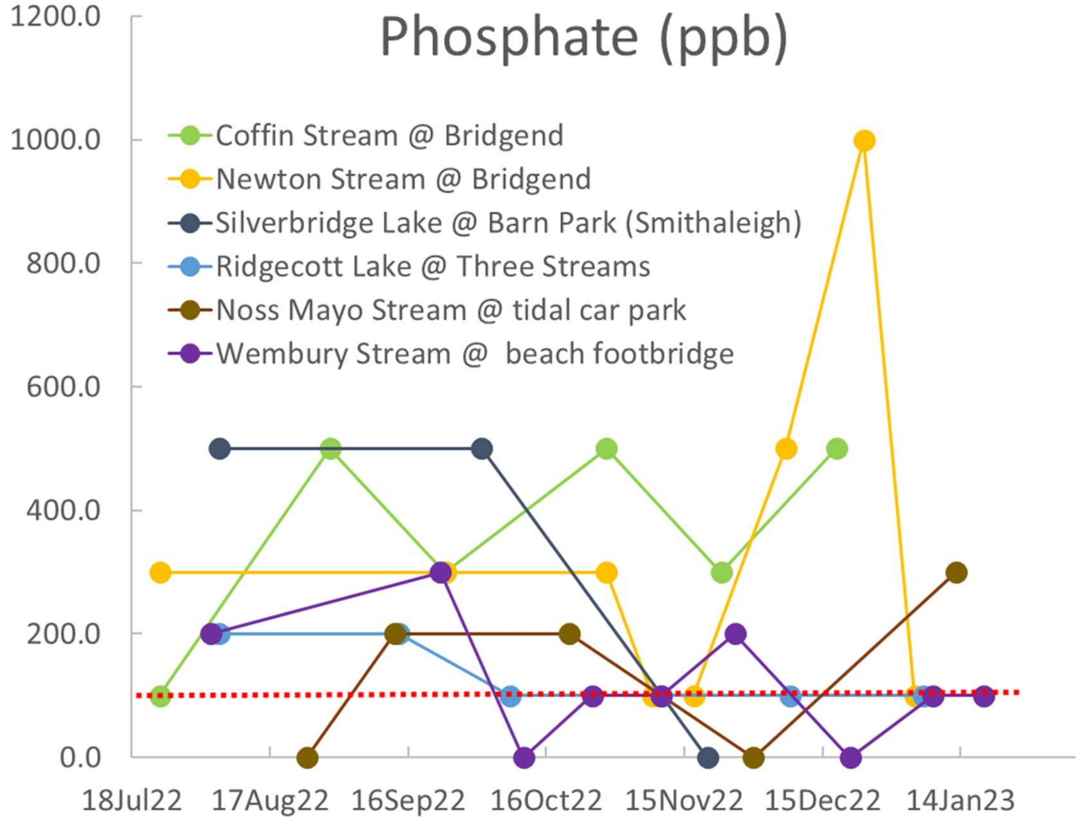

Figure 9. Selection of photographs submitted by our CSI volunteers, included within a report that details the likely source, smothering for more than one month after the event, plus associated fish mortality, following the kaolin-like pollution event dated 05 January 2023.

Figure 10. Sample sites through the Yealm catchment, with names and locations as listed in Table 2. Sites in blue are on the main river, whereas sites in white are on tributaries. Sites at which water quality measures have exceeded upper safe levels between 1st July 22 to 30th Jan 23 are encircled in red. Unnumbered sites in brown designate sewage treatment plants, whereas unnumbered sites in yellow designate industrial parks.

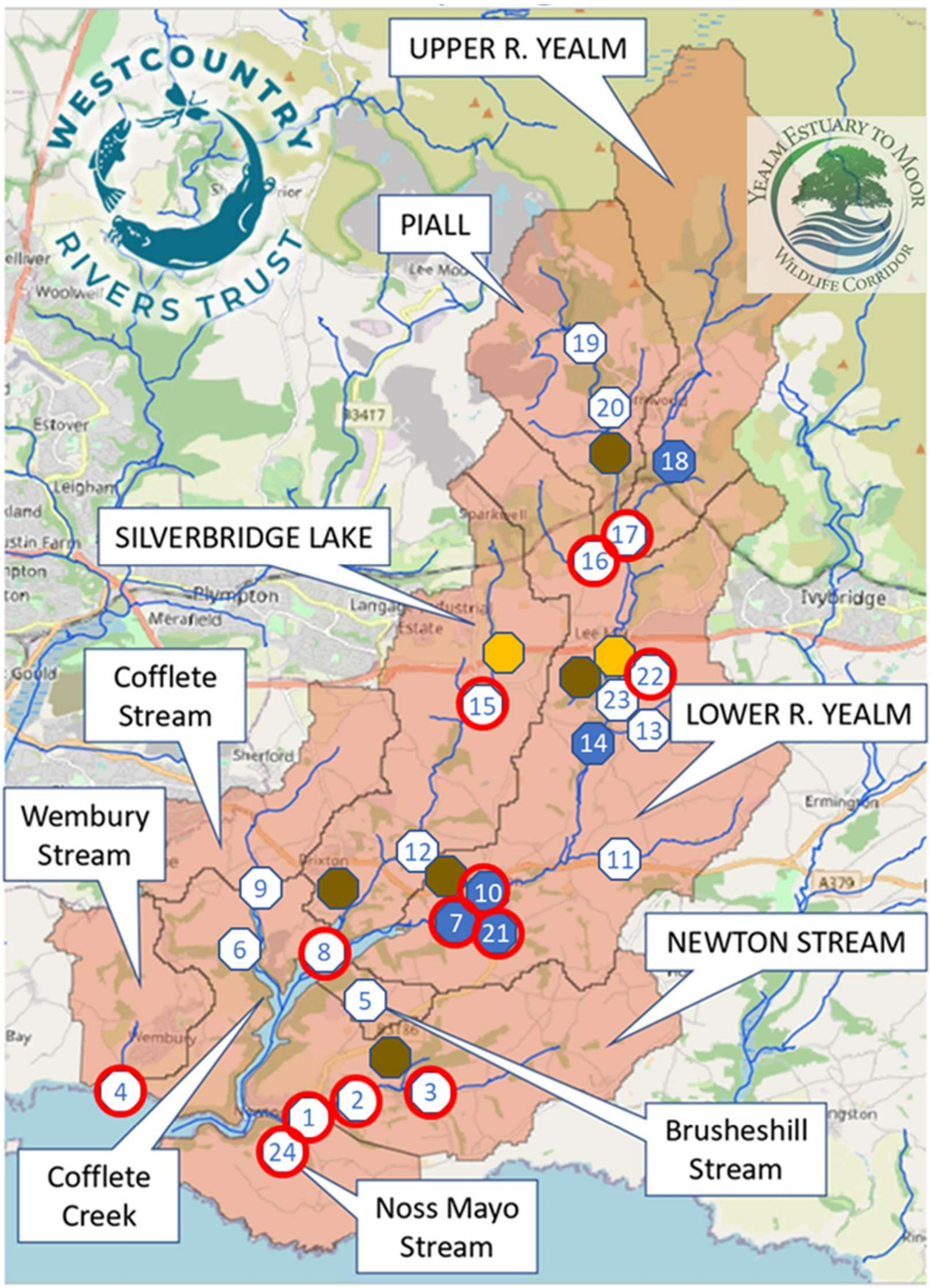

Table 1: Summary of sampling sites, dates and volunteers from 1st July 2022 to 30th Jan 2023.

Sample #	Parish	Site #	Site name	Date	Volunteer
1	Wembury	4	Wembury Stream @ Wembury beach footbridge	04/08/2022	Surf Steve
2				23/09/2022	Debby Cotton
3				11/10/2022	Debby Cotton
4				26/10/2022	Debby Cotton
5				10/11/2022	Debby Cotton
6				26/11/2022	Debby Cotton
7				21/12/2022	Debby Cotton
8				08/01/2023	Carl Gibbard
9				19/01/2023	Karen Shacklock
10	Wembury	6	Hollacombe Brook @ Traine Wood	28/09/2022	Jonny Rae
11				03/11/2022	Jonny Rae
12				24/11/2022	Jonny Rae
13	Newton & Noss	1	Noss Mayo Stream @ Tidal car park	25/08/2022	Simon Pearson
14				13/09/2022	Simon Pearson
15				21/10/2022	Simon Pearson
16				30/11/2022	Simon Pearson
17				13/01/2023	Simon Pearson
18	Newton & Noss	2	Newton Stream @ Bridgend	08/11/2022	Theresa Henning
19				17/11/2022	Diane Castle
20				07/12/2022	Theresa Henning
21				04/01/2023	Theresa Henning
22				24/07/2022	Alice Lewthwaite
23				24/09/2022	Alice Lewthwaite
24				29/10/2022	Alice Lewthwaite
25				24/12/2022	Alice Lewthwaite
26	Newton & Noss	24	Coffin Stream @ Bridgend	24/07/2022	Alice Lewthwaite
27				30/08/2022	Alice Lewthwaite
28				24/09/2022	Alice Lewthwaite
29				29/10/2022	Alice Lewthwaite
30				23/11/2022	Alice Lewthwaite
31				18/12/2022	Alice Lewthwaite
32	Newton & Noss	3	Newton stream @ Preston	30/09/2022	Diane Castle
33				18/01/2023	Diane Castle
34	Newton & Noss	5	Brusheshill Stream @ road above Brusheshill Wood	18/08/2022	Diane Castle
35	Brixton	8	Silverbridge Lake @ Kitley Lake outflow	10/09/2022	Alex Whish
36				15/10/2022	Alex Whish

37				22/01/2023	Alex Whish
38	Yealmpton	7	R. Yealm @ Puslinch Bridge	24/07/2022	Bill Thom
39				10/08/2022	Linda Durman
40				25/08/2022	Roger Durman
41				03/09/2022	Bill Thom
42				05/09/2022	Linda Durman
43				15/09/2022	Samuel Whitfield
44				18/09/2022	Roger Durman
45				16/10/2022	Roger Durman
46				04/11/2022	Bill Thom
47				18/11/2022	Roger Durman
48				01/12/2022	Bill Thom
49				16/12/2022	Bill Thom
50				23/12/2022	Linda Durman
51				21/01/2023	Bill Thom
52				30/01/2023	Roger Durman
53	Yealmpton	10	R. Yealm @ Yealm Bridge	02/08/2022	Ray and Gill Moorhouse
54				08/09/2022	Ray and Gill Moorhouse
55				04/10/2022	Ray and Gill Moorhouse
56				20/11/2022	Ray and Gill Moorhouse
57				19/12/2022	Ray and Gill Moorhouse
58				15/01/2023	Ray and Gill Moorhouse
59	Yealmpton	11	Long Brook @ Yealm Bridge	01/08/2022	Giles Ebbutt
60				10/09/2022	Giles Ebbutt
61				04/10/2022	Giles Ebbutt
62				20/11/2022	Giles Ebbutt
63				16/12/2022	Giles Ebbutt
64				19/01/2023	Giles Ebbutt
65	Yealmpton	12	Silverbridge Lake @ Gorlofen Bridge	16/07/2022	Kate Guest
66				17/08/2022	Ben Tutty
67				09/09/2022	Ben Tutty
68				29/10/2022	Kate Guest
69				21/11/2022	Kate Guest
70				12/12/2022	Ben Tutty
71	Yealmpton	13	Brook Lake @ Rubys wood near Popples Bridge	24/08/2022	Neil Tugwell
72				25/09/2022	Neil Tugwell
73				21/10/2022	Charles Weston-Baker
74				29/11/2022	Neil Tugwell
75	Yealmpton	14	R. Yealm @ Popple's Bridge	24/08/2022	Neil Tugwell
76				25/09/2022	Neil Tugwell
77				21/10/2022	Charles Weston-

					Baker
78				29/11/2022	Neil Tugwell
79				05/12/2022	Neil Tugwell
80	Yealmpton	23	Lee Mill Stream@ New England Nature Reserve	27/09/2022	Jamie Howourth
81				21/10/2022	Jamie Howourth
82				19/12/2022	Jamie Howourth
83				22/01/2023	Jamie Howourth
84	Yealmpton	21	R. Yealm @ The Borough	09/09/2022	Tony Hawkins
85				11/09/2022	Peter Johnson
86				25/09/2022	Rory Anderson
87				22/10/2022	Peter Johnson
88				21/11/2022	Peter Johnson
89				24/12/2022	Peter Johnson
90				24/01/2023	Peter Johnson
91	Sparkwell	15	Silverbridge Lake @ Barn Park (Smithaleigh)	06/08/2022	Glen Peacham
92				02/10/2022	Clare Lee
93				20/11/2022	Clare Lee
94	Sparkwell	16	Ridgecott Lake @ Three Streams	06/08/2022	Glen Peacham
95				14/09/2022	Glen Peacham
96				08/10/2022	Glen Peacham
97				10/11/2022	Glen Peacham
98				08/12/2022	Glen Peacham
99				06/01/2023	Glen Peacham
100	Sparkwell	17	R. Piall @ Marks Bridge	06/08/2022	Glen Peacham
101				14/09/2022	Glen Peacham
102				08/10/2022	Glen Peacham
103				10/11/2022	Glen Peacham
104				08/21/2022	Glen Peacham
105				06/01/2023	Glen Peacham
106	Sparkwell	22	Lee Mill Stream@Lee Mill	06/08/2022	Glen Peacham
107				18/09/2022	Helen Webb
108				16/10/2022	Helen Webb
109				19/11/2022	Helen Webb
110				02/01/2023	Helen Webb
111	Cornwood	18	R. Yealm @ Cornwood (Slade Mill)	12/08/2022	Julia Bertram
112				16/09/2022	Ilona Colton
113				17/10/2022	Ilona Colton
114				15/11/2022	Ilona Colton
115				27/12/2022	Ilona Colton
116				27/0102023	Ilona Colton
117	Cornwood	20	R. Piall @ Almshouse Bridge	10/07/2022	Alexander Parr
118	Cornwood	19	R. Piall @ Quick Bridge	24/07/2022	Julia Bertram
119				14/08/2022	Julia Bertram
120				18/09/2022	Julia Bertram

121	16/10/2022	Julia Bertram
122	14/11/2022	Julia Bertram
123	05/12/2022	Julia Bertram
124	06/12/2022	Julia Bertram
125	18/12/2022	Julia Bertram
126	10/01/2023	Julia Bertram

Table 2. Summary of sample site numbers, names and locations as illustrated in Figure 1.

Site #	Name	Grid reference	Lat & Long
1	Noss Mayo Stream @ Tidal car park	SX 54798 47579	50.310229 , -4.0405851
2	Newton Stream @ Bridgend	SX 55576 48196	50.315966 , -4.0299023
3	Newton stream @ Preston	SX 57930 48471	50.319010 , -3.9969636
4	Wembury Stream @ Wembury beach footbridge	SX 51726 48519	50.317912 , -4.0840681
5	Brusheshill Stream @ Brusheshill Wood	SX 55783 50160	50.333668 , -4.0277481
6	Hollacombe Brook @ Traine Wood	SX 53601 50719	50.338154 , -4.0586038
7	R. Yealm @ Puslinch Bridge	SX 57083 50991	50.341454 , -4.0098090
8	Silverbridge Lake @ Kitley Lake outflow	SX 55459 51171	50.342675 , -4.0326855
9	Cofflete Stream @ Combe	SX 54108 51735	50.347411 , -4.0518777
10	R. Yealm @ Yealm Bridge	SX 59042 52002	50.351013 , -3.9826747
11	Long Brook @ Yealm Bridge	SX 59352 52124	50.352184 , -3.9783656
12	Silverbridge Lake @ Gorlofen	SX56811 52653	50.356326 , -4.0142611
13	Brook Lake @ Rubys wood near Popples Bridge	SX 59848 54241	50.371330 , -3.9721867
14	R. Yealm @ Popple's Bridge	SX 59839 54313	50.371975 , -3.9723401
15	Silverbridge Lake @ Barn Park (Smithaleigh)	SX 57961 54988	50.377591 , -3.9989871
16	Ridgecott Lake @ Three Streams	SX 59745 57067	50.396705 , -3.9746892
17	R. Piall @ Marks Bridge	SX 60142 57148	50.397528 , -3.9691372
18	R. Yealm @ Cornwood (Slade Mill)	SX 60797 58885	50.413295 , -3.9605715
19	R. Piall @ Quick Bridge	SX 59146 60841	50.430481 , -3.9845287
20	R. Piall @ Almshouse Bridge	SX 59746 59563	50.419139 , -3.9756081
21	R. Yealm @ The Borough	SX 57827 51584	50.346964 , -3.9995840
22	Lee Mill Stream @Lee Mill	SX 60115 55525	50.382934 , -3.9689124
23	Lee Mill Stream @ New England Nature Reserve	SX 59798 54587	50.374428 , -3.9730184
24	Coffin Stream @ Bridgend	SX 55465 48021	50.314366 , -4.0313933