



WESTCOUNTRY RIVERS TRUST CITIZEN SCIENCE

MONITORING OF THE PAR RIVER AND ITS TRIBUTARIES

The monitoring group has been helped by the Westcountry Rivers Trust, The Friends of Luxulyan Valley, The Friends of Par Beach, and the G7 Legacy Project for Nature Recovery. Comments and opinions in this report are not necessarily shared by these organisations.

SEPTEMBER 2022

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A. KEY POINTS FROM WRT CSI MONITORING IN SEPTEMBER 2022

1. The Friends of Par Beach (FoPB) have started CSI testing on the Polmear stream near the Ship Inn.
2. River levels were low but higher than in the previous few months.
4. Phosphate levels at the maximum reading of 2500 ppb at Cam Bridges and Par Beach slipway, *High* on the Carbis stream and *Too High* downstream from Luxulyan allotments (WRT classifications).
5. High bacteria levels continue to be a concern but the source(s) is unknown.
6. Evidence was found for the presence of otters and fish.

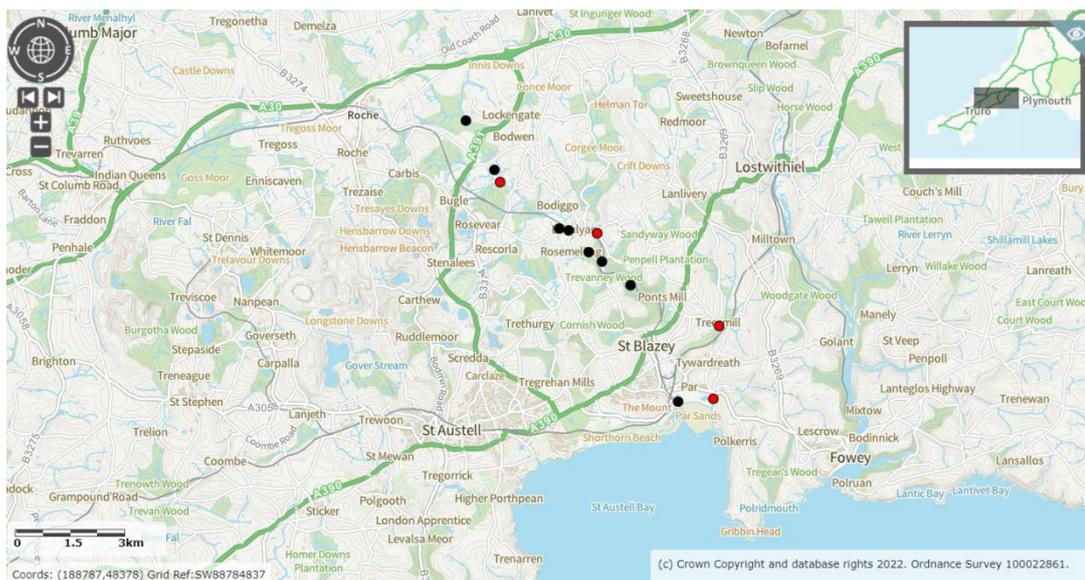
B. OUR GROUP

Monitoring is part of the Citizen Science programme run by the West Country Rivers Trust (WCRT) and is carried out monthly by volunteers from the Friends of Luxulyan Valley. The FoLV team comprises: Dave Burrell; Joan Farmer; Veronica Jones; Sue Perry; Roger Smith; the FoPB team includes Simon Tagney and Brian Harrison. They have received training from Lydia Ashworth, Junior Evidence and Engagement Officer of the West Country Rivers Trust (<https://wrt.org.uk/project/become-a-citizen-scientist/>). Results are logged on the Cartographer website. The support and advice given by Ross Tonkin, Chloe Lake, David Edwards, Claire and Gary Phillips, Jenny Heskett, Nick Taylor, Jeremy Roberts, Mat Bateman, Colin Pringle, Matt Healey, Simon Browning and Lydia Deacon is greatly appreciated. The interest and encouragement offered by Environment Agency officers, especially Lisa Best and Lisa Goodall, have been invaluable.

C. SEPTEMBER 2022 MONITORING POINTS

This month monitoring occurred at 12 locations. Monitoring points along the main Par River are shown in black. Those in red are on tributaries.

Source: <https://magic.defra.gov.uk/MagicMap.aspx>



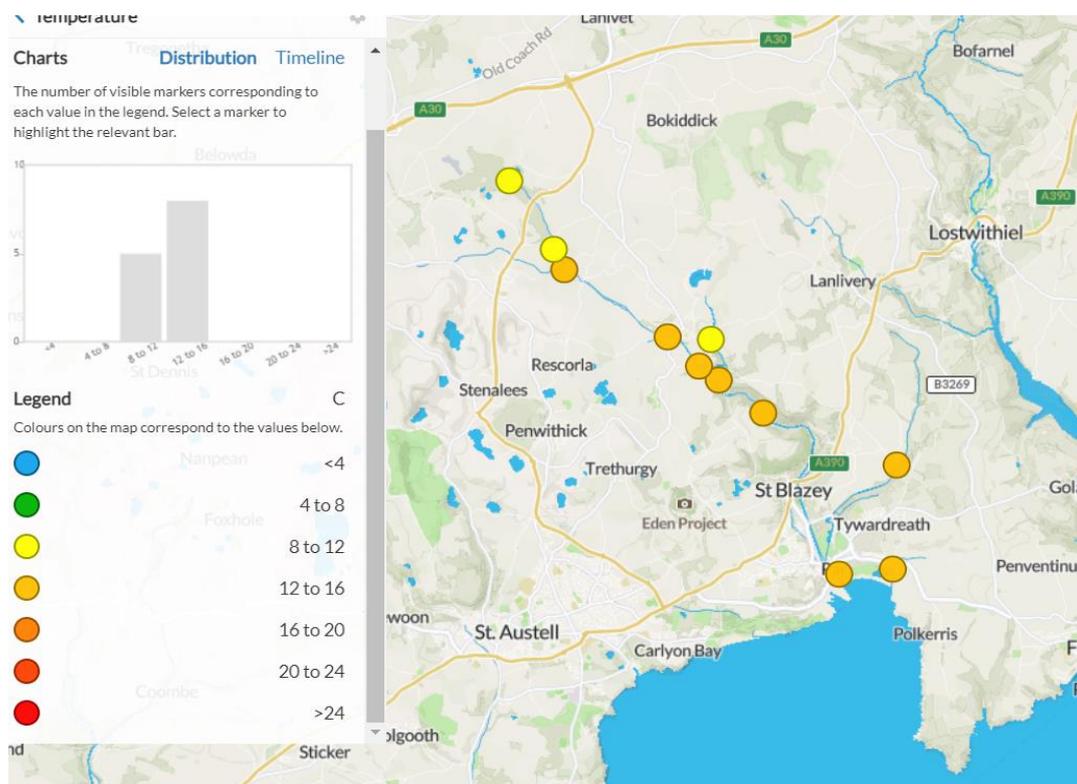
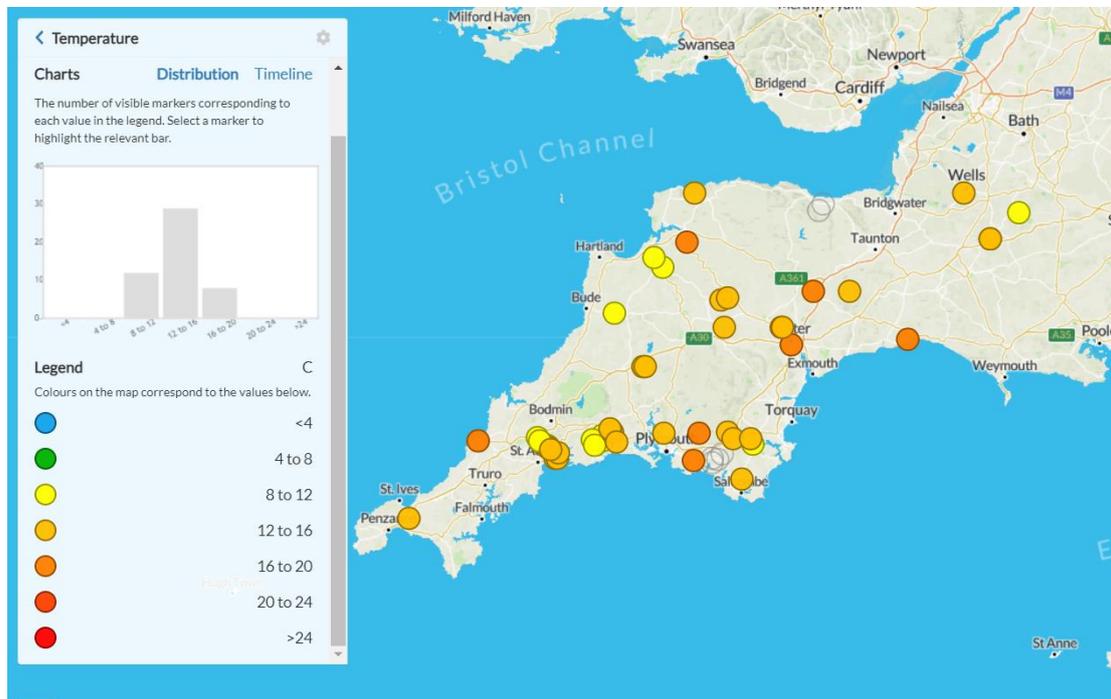
| LOCATION | DATE | TYPE OF CHECK | MONITORED BY |
|---|-------------|---|---|
| Criggan Moors, Par River, SX 01882 61133 | 16/09/2022 | CSI sample & Cartographer record. Water sample for bacteria testing. | Roger Smith |
| South of Minorca Lane, Par River, SX 02657 59788 | 16/09/2022 | CSI sampling. Cartographer record. Water sample for bacteria testing. | Roger Smith |
| Carbis Stream SX 02834 59401 | 16/09/2022 | CSI sampling. Cartographer record. | Roger Smith |
| Downstream St Austell North STW SX 0446 5811 | 17/09/2022 | Visual check. | Joan Farmer, Veronica Jones, Roger Smith. |
| Luxulyan allotments, Par River, SX 04732 58045 | 17/09/2022 | CSI sampling. Cartographer record. | Joan Farmer, Veronica Jones, Roger Smith. |
| Cam Bridges, Par River, SX 05292 57454 | 17/09/2022 | CSI sampling. Cartographer record. | Joan Farmer, Roger Smith. |
| Gatty's Bridge, Bokiddick Stream SX 05531 57953 | 17/09/2022 | CSI sampling. Cartographer record. | Joan Farmer, Roger Smith. |
| Treffry Viaduct, Par River, SX 05650 57179 | 17/09/2022 | CSI sampling. Cartographer record. | Joan Farmer, Roger Smith. |
| Lady Rashleigh Mine, Par River, SX 06451 56509 | 17/09/2022 | CSI sampling. Cartographer record. Water sample for bacteria testing. | Joan Farmer, Veronica Jones, Roger Smith. |
| Treemill, Tywardreath Stream, SX 08873 55385 | 18/09/2022 | CSI sampling. Cartographer record. | Simon Tagney |
| Par Beach slipway, SX 0776 53261 | 18/09/2022 | CSI sampling. Cartographer record. | Brian Harrisson |
| Polmear Stream, Ship Inn SX 08749 53417 | 18/09/2022 | CSI sampling. Cartographer record. | Simon Tagney |

D. TEMPERATURE

1. This is the WRT's explanation of why this is monitored:

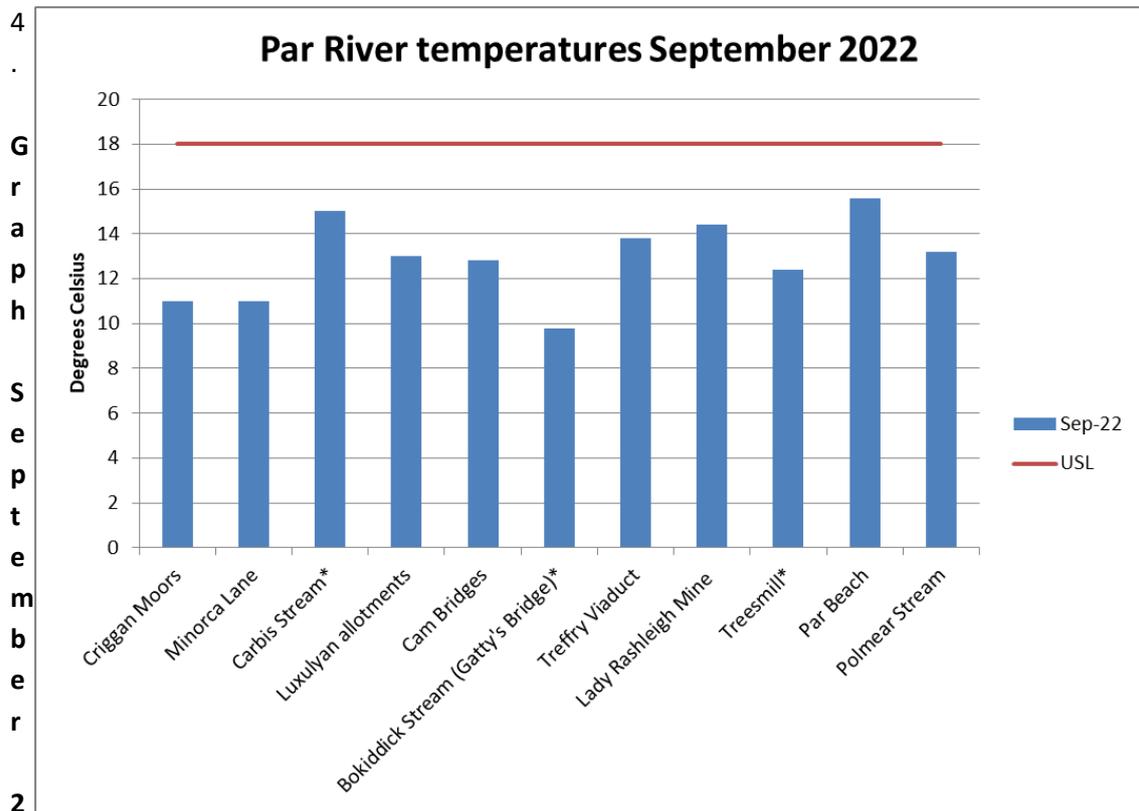
Temperature is a vital parameter within the river ecosystem. It controls many of the aquatic species life cycles. Temperature fluctuates with the seasons; however, you do get variation within that, particularly in small rivers and streams. Another important reason to measure temperature is to track the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

2. Geographical comparison. Source: Cartographer.



3. Results September 2022

| PAR RIVER/TRIBUTARY | LOCATION | Temperature °Celsius |
|---------------------|--|----------------------|
| Par | Criggan Moors, SX 01882 61133 | 11 |
| Par | South of Minorca Lane, Par River, SX 02657 59788 | 11 |
| Tributary | Carbis Stream SX 02834 59401 | 15 |
| Par | Luxulyan allotments, Par River, SX 04732 58045 | 13 |
| Par | Cam Bridges, Par River, SX 05292 57454 | 12.8 |
| Tributary | Gatty's Bridge, Bokiddick Stream SX 05531 57953 | 9.8 |
| Par | Treffry Viaduct, Par River, SX 05650 57179 | 13.8 |
| Par | Lady Rashleigh Mine, Par River, SX 06451 56509 | 14.4 |
| Tributary | Treesmill, Tywardreath Stream, SX 08873 55385 | 12.4 |
| Par | Par Beach slipway, SX 0776 53261 | 15.6 |
| Tributary | Polmear Stream, Ship Inn, SX 08749 53417 | 13.2 |

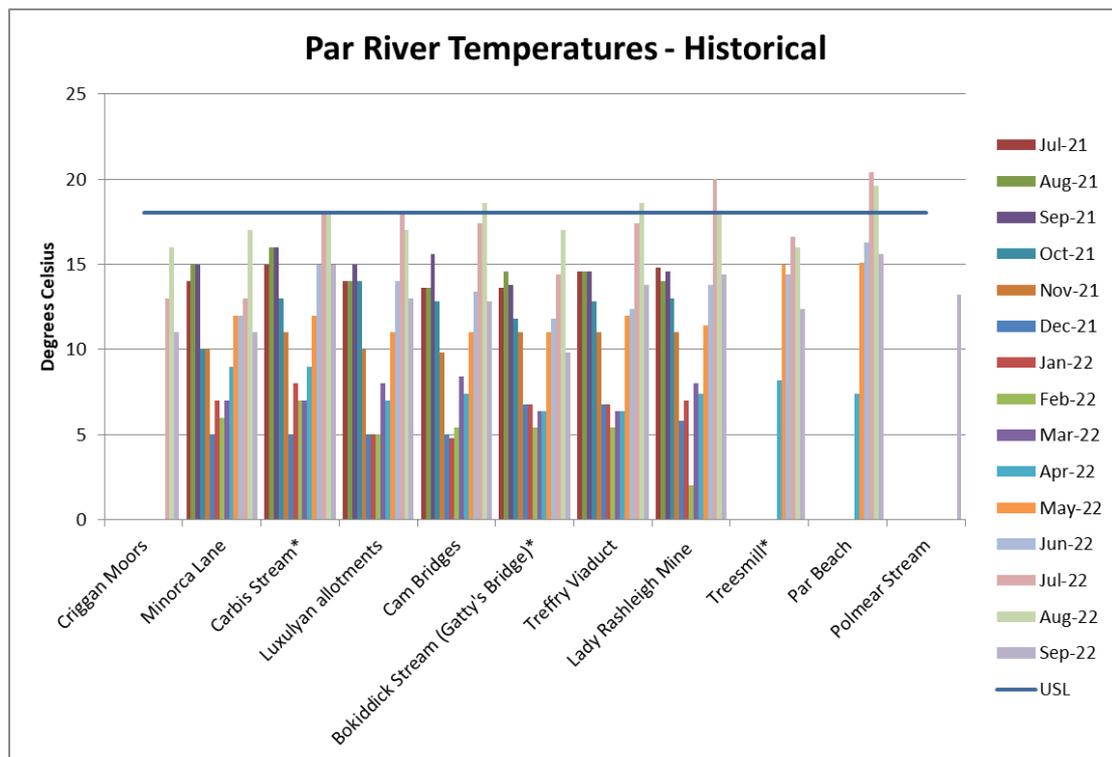


022

*indicates a tributary of the Par River.

USL – Upper Safe Limit Our assumption is that 18° Celsius is the upper safe limit for fish. This simplification is a useful rule of thumb.

5. Historical data on temperature:



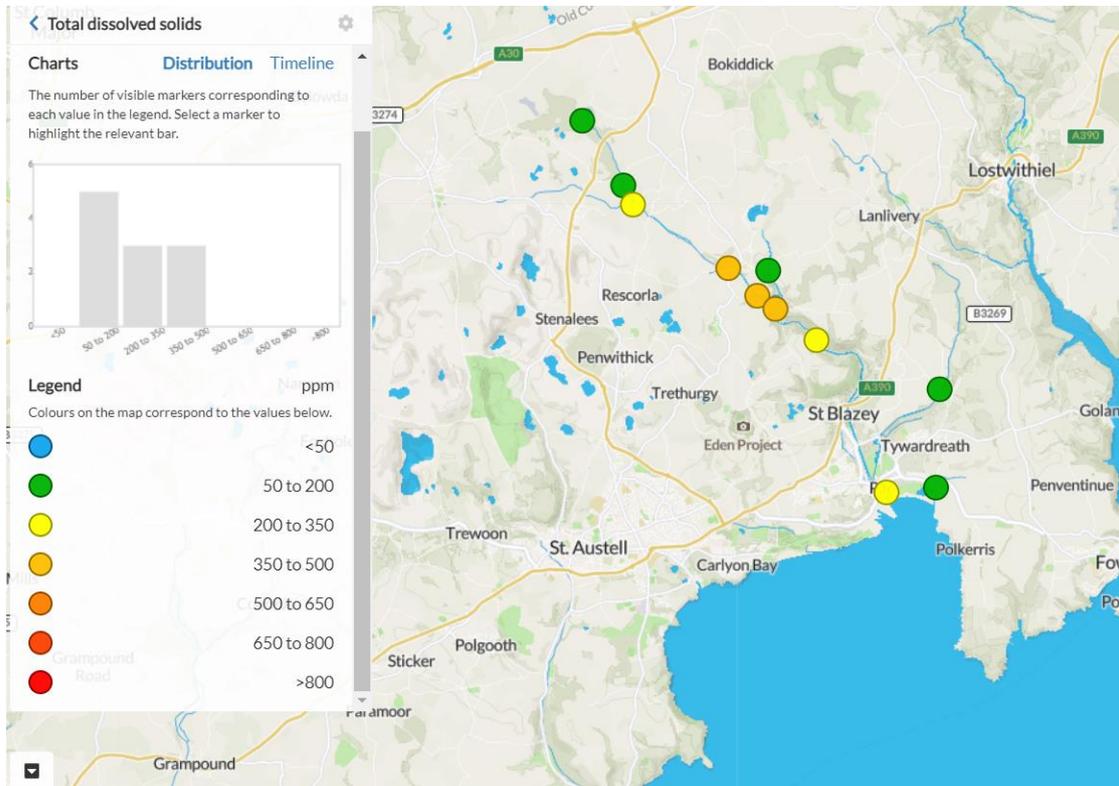
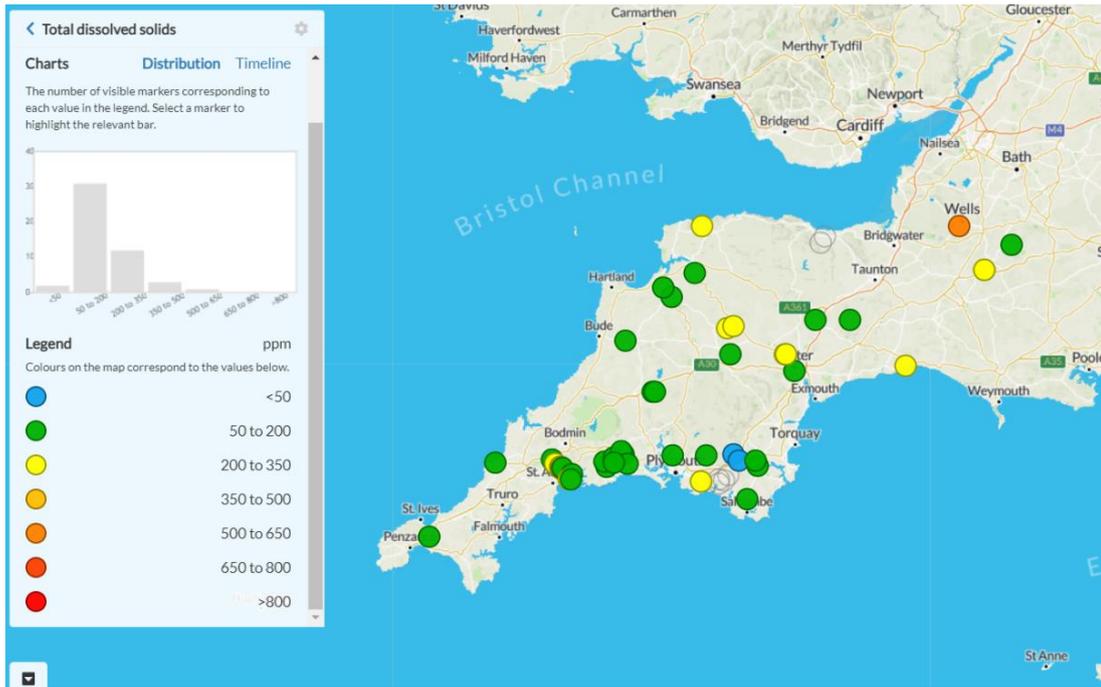
The temperature data is limited, so generalisations will be ill-founded. Even so, it seems that river temperatures on the Carbis Stream and on the main Par River from Luxulyan allotments downstream were worryingly high in summer 2022.

E. TOTAL DISSOLVED SOLIDS

1. We measure these in ppm (parts per million). This is the WRT's explanation:

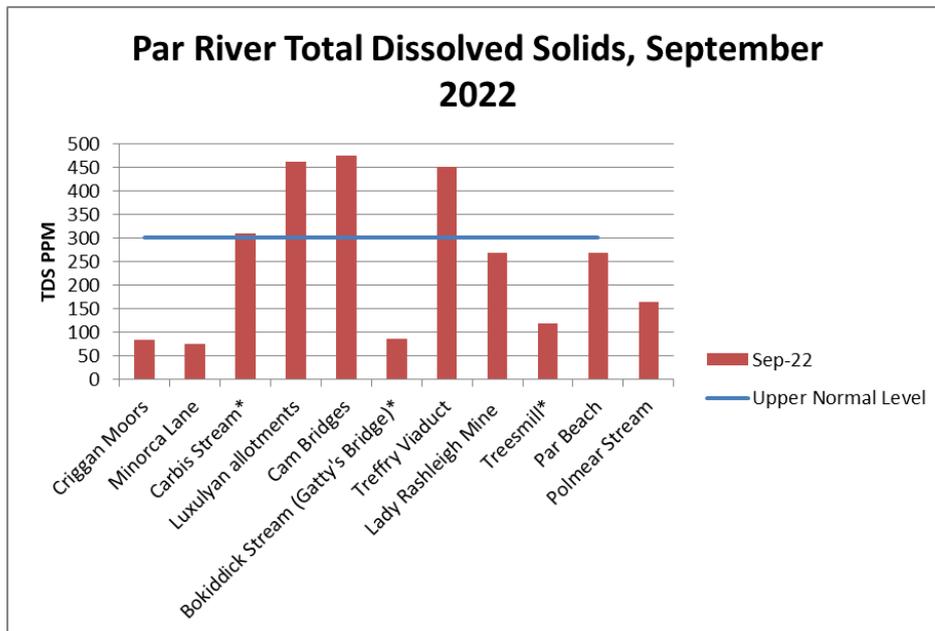
Total Dissolved Solids (TDS) is directly related to the conductivity of the water. The more minerals, salts and metals that are dissolved in the water the more conductive it gets. Low levels of dissolved solids in waters such as those on Dartmoor near to the source of the river are a result of very low 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.

2. Geographical comparison. Source: Cartographer.



3. Results September 2022

| PAR RIVER/TRIBUTARY | LOCATION | Total Dissolved Solids PPM |
|---------------------|--|----------------------------|
| Par | Criggan Moors, SX 01882 61133 | 83 |
| Par | South of Minorca Lane, Par River, SX 02657 59788 | 76 |
| Tributary | Carbis Stream SX 02834 59401 | 309 |
| Par | Luxulyan allotments, Par River, SX 04732 58045 | 461 |
| Par | Cam Bridges, Par River, SX 05292 57454 | 474 |
| Tributary | Gatty's Bridge, Bokiddick Stream SX 05531 57953 | 87 |
| Par | Treffry Viaduct, Par River, SX 05650 57179 | 450 |
| Par | Lady Rashleigh Mine, Par River, SX 06451 56509 | 268 |
| Tributary | Treesmill, Tywardreath Stream, SX 08873 55385 | 119 |
| Par | Par Beach slipway, SX 0776 53261 | 269 |
| Tributary | Polmear Stream, Ship Inn, SX 08749 53417 | 164 |

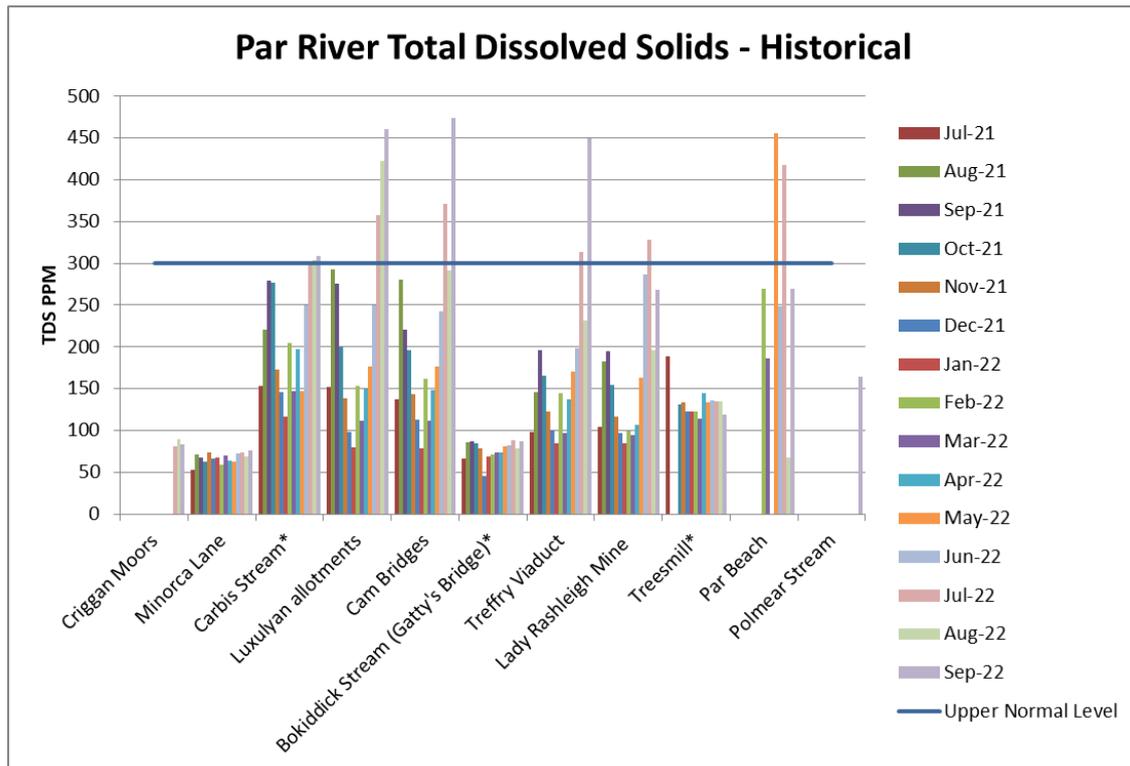


Upper Normal Level

The WRT advice is: 'TDS levels vary between catchments due to natural geology etc. We generally say that after 6 months of sampling you should have an idea of what is 'normal' for your river. Looking at the scorecards for the Lower Par for 2020 and 2021 I would say that anything above 300 ppm is too high.'

N.B. The 'excess' TDS on the Carbis Stream coincides with, or is caused by, the resumption of china clay in the water; however, the markedly excessive readings at 3 locations on the Par River cannot be explained.

4 Historical data on total dissolved solids:



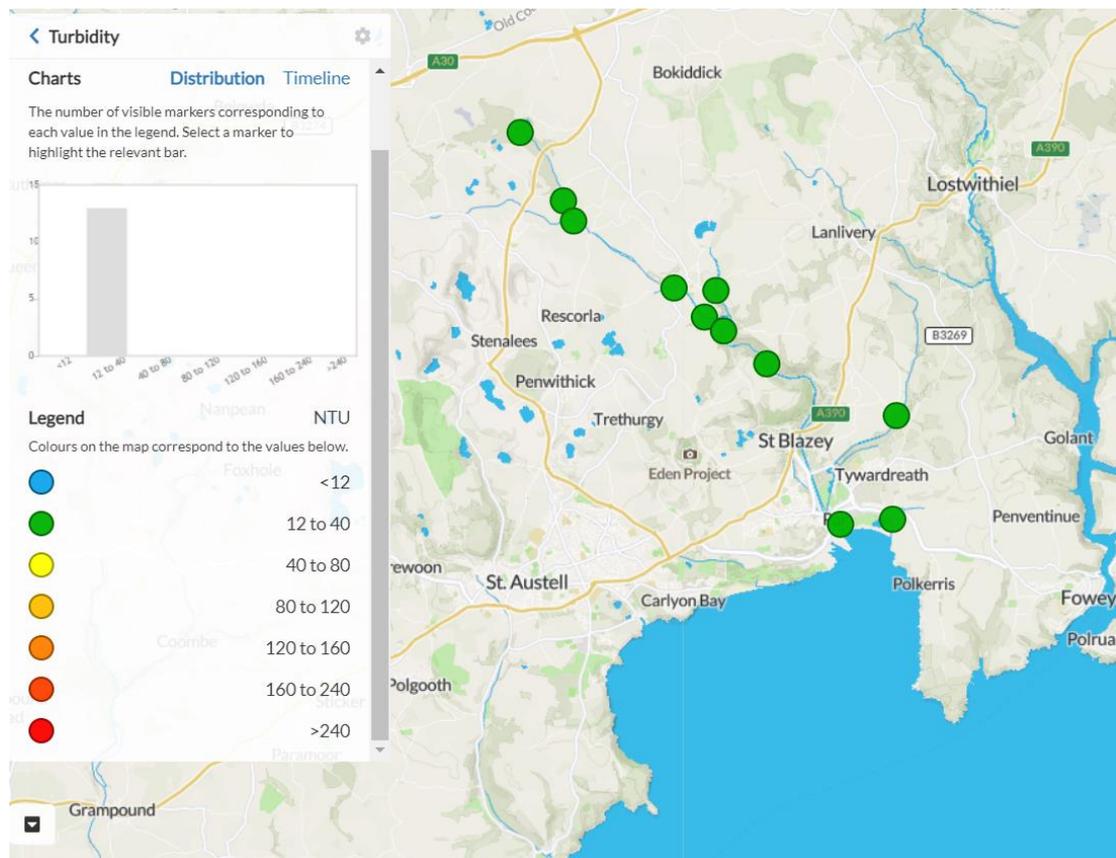
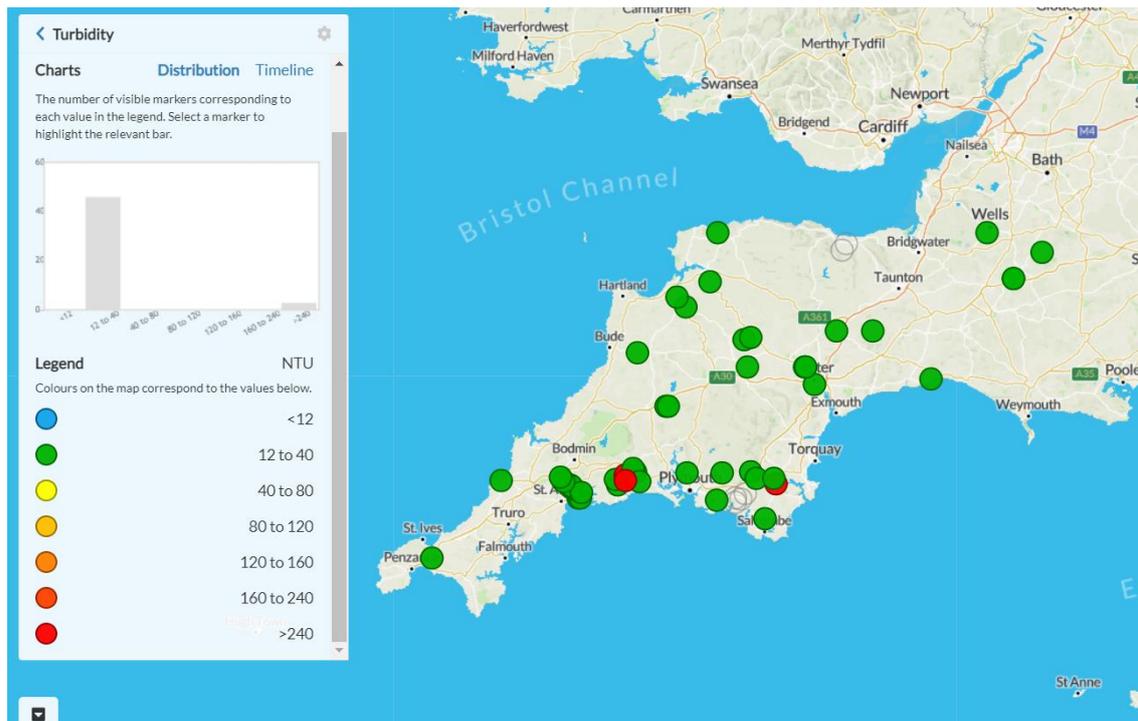
N.B. The sites most frequently exceeding the informally designated Upper Normal Level are downstream from St Austell North STW but correlation does not establish causation. Readings on the Carbis Stream often exceed those elsewhere but only triggered the Upper Normal Level this year. Low water levels might be an explanation of some of these readings if dilution increases the concentration of Total Dissolved Solids.

F. TURBIDITY

1. This is the WRT explanation of this measure:

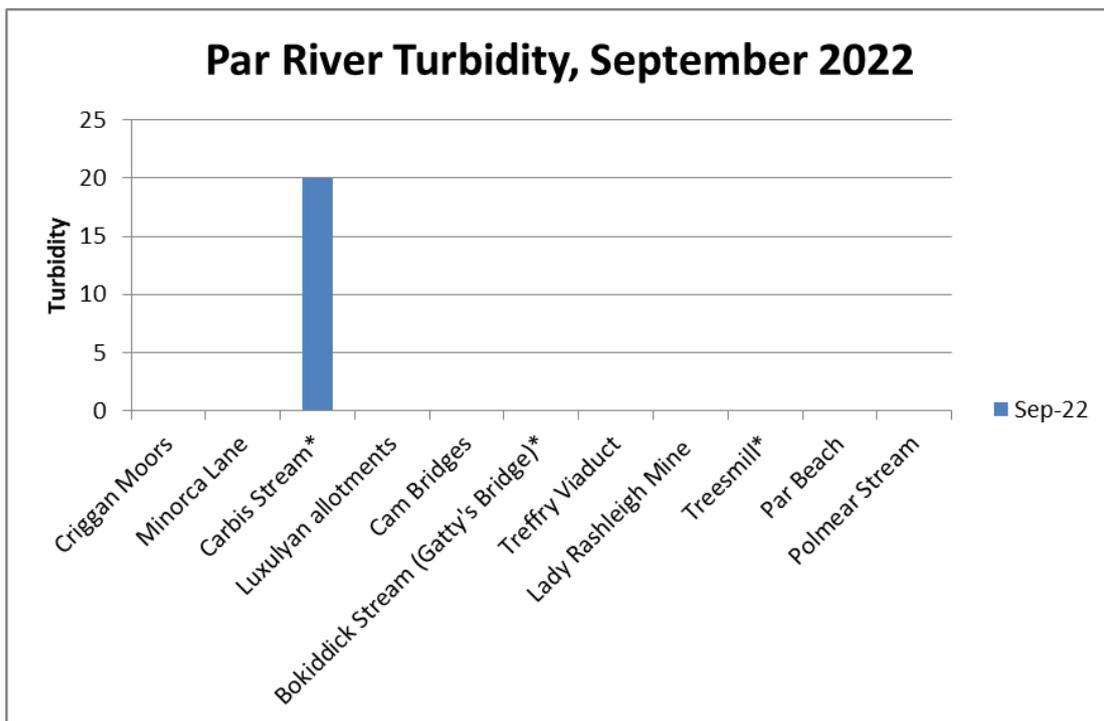
Turbidity tube is a measure of the optical clarity of the water. The more suspended particles in the water the lower the clarity and the higher the turbidity. You will often find your waterbody gets more turbid after heavy rainfall due to soil running off the fields and sediment being mixed into the 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.

2. **Geographical comparison.** Where scores are shown as 0, it means that the reading using the Secchi tube was <12. Source: Cartographer.

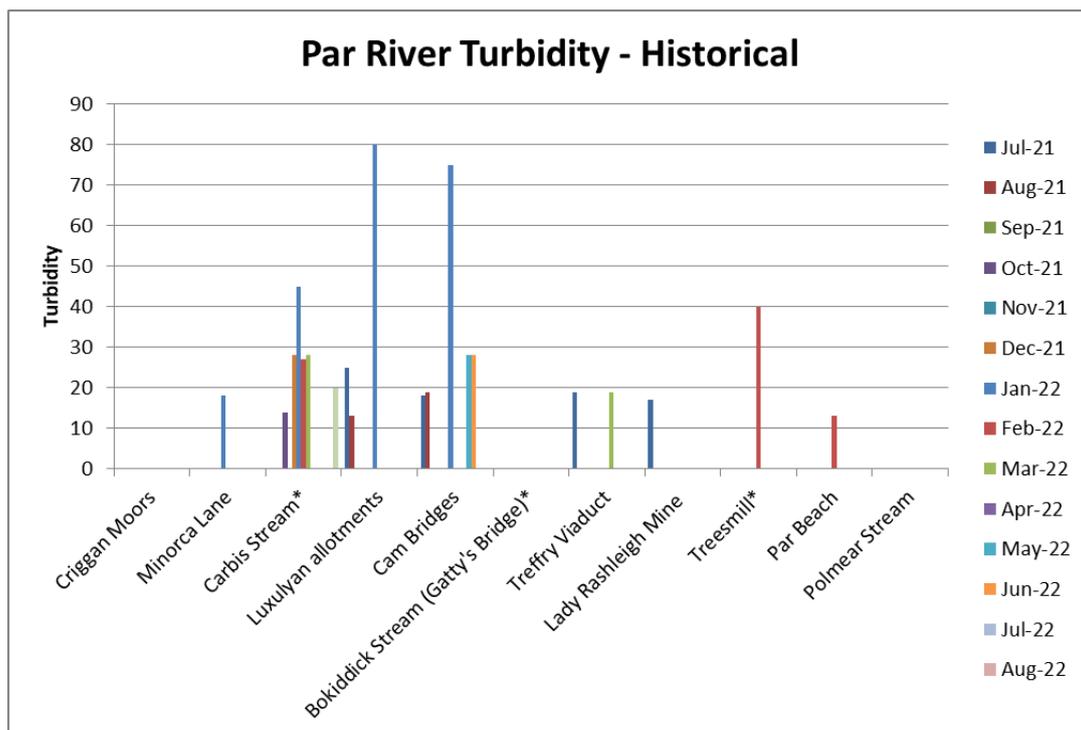


3 Results September 2022

| PAR RIVER/TRIBUTARY | LOCATION | Turbidity |
|---------------------|--|-----------|
| Par | Criggan Moors, SX 01882 61133 | 0 |
| Par | South of Minorca Lane, Par River, SX 02657 59788 | 0 |
| Tributary | Carbis Stream SX 02834 59401 | 20 |
| Par | Luxulyan allotments, Par River, SX 04732 58045 | 0 |
| Par | Cam Bridges, Par River, SX 05292 57454 | 0 |
| Tributary | Gatty's Bridge, Bokiddick Stream SX 05531 57953 | 0 |
| Par | Treffry Viaduct, Par River, SX 05650 57179 | 0 |
| Par | Lady Rashleigh Mine, Par River, SX 06451 56509 | 0 |
| Tributary | Treesmill, Tywardreath Stream, SX 08873 55385 | 0 |
| Par | Par Beach slipway, SX 0776 53261 | 0 |
| Tributary | Polmear Stream, Ship Inn, SX 08749 53417 | 0 |



4 Historical data on turbidity:



G. PHOSPHATES

1. This is the WRT's explanation of this measure.

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.)

Ranges on phosphate diagnostic colour chart:

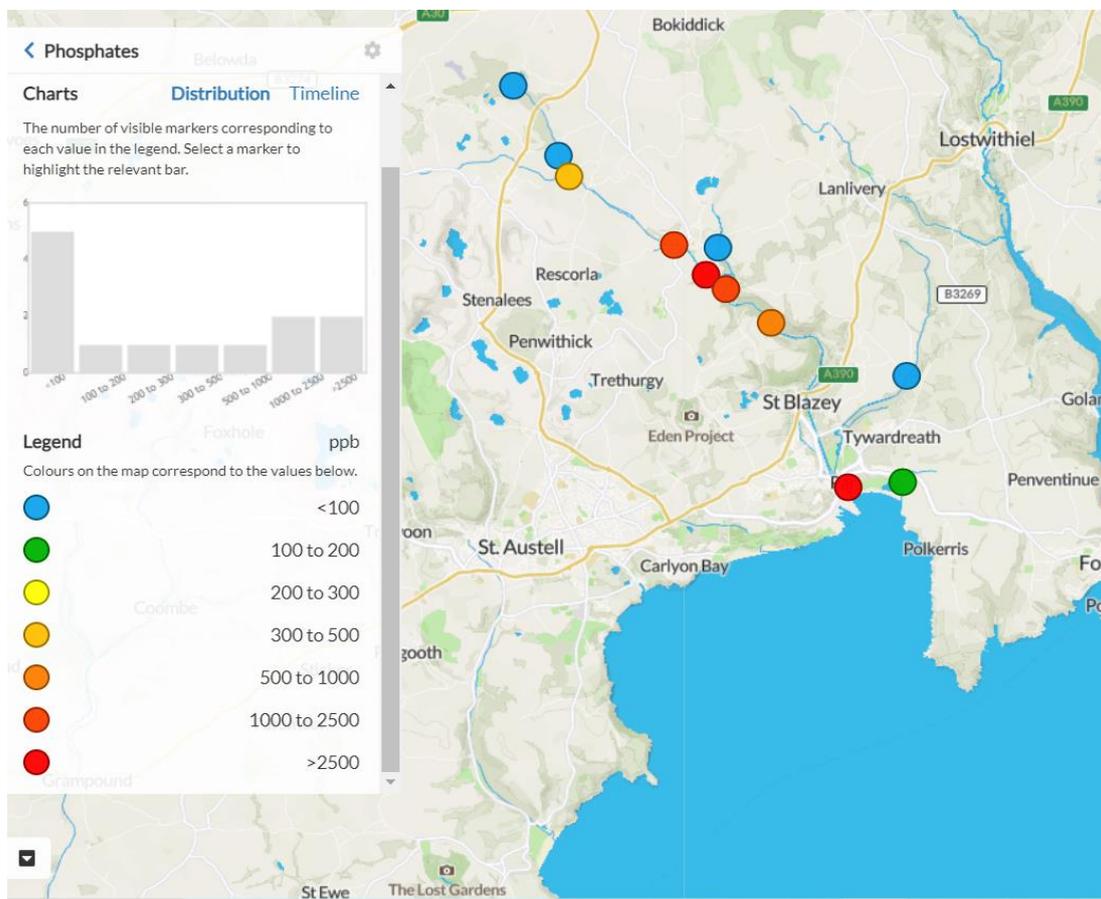
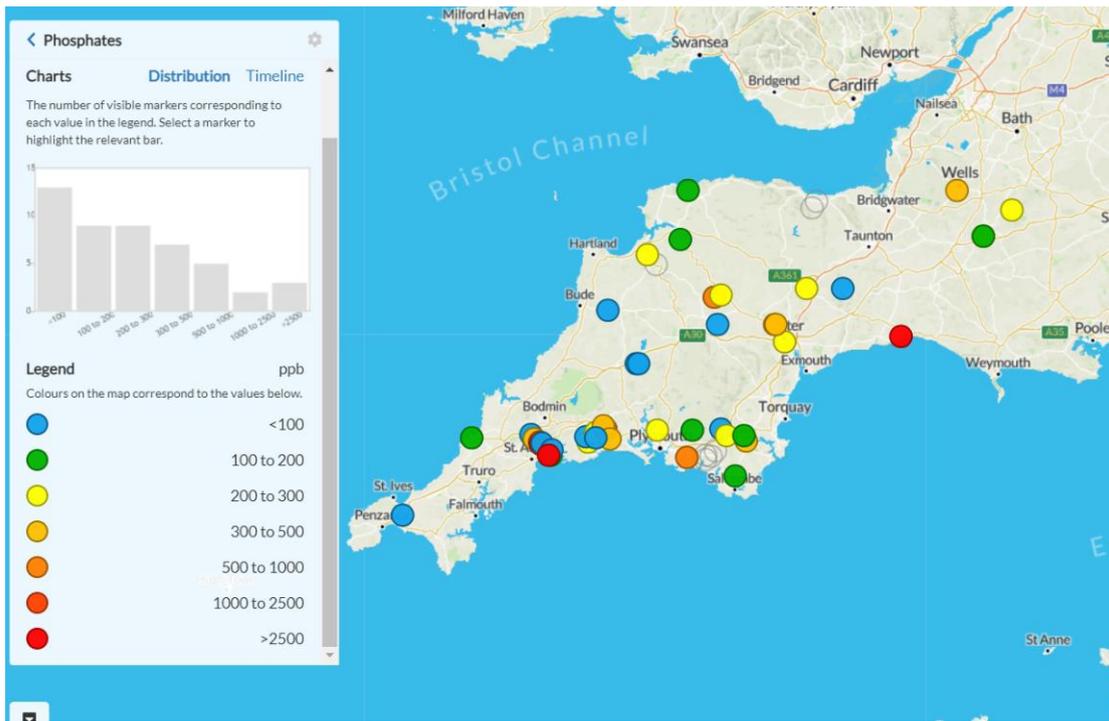
0 – 100 OK

200 – 300 HIGH

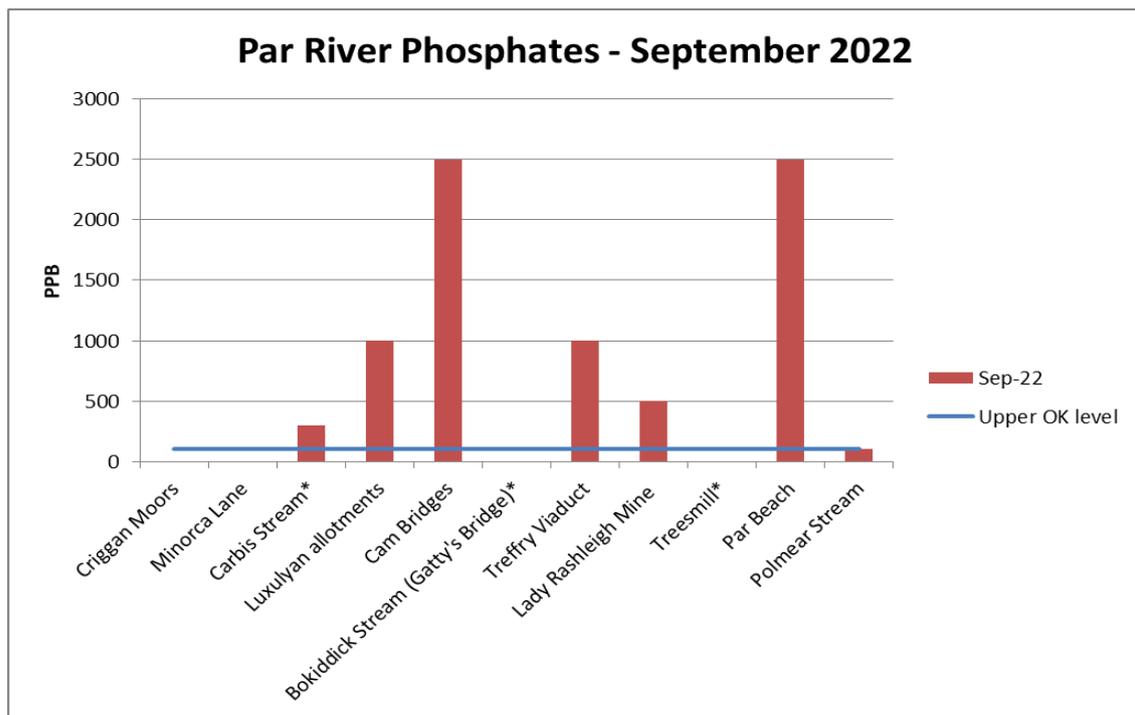
500 – 2500 – TOO HIGH

Phosphate levels were relatively low for the second month running. Levels at all sites monitored were OK according to the WRT guidance. Maximum scores of 2500 PPB have been recorded at some sites but these precede the date range in the historical graphs. They have been recorded on Cartographer.

2. Geographical comparison. Source: Cartographer

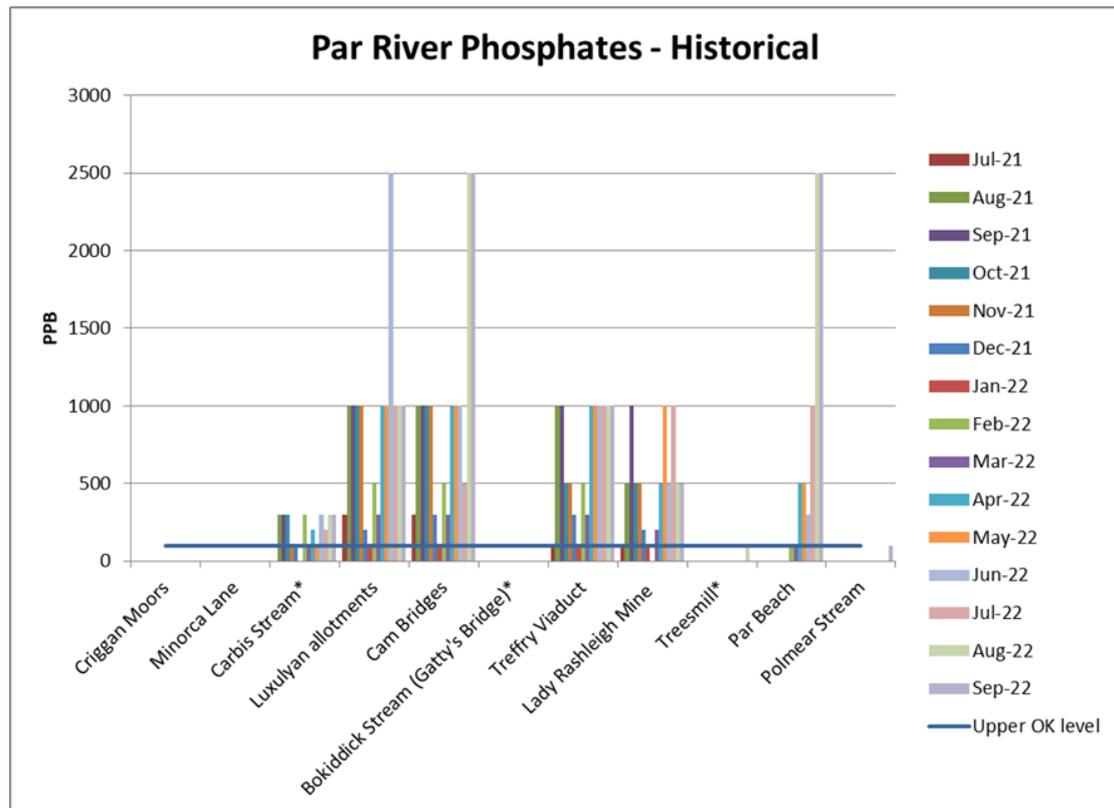


| PAR RIVER/TRIBUTARY | LOCATION | Phosphates PPB |
|---------------------|--|----------------|
| Par | Criggan Moors, SX 01882 61133 | 0 |
| Par | South of Minorca Lane, Par River, SX 02657 59788 | 0 |
| Tributary | Carbis Stream SX 02834 59401 | 300 |
| Par | Luxulyan allotments, Par River, SX 04732 58045 | 1000 |
| Par | Cam Bridges, Par River, SX 05292 57454 | 2500 |
| Tributary | Gatty's Bridge, Bokiddick Stream SX 05531 57953 | 0 |
| Par | Treffry Viaduct, Par River, SX 05650 57179 | 1000 |
| Par | Lady Rashleigh Mine, Par River, SX 06451 56509 | 500 |
| Tributary | Treesmill, Tywardreath Stream, SX 08873 55385 | 0 |
| Par | Par Beach slipway, SX 0776 53261 | 2500 |
| Tributary | Polmear Stream, Ship Inn, SX 08749 53417 | 100 |



*indicates a tributary of the Par River. USL is 100 Parts Per Billion which, according to WRT, is the Upper Safe Level.

3. Historical data on phosphates:



H. NITRATES

1. The WRT kit has these ranges for nitrates:

Nitrate (ppm NO₃)

0

10

30

60

120

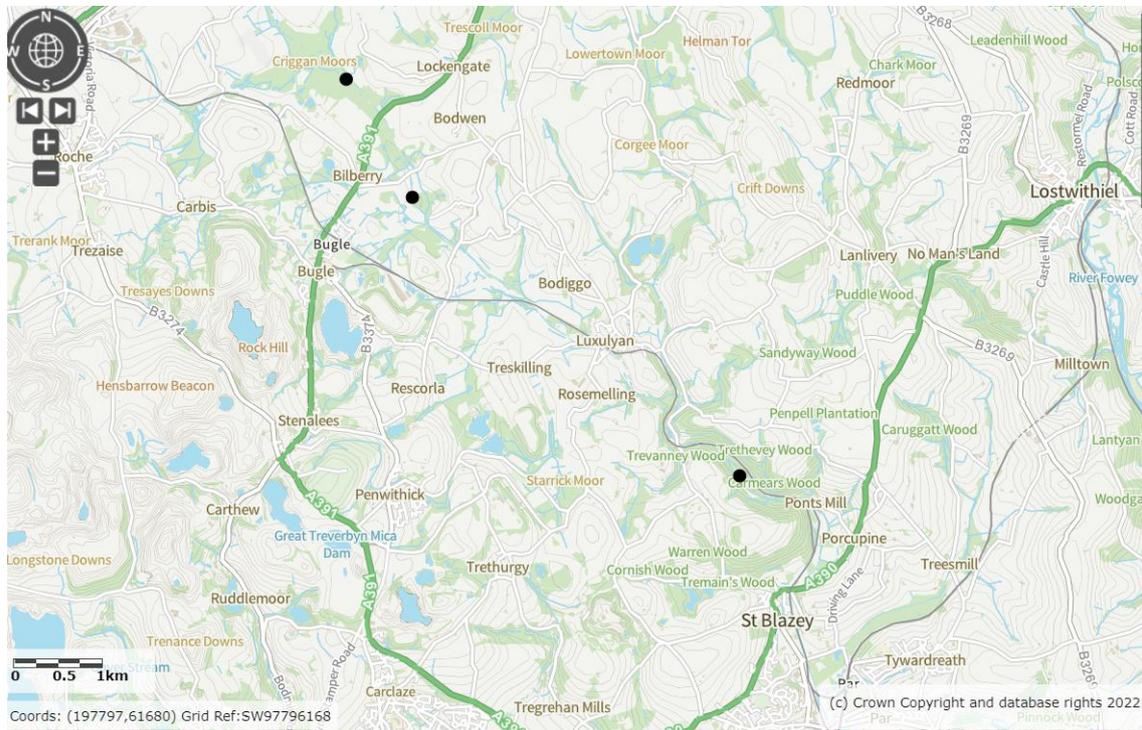
200

2. We have concerns about the sensitivity of the testing strips so did not carry out any tests this month.

I. BACTERIA (E.COLI (EC) AND TOTAL COLIFORM (TC))

1. Samples were taken at these locations:

- Criggan Moor (SX 01882 61133)
- South of Minorca Lane (SX 02657 59788)
- Lady Rashleigh Mine (SX 06451 56509)



2. Key information:

What is the difference between total coliform and E. coli?

Total coliform is a large collection of different kinds of bacteria. Faecal coliform are types of total coliform that exist in faeces. E. coli is a subgroup of faecal coliform.

<https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs//331-181.pdf>

Why is E. coli in river water a concern?

The presence of E. coli indicates **faecal contamination of the drinking water** and as a result, there is an increased risk that enteric pathogens may be present. <https://www.canada.ca/en/health-canada/programs/consultation-e-coli-drinking-water/document.html>

Particular thanks are due to Joan Farmer for allowing the use of her home for the unpleasant process of incubating the samples and also for contacting the manufacturers of the kit in North Carolina, USA, for guidance on the results. Thanks too to Ross Tonkin for sharing his professional expertise.

Interpreting the results:

Aquagenx CBT EC+TC MPN Kit gives a guide to help interpret the results of the incubated samples. This is an attempt at a simple guide linked to the **United States Environmental Protection Agency Recreational Water Health Risk Category Based on Minimum Probable Number and Upper 95% Confidence Level**. However, this simplification should be used with caution until it has been checked by someone with relevant expertise.

| MPN/100mL | Health Risk Category |
|-----------|---------------------------------|
| 0 | Low Risk/Safe |
| 10 - 40 | Low Risk/Probably Safe |
| 47 – 84 | Low Risk/Possibly Safe |
| 91 - 96 | Intermediate Risk/Possibly Safe |
| 136 - 171 | High Risk/Probably Unsafe |
| 326 - 483 | Very High Risk/Unsafe |
| >1000 | Very Unsafe |

3. Bacteria results. Report and data from Joan Farmer:**Bacteria in the Par River:****Comparing 3 sites, 2 upstream of the St Austell North Sewage Treatment Works (STW) and 1 downstream**

All 3 sites were the same according to the Aquagenx compartment bag test for Surface and Recreational Water. If anything, the samples seemed slightly darker and smelt stronger in the upstream samples and took more pills to neutralize the sample, but these observations are not part of the test.

The USA Health risk Category is for Recreational water. Although the river is not deemed a recreational bathing area, Lady Rashleigh mine is used recreationally by families visiting the Luxulyan Valley, and the water flows into the sea at Par Sands.

In August, the results were the same for all 3 sites. (No. 31 on a 32 point chart for e coli.)

In September the Minorca Lane site had lower e coli than the others (But still number 28 on a 32 point chart.)

The levels of total coliforms have consistently been the highest on the chart.

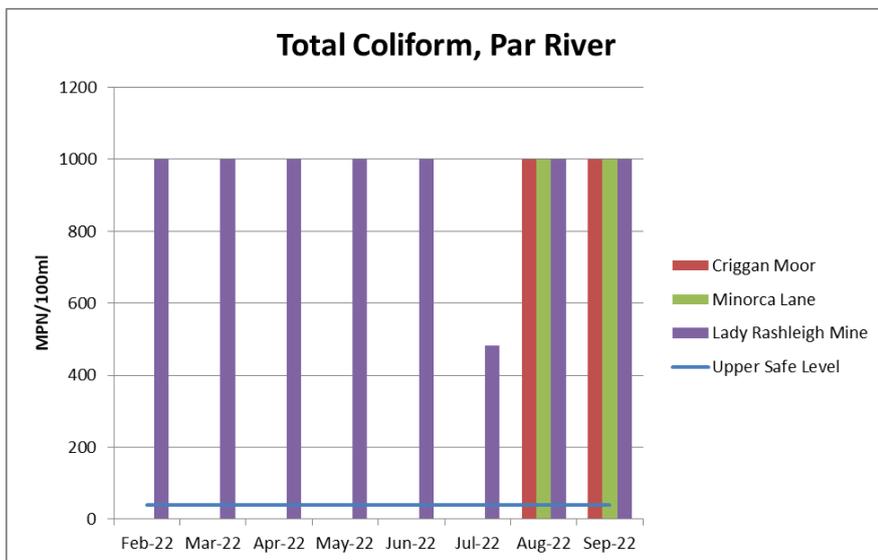
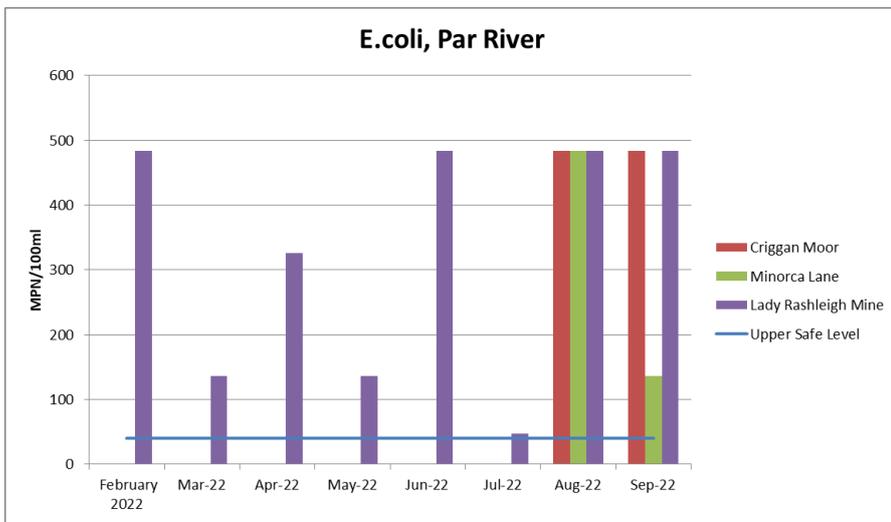
| MONTH & TEST | Criggan Moor (Upper Par) SX01882 61133 Sample & Result Dates, Score & Health Risk | Minorca Lane (Upper Par) SX02657 59788 Sample & Result Dates, Score & Health Risk | Lady Rashleigh Mine (Lower Par) SX06451 56509 Sample & Result | NOTES ON WEATHER, TEST ETC |
|--------------|---|--|--|----------------------------------|
| | | | | |

| | | | Dates, Score & Health Risk | |
|-----------------------|----------------|---------------------|--|--|
| FEBRUARY 2022 | | | | |
| E.coli | n/a | n/a | 21/02/2022 (23/02/2022; 24/02/2022) 483¹ Very High/ Unsafe 483² Very High Risk /Unsafe | Rain prev. 24 hrs |
| Total Coliform | n/a | n/a | 21/02/2022 (23/02/2022; 24/02/2022) >1000 Very Unsafe >1000 Very Unsafe | Rain prev. 24 hrs |
| MARCH 2022 | Criggan | Minorca Lane | Lady Rashleigh | |
| E.coli | n/a | n/a | 21/03/2022; 24/02/2022 136 High Risk. Probably unsafe. | Dry |
| Total Coliform | n/a | n/a | 21/03/2022; 24/02/2022 >1000³ Very Unsafe | Dry |
| APRIL 2022 | Criggan | Minorca Lane | Lady Rashleigh | |
| E.coli | n/a | n/a | 16/04/2022; 18/04/2022 326 Very High Risk /Unsafe | Dry and sunny following rain. Temp over 30° C. |

| | | | | |
|--|---|---|---|---|
| Total Coliform | n/a | n/a | 16/04/2022; 18/04/2022 >1000 Very Unsafe | Dry and sunny following rain. Temp over 30° C. Definitely blue in compartments 4 & 5. |
| MAY 2022 | Criggan | Minorca Lane | Lady Rashleigh | |
| E.coli | n/a | n/a | 9/05/2022; 11/05/2022 136 High Risk. Prob. Unsafe | Dry |
| Total Coliform | n/a | n/a | 9/05/2022; 11/05/2022 >1000 Very Unsafe | Dry Def. blue |
| JUNE 2022 | Criggan | Minorca Lane | Lady Rashleigh | |
| E.coli | n/a | n/a | 27/06/2022; 29/06/2022 483 Very High Risk/ Unsafe | Rain in prev. 24 hours |
| Total Coliform | n/a | n/a | 27/06/2022; 29/06/2022 >1000 Very Unsafe | Rain in prev. 24 hours Def. blue |
| JULY 2022 | Criggan | Minorca Lane | Lady Rashleigh | |
| E.coli | n/a | n/a | 18/07/2022; 20/07/2022 47 Low Risk/Possibly Safe⁴ | Dry |
| Total Coliform 18/07/2022; 20/07/2022 | n/a | n/a | 18/07/2022; 20/07/2022 483 Very High Risk/ Unsafe | Dry |
| AUGUST 2022 | Criggan | Minorca Lane | Lady Rashleigh | |
| E.coli | 19/08/2022 483 Very High Risk/ Unsafe | 19/08/2022 483 Very High Risk/ Unsafe | 21/08/2022; 23/08/2022 483 Very High Risk/ Unsafe | |
| Total Coliform | 19/08/2022 >1000 | 19/08/2022 >1000 | 21/08/2022; 23/08/2022 | Light rain |

| | | | | |
|-----------------------|---|--|--|---------|
| | Very Unsafe | Very Unsafe | >1000 Very Unsafe | |
| SEPTEMBER 2022 | Criggan | Minorca Lane | Lady Rashleigh | |
| E.coli | 16/09/2022 483 Very High Risk/ Unsafe | 16/09/2022 136 High Risk/Probably Unsafe | 17/09/2022; 19/09/2022 483 Very High Risk/ Unsafe | No rain |
| Total Coliform | 16/09/2022 >1000 Very Unsafe | 16/09/2022 >1000 Very Unsafe | 17/09/2022; 19/09/2022 >1000 Very Unsafe | No rain |

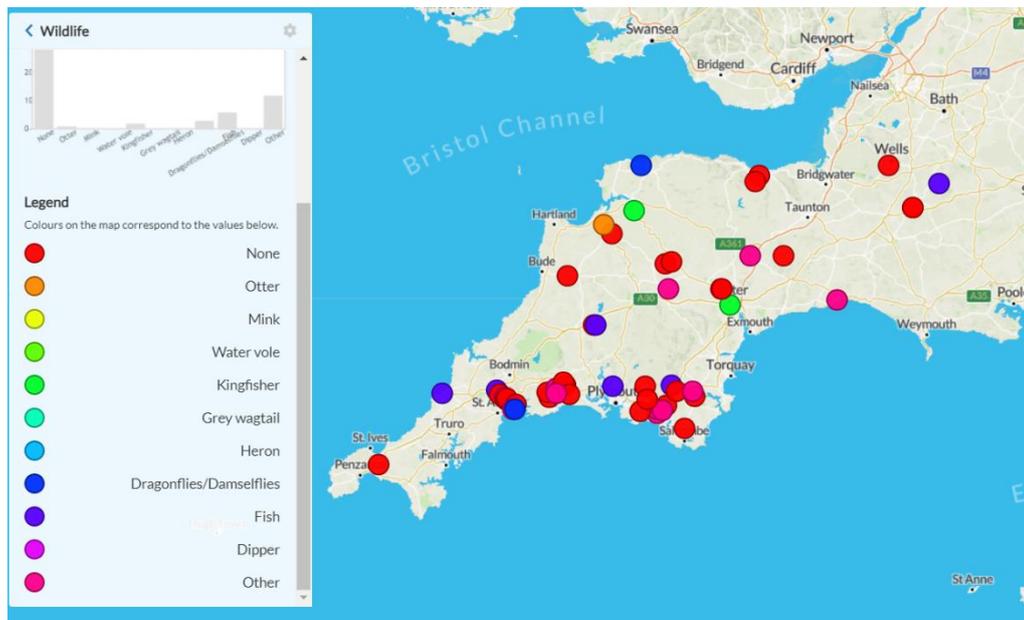
4. Graphs



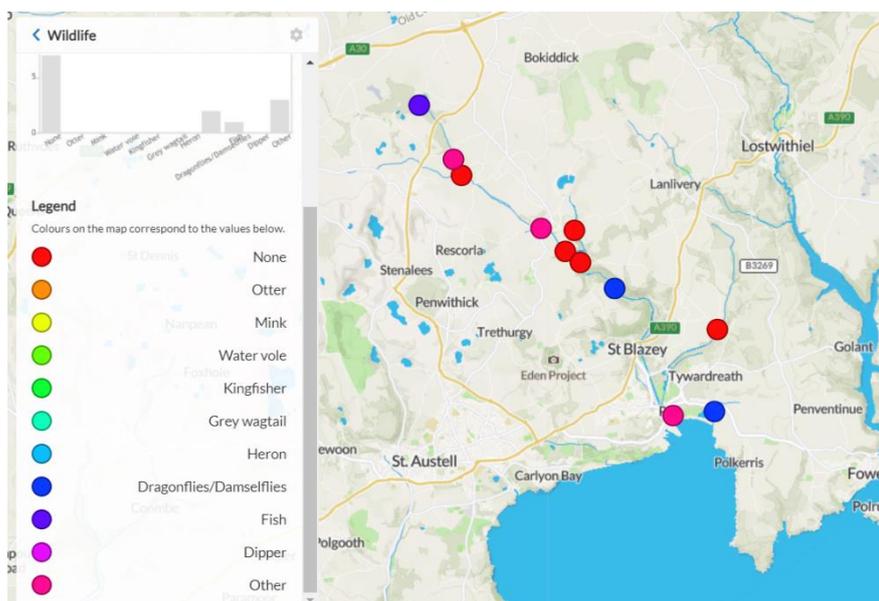
Note: readings in excess of 1000 MPN/100 ml are represented as 1001 on the graph.

J. WILDLIFE (FOR OTTER REPORT SEE SECTION K)

(a) Maps



Source: Cartographer.



Source: Cartographer.

Otter spraint is included, as usual, under 'Other'.

(b) Wildlife sightings, other than evidence for otters, included:

a tiny fish in the river on Criggan Moors; dragonflies (Lady Rashleigh Mine and Polmear Stream); a butterfly (Lady Rashleigh Mine); a buzzard and swan (Par Beach slipway); a kingfisher on the Polmear Stream at the eastern end of Par Beach (not a monitored site).

K. OTTER SURVEY

SEPTEMBER 2022

A. SURVEY CONDITIONS

| | |
|------------------------|--|
| Date & time | 16/9/2022, 17/9/2022, 20/9/2022 |
| Surveyors | Roger Smith, Joan Farmer, Veronica Jones |
| Areas surveyed | Upper Par (Criggan Moors and Minorca Lane); Par River from STW to Cam Bridges; Par River from Treffry Viaduct to Lady Rashleigh Mine; Lady Rashleigh Mine to Par Beach |
| Weather | Mostly dry |
| River level | Low |
| River flow | Steady |
| Water quality | Too High phosphate levels from Luxulyan allotments downstream, with maximum readings of 2500 PPB at Cam Bridges and Par Beach. E.coli readings at Criggan Moor and Lady Rashleigh Mine were <i>Very High Risk/Unsafe, and High Risk/Probably Unsafe</i> at Minorca Lane. Total coliform scores at the same locations were <i>Very Unsafe</i> . |
| Other wildlife | Tiny fish seen in the river on Criggan Moors on 16 th September 2022. |

B. EVIDENCE FOR OTTERS ✓

| EVIDENCE | SEEN/ ORKS* | LOCATION | NOTES |
|-------------------------|----------------|---|---------------------|
| Spraint - fresh | ✓* | SX 0722 5542 Stone in river near path south of Prideaux Wood china clay works (disused) | First sighting here |
| Spraint – recent | ✓* | SX 04747 58056 Luxulyan allotments boulder in river | |
| Spraint - old | ✓* | SX 04747 58056 Luxulyan allotments boulder in river | |
| | ✓* | SX 06456 56498 Lady Rashleigh Mine – boulder in river | |
| Anal jelly | | | |
| Sign heap | | | |
| Staining | ✓ | SX 04747 58056 Luxulyan allotments boulder in river | |
| Tracks | | | |
| Path | | | |
| Slide | | | |
| Holt | | | |
| Hover | | | |
| Couch | | | |
| Live sighting | | | |
| Corpse | | | |

*Report sent to ORKS: <https://ercis.org.uk/>

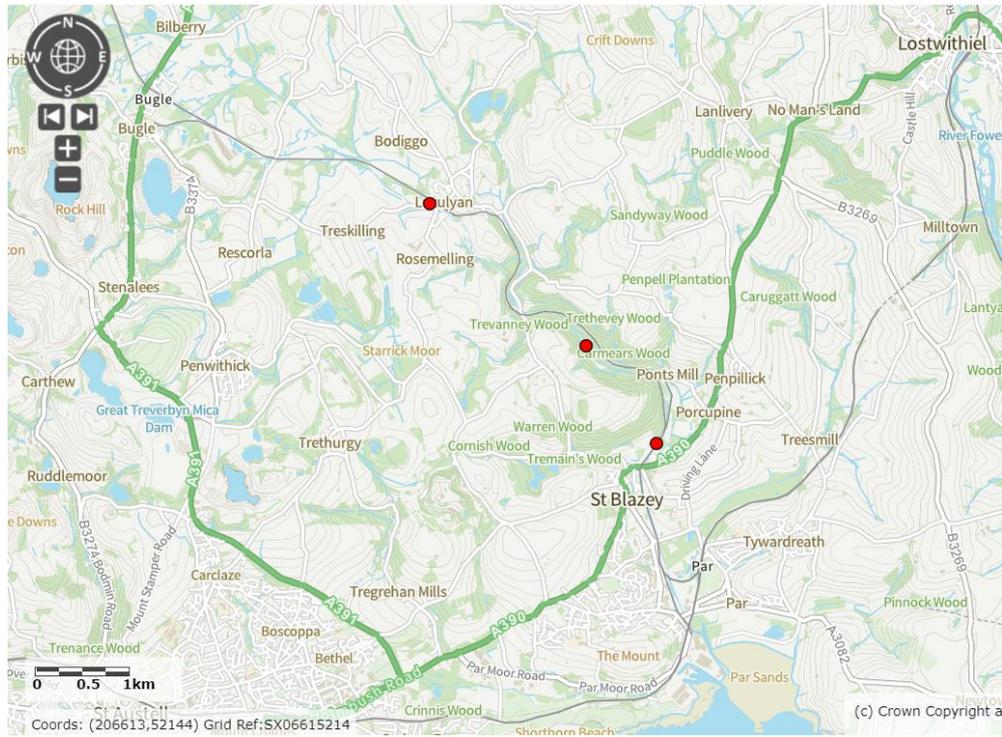
C. MAP

Source: <https://magic.defra.gov.uk/MagicMap.aspx>

Red dots – definite evidence. Recorded on ORKS.

Black dots – possible evidence. Not recorded on ORKS.

Green dots – definite evidence but may have been recorded in the previous month, e.g. old spraint.

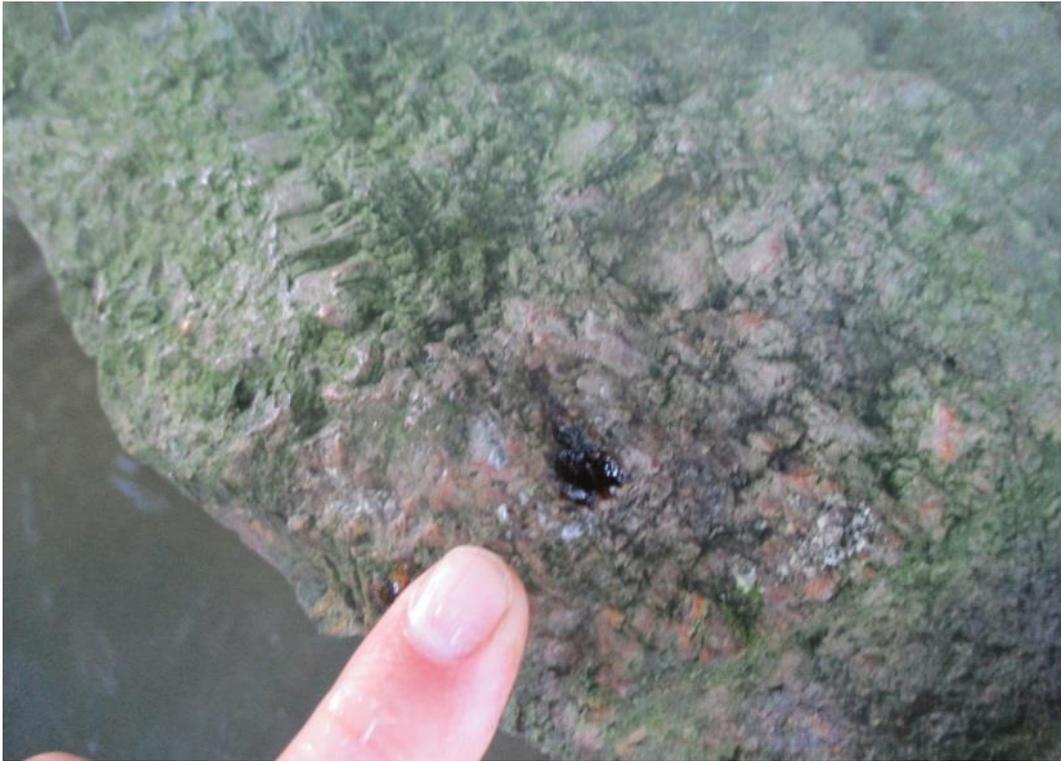


D. PHOTOGRAPHS

1. Old spraint on boulder near Luxulyan allotments (SX 04747 58056):



2. Tarry stain on boulder near Luxulyan allotments (SX 04747 58056):



3. Old spraint on boulder in river near Lady Rashleigh Mine (SX 06456 56498):



4. Fresh spraint on stone in river near path south of Prideaux Wood china clay works (disused) - SX 0722 5542:



E. COMMENTS

This time various locations were examined from near the source (Criggan Moors) to Par Beach, although long sections are not accessible (especially between Lavrean Bridge and Luxulyan). Evidence was sparse. Some locations that have often had spraint or other evidence for otters in the past had nothing, e.g. under the canal bridge at Pontois Mill. However, there was enough to show the presence of otters in the month since the last survey and excitingly fresh spraint was found in a new location between Pontois Mill and Tywardreath Highway.

L. ARMI RIVERFLY SURVEY

Three of the group (Joan Farmer, Veronica Jones and Roger Smith) have undertaken the training to carry out Riverfly Surveys under the Anglers' Riverfly Monitoring Initiative (<https://www.riverflies.org/rp-riverfly-monitoring-initiative>). In short, sampling for 8 riverfly groups is carried out using standardised methods with scores calculated for their abundance. Information is passed to ARMI and the ORKS database. If the score does not reach a trigger level (in our case trigger level was raised from 5 to 6 in May 2022), the Environment Agency must be informed immediately since it is highly likely to indicate that the water is polluted. Our group received approval to sample at two sites: Luxulyan allotments (SX 04743 58054) and Lady Rashleigh Mine (SX 06453 56500). We have decided, for the time being, to concentrate on the latter.

It is impossible to count every invertebrate so this counting method is used:

| Abundance | Score | Estimated Number |
|-----------|-------|------------------|
| 1-9 | 1 | Quick count |
| 10-99 | 2 | Nearest 10 |
| 100-999 | 3 | Nearest 100 |
| >1000 | 4 | Nearest 1000 |

Riverfly monitoring has been suspended because of low river levels. Surveying in these conditions could cause harm to riverfly populations. We hope to resume in October.

M. DISCUSSION

1. Positive observations.

- (a) Simon Tagney has started river monitoring at the Polmear Stream near Par beach.
- (b) Otter spraint was found at a new site, south of the disused Prideaux Wood china clay works.
- (c) A tiny fish was glimpsed in the stream on Criggan Moors.

2. Points of concern.

- (a) Joan Farmer's analysis of bacteria samples taken from 3 sites shows that, with the exception of the E.coli result for the river near Minorca Lane, levels of both types of bacteria (E.coli and Total Coliform) were *Very High Risk/Unsafe* (E.coli) and *Very Unsafe* (Total Coliforms) according to the USA Health Risk Category for Recreational Water.
- (b) Phosphate levels, again, were *Too High* (WRT classification) at sites from Luxulyan allotments downstream to the sea and at two sites (Cam Bridges and Par Beach Slipway) were at the maximum level that our tests can identify. The level was *High* on the Carbis Stream.
- (c) After several months of clear water, the Carbis Stream was tinged white, probably with china clay and at the confluence with the Par the contrast in water colour was evident once again, although not as stark as it is for most months of the year.



Bottom right – grey water from the Carbis Stream at the confluence with the Par River.

- (d) Total Dissolved Solids exceeded what would be expected in a river of this type at 3 locations on the main river (Luxulyan allotments, Cam Bridges and Treffry Viaduct) and, just, on the Carbis stream.

(e) The new UK government is rumoured to be considering swingeing cuts in public services, as well as setting up enterprise zones (Cornwall is one example) where regulation and planning will be relaxed. Various countryside bodies, including the National Trust and Wildlife Trusts, are very concerned. The impact on rivers and biodiversity of further cuts could be catastrophic. The Prime Minister, during her period in charge of Defra, authorised 'cutting millions of pounds of funding earmarked for tackling water pollution' according to the *Guardian*.

'This included a £24m cut from a government grant for environmental protection, including surveillance of water companies to prevent the dumping of raw sewage, between 2014-15 and 2016-17, according to the National Audit Office.

It represents almost a quarter of the funding cut from this area between 2010, when the grant stood at £120m, and 2020, by which time it had fallen to £40m.' Source: <https://www.theguardian.com/politics/2022/aug/22/liz-truss-environment-agency-cuts-sewage-water-pollution> .

There are god reasons to be pessimistic about the likely implications for our river.

3. Areas of doubt

(a) It was once expected that bacteria levels would be elevated on the Lower Par, especially from the vicinity of St Austell North STW, although that has not been proved to be a source. What is surprising is that this is the case at Criggan Moors, near the source of the river. A further surprise is that at the middle of the three sites that were sampled, Minorca Lane, there was a dip in E.coli levels. The source(s) of high bacteria is unknown.

(b) Our judgements on bacteria levels relate to the US Health Risk Category for Recreational Water but we have no idea if there are equivalent standards in the UK.

(c) We do have some uncertainty about the devices measuring temperature and Total Dissolved Solids, as this comment by Joan Farmer explains:

I compared thermometers. The readings are from my usual thermometer.. Mandy's thermometer read 13.8 degrees and 515 TDS. The newer thermometer (which needs far longer than the older models), read 16.2 degrees and 334 TDS. I tried it again leaving it for longer (well over 2 minutes) and it read 15.3 degrees and 342 TDS. The TDS has been higher than usual on every piece of equipment .in July and September.

N. BUT TO FINISH ON A BRIGHT NOTE:

Here is one inhabitant of the river gliding serenely upstream:



**Par River Monitoring Group, 1st
October 2022**