

WESTCOUNTRY RIVERS TRUST CITIZEN SCIENCE



MONITORING OF THE PAR RIVER AND ITS TRIBUTARIES

The monitoring group operates under the citizen science scheme run by the Westcountry Rivers Trust. The Friends of Luxulyan Valley, The Friends of Par Beach, and the G7 Legacy Project for Nature Recovery have helped. Comments and opinions in this report are not necessarily shared by these organisations.

JANUARY 2023

CONTENTS & PAGES

A. KEY POINTS FROM WRT CSI MONITORING IN NOVEMBER 2022	Page 1
B. OUR GROUP	Page 2
C. JANUARY 2023 MONITORING POINTS	Pages 2-3
D. TEMPERATURE	Pages 4-6
E. TOTAL DISSOLVED SOLIDS	Pages 6-9
F. TURBIDITY	Pages 9-11
G. PHOSPHATES	Pages 12-14
H. BACTERIA (no testing this month)	Page 15
I. WILDLIFE	Pages 15-16
J. OTTER SURVEY	Pages 16-20
K. A.R.M.I. RIVERFLY MONITORING(no testing this month)	Page 20
L. DISCUSSION	Page 20

A. KEY POINTS FROM WRT CSI MONITORING IN JANUARY 2023

1. It wasn't possible to carry out bacteria testing this month but this will resume in February.
2. The usual CSI tests were conducted but results were affected by the high river levels following a period of heavy rain.
3. Evidence for the presence of otters was only found at Pontois Mill. This was unsurprising given the high river levels.
4. Stretches of the river had flooded, upstream from Luxulyan. The riverside path south of Minorca Lane was impassable.

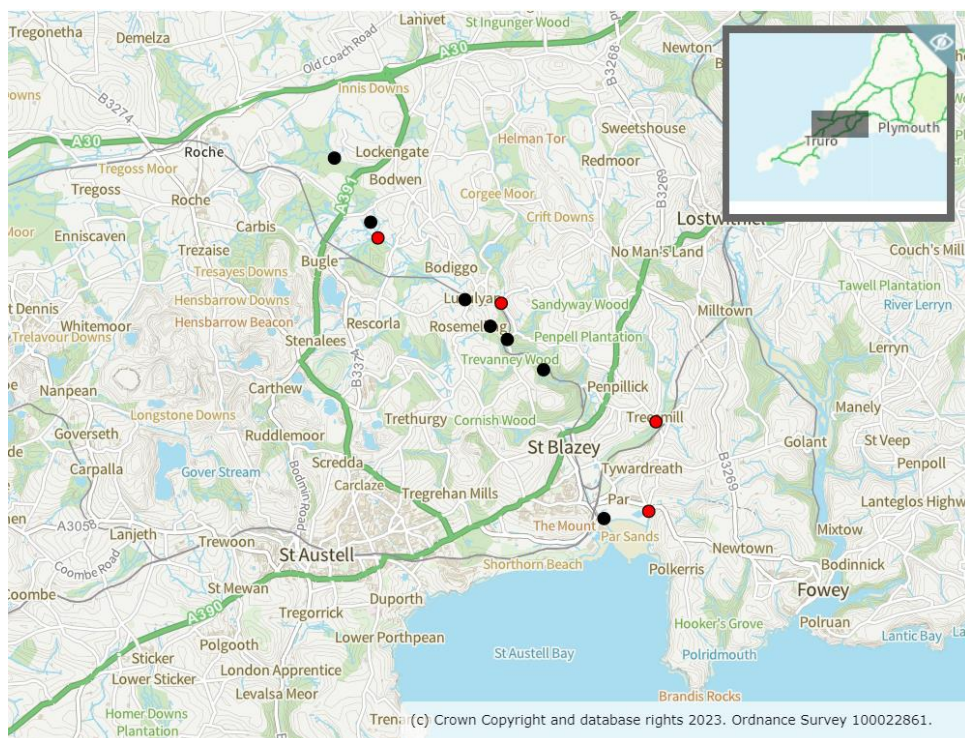
B. OUR GROUP

Monitoring is part of the Citizen Science programme run by the West Country Rivers Trust (WCRT) and is carried out monthly by volunteers, including Dave Burrell; Joan Farmer; Veronica Jones; Sue Perry; Roger Smith; Simon Tagney; Maggie 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, Lydia Deacon, Layla Ousley, Jack Middleton and Nicola Rogers is greatly appreciated. The interest and encouragement offered by Environment Agency officers, especially Lisa Best, Lisa Goodall and Peter Scobie, have been invaluable.

C. JANUARY 2023 MONITORING POINTS

This month monitoring occurred at 11 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	14/1/2023	CSI sample & Cartographer record.	Roger Smith
South of Minorca Lane, Par River, SX02668 59747	14/1/2023	CSI sampling. Cartographer record.	Roger Smith
Carbis Stream SX 02834 59401	14/1/2023	CSI sampling. Cartographer record.	Roger Smith
Luxulyan allotments, Par River, SX 04732 58045	15/1/2023	CSI sampling. Cartographer record.	Veronica Jones, Roger Smith
Cam Bridges, Par River, SX 05292 57454	15/1/2023	CSI sampling. Cartographer record.	Veronica Jones, Roger Smith
Gatty's Bridge, Bokiddick Stream SX 05531 57953	15/1/2023	CSI sampling. Cartographer record.	Veronica Jones, Roger Smith
Treffry Viaduct, Par River, SX 05650 57179	15/1/2023	CSI sampling. Cartographer record.	Veronica Jones, Roger Smith
Lady Rashleigh Mine, Par River, SX 06451 56509	15/1/2023	CSI sampling. Cartographer record.	Veronica Jones, Roger Smith
Treesmill, Tywardreath Stream, SX 08873 55385	15/1/2023	CSI sampling. Cartographer record.	Maggie Tagney
Par Beach slipway, SX 0776 53261	15/1/2023	CSI sampling. Cartographer record.	Brian Harrison
Polmear Stream, Ship Inn SX 08749 53417	15/1/2023	CSI sampling. Cartographer record.	Simon Tagney

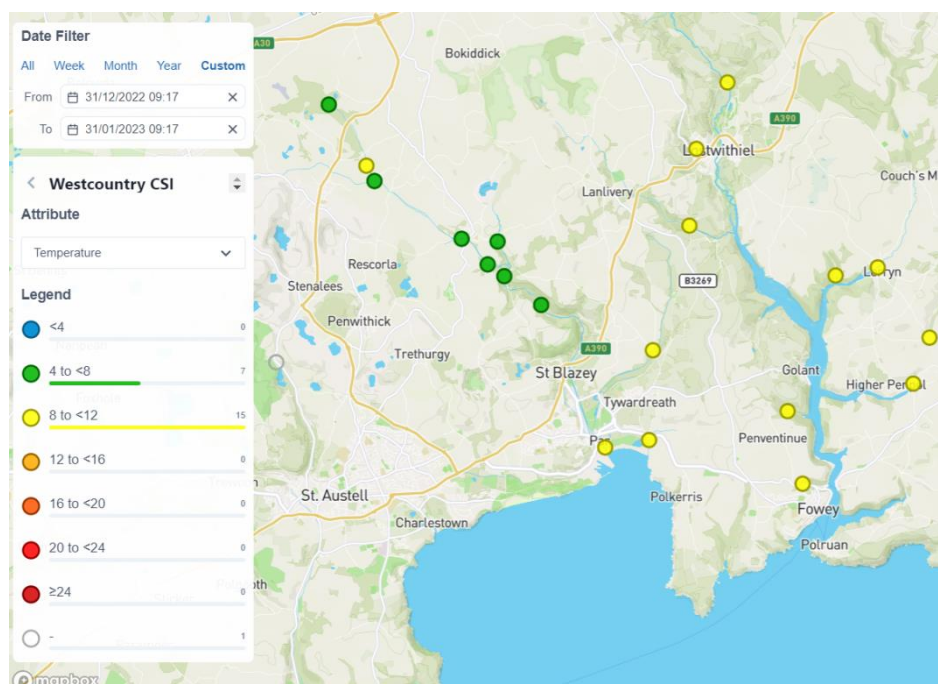
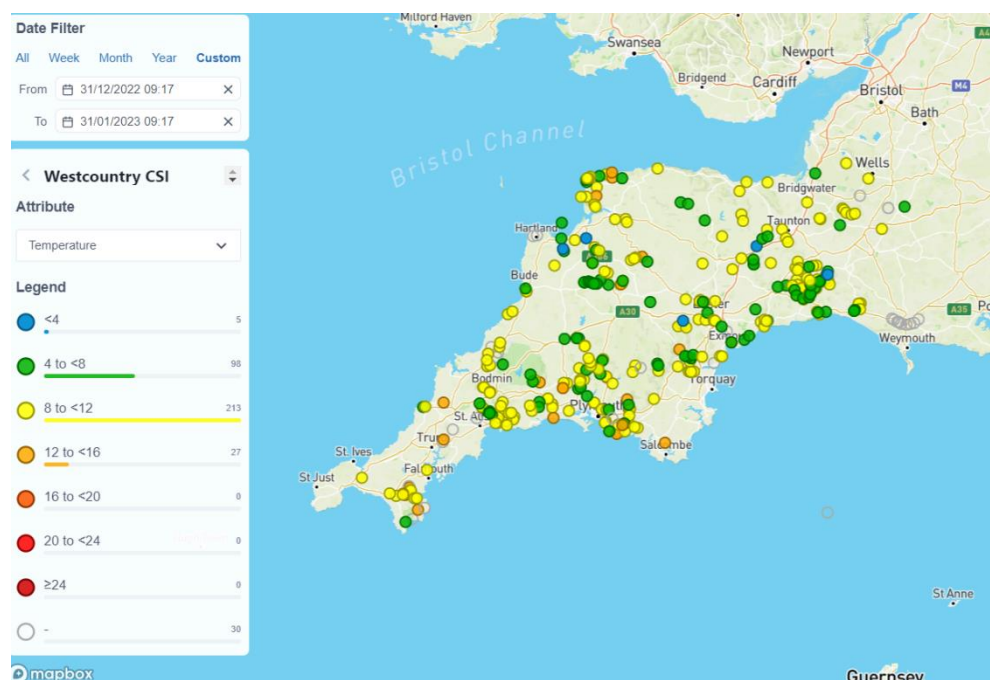
D. TEMPERATURE

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.

N.B. Using new Cartographer maps. Data 31st December 2022 to 31st January 2023.



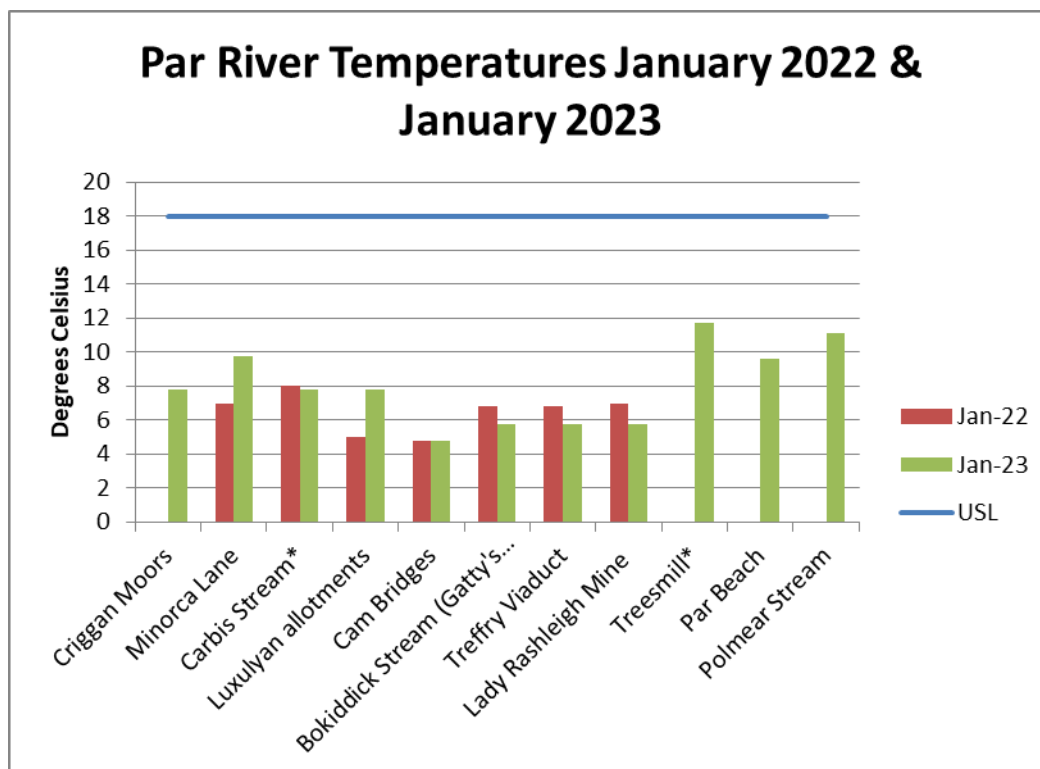
3. Results January 2023

PAR RIVER/TRIBUTARY	LOCATION	Temperature °Celsius
Par	Criggan Moors, SX 01882 61133	8
Par	South of Minorca Lane, Par River, SX 02657 59788	9.8
Tributary	Carbis Stream SX 02834 59401	7.8
Par	Luxulyan allotments, Par River, SX 04732 58045	7.8
Par	Cam Bridges, Par River, SX 05292 57454	4.8
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	5.8
Par	Treffry Viaduct, Par River, SX 05650 57179	5.8
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	5.8
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	11.7
Par	Par Beach slipway, SX 0776 53261	9.6
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	11.1

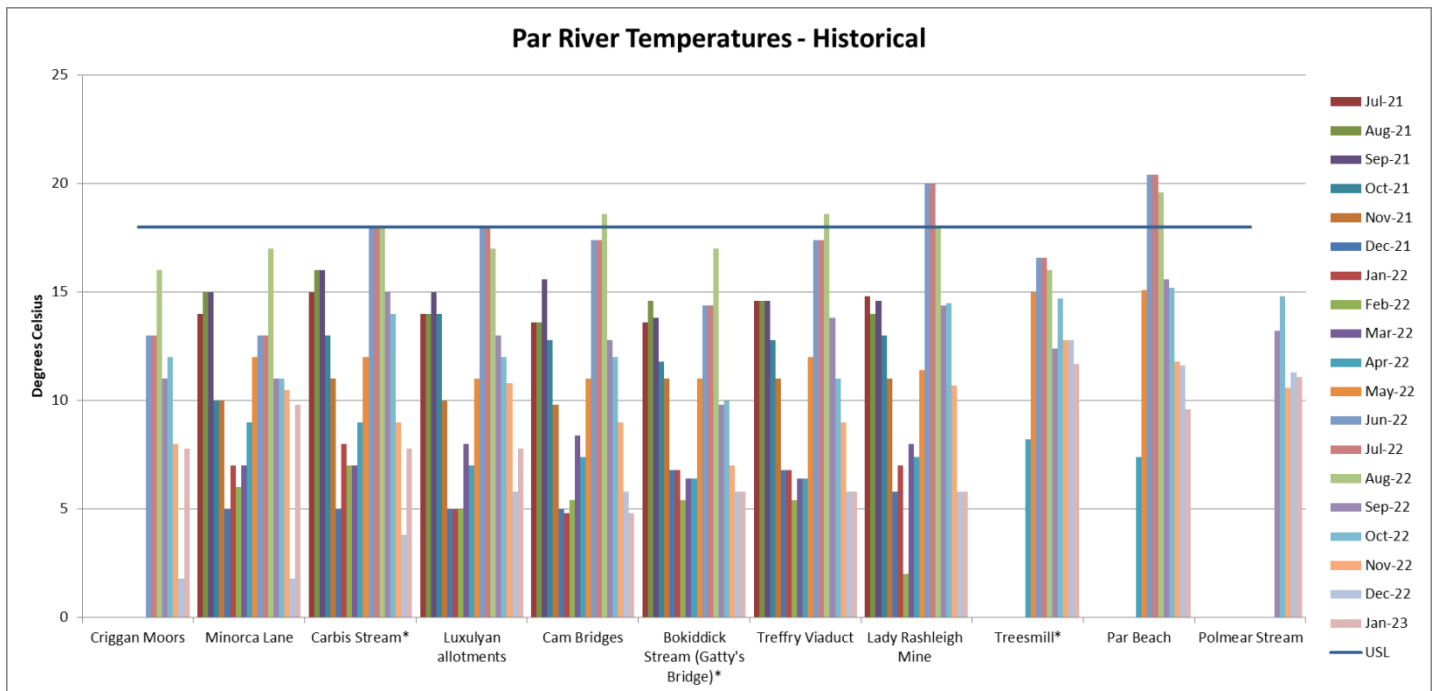
4. Graph January 2023 (and January 2022 for comparison)

*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:

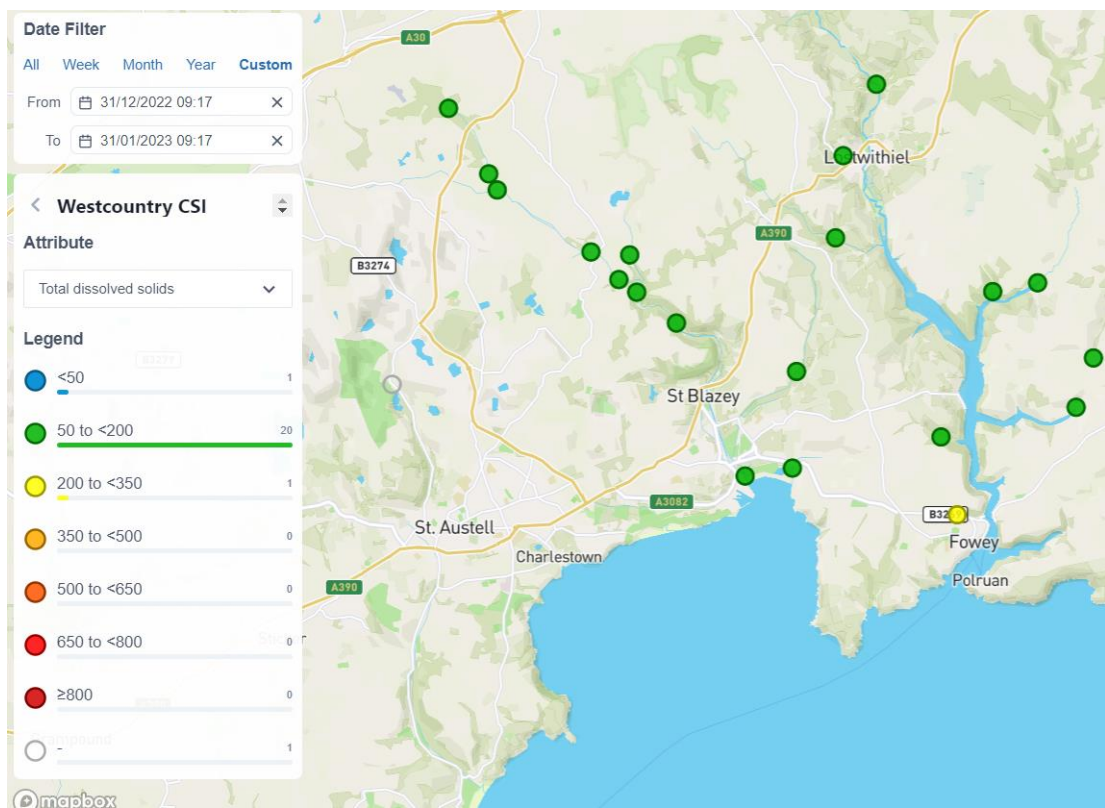
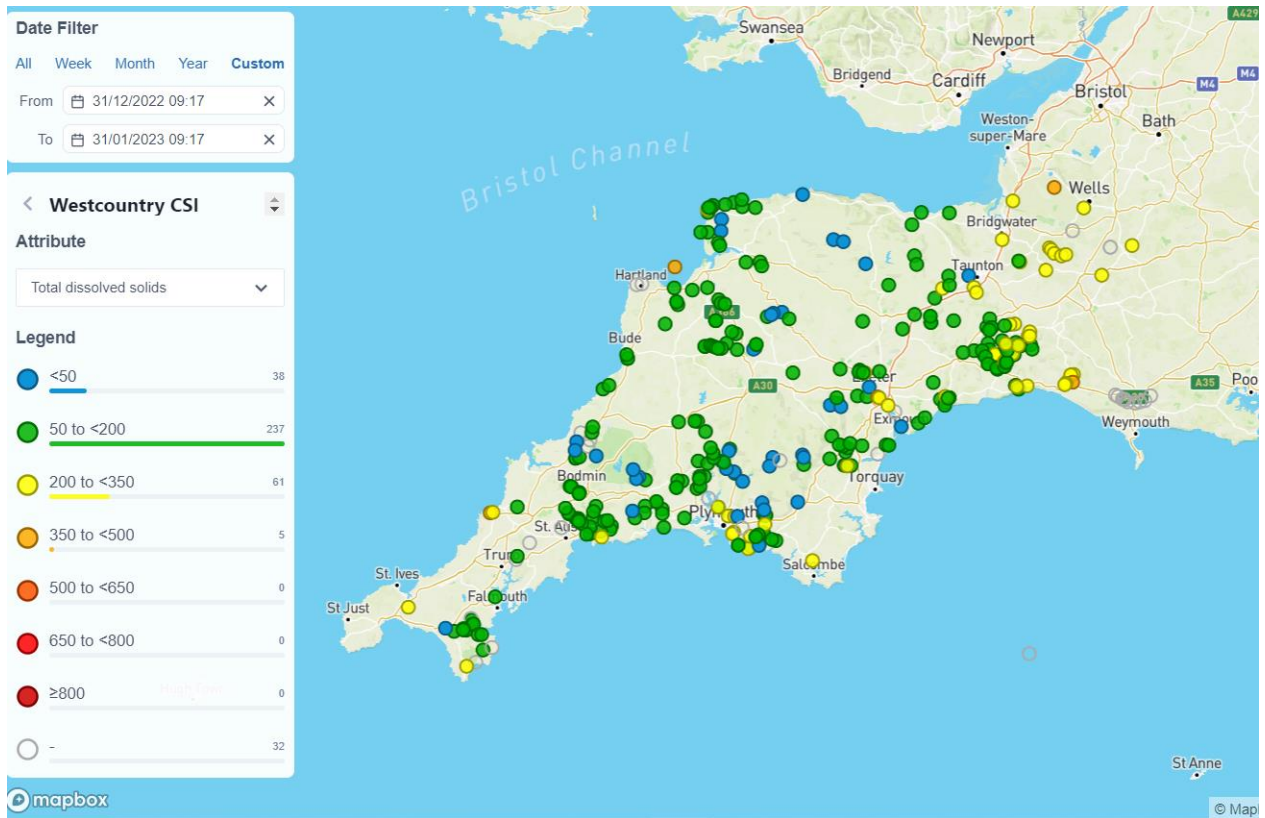


E. TOTAL DISSOLVED SOLIDS

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.



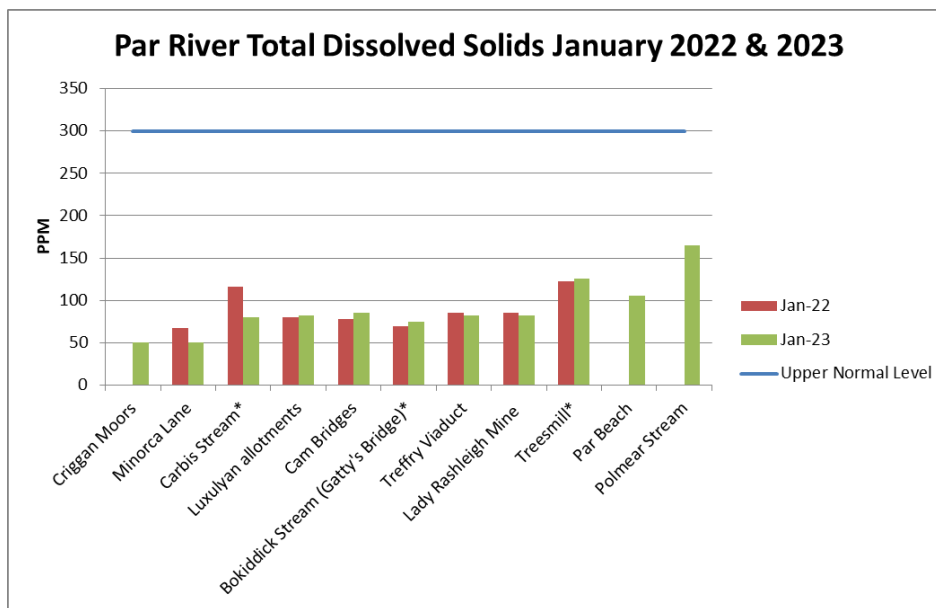
3. Results January 2023

PAR RIVER/TRIBUTARY	LOCATION	Total Dissolved Solids PPM
Par	Criggan Moors, SX 01882 61133	50
Par	South of Minorca Lane, Par River, SX 02657 59788	50
Tributary	Carbis Stream SX 02834 59401	80
Par	Luxulyan allotments, Par River, SX 04732 58045	82
Par	Cam Bridges, Par River, SX 05292 57454	85
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	75
Par	Treffry Viaduct, Par River, SX 05650 57179	82
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	82
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	126
Par	Par Beach slipway, SX 0776 53261	105
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	165

4. Graph January 2023 (and January 2022 for comparison)

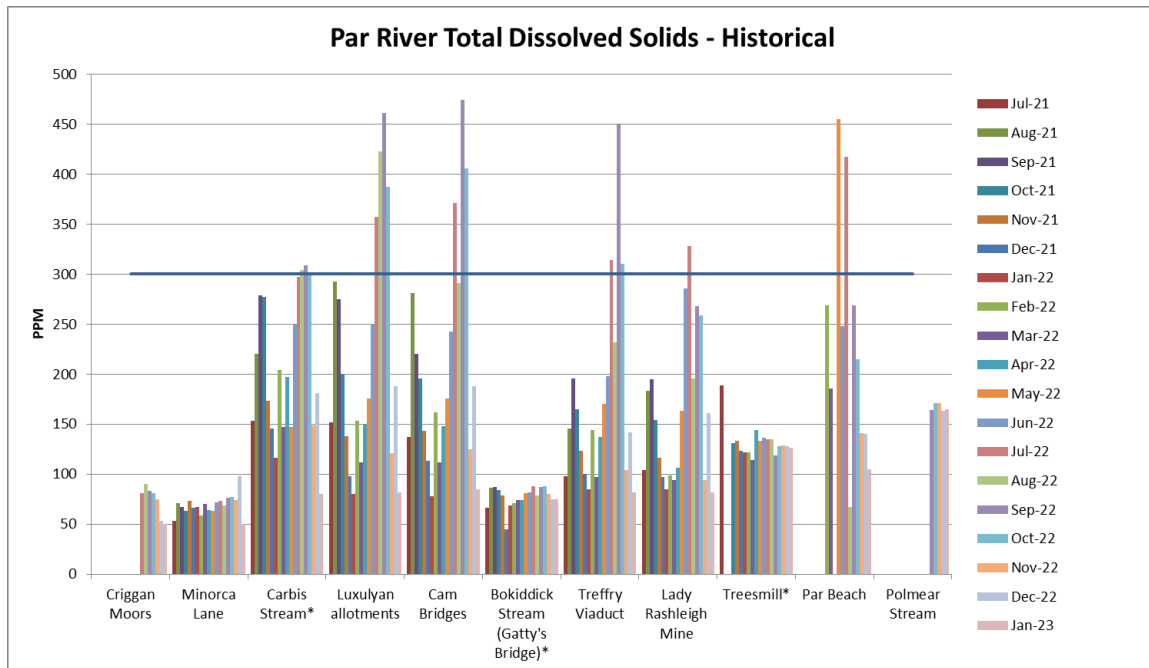
Upper Normal Level

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.'



*indicates a tributary of the Par River.

3. **Historical data** on total dissolved solids:



*indicates a tributary of the Par River.

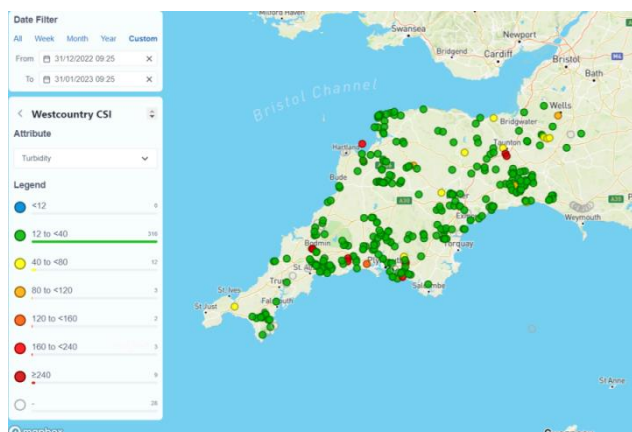
F. TURBIDITY

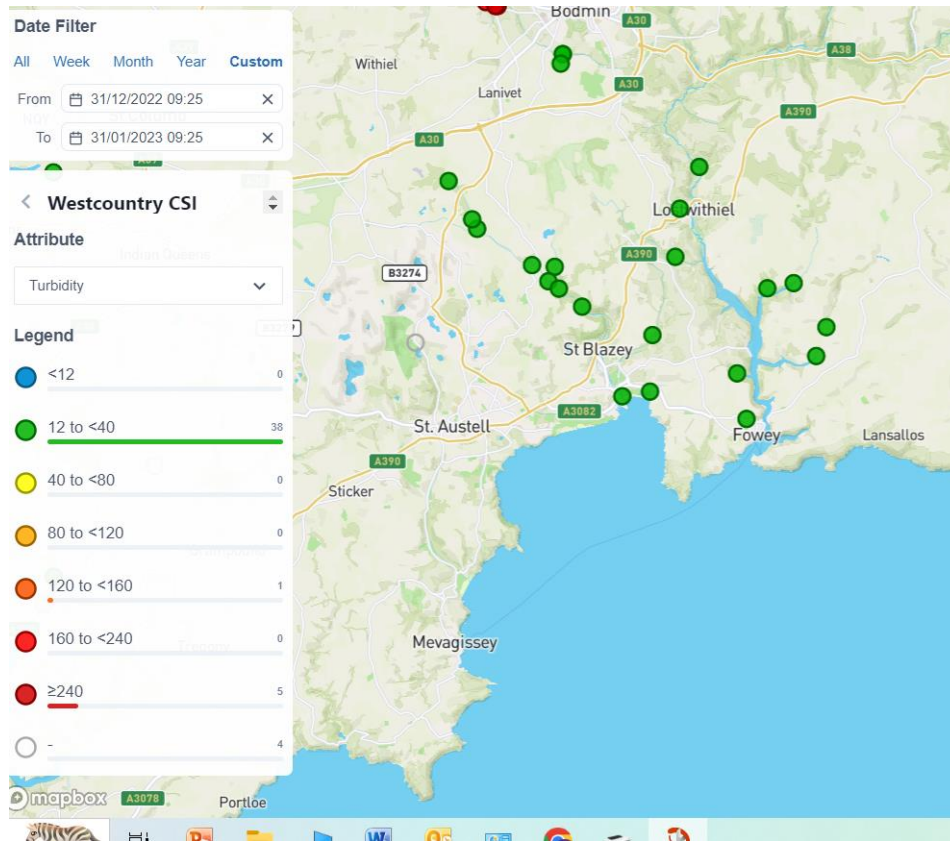
1. This is the WRT explanation of this measure:

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.

N.B. Cartographer has not shown the results correctly. As the table below shows, only 3 of our locations had Turbidity scores which merit green dots, the majority should be blue.





PAR RIVER/TRIBUTARY	LOCATION	Turbidity
Par	Criggan Moors, SX 01882 61133	0
Par	South of Minorca Lane, Par River, SX 02657 59788	18
Tributary	Carbis Stream SX 02834 59401	38
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	13
Par	Par Beach slipway, SX 0776 53261	0
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	0

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.)

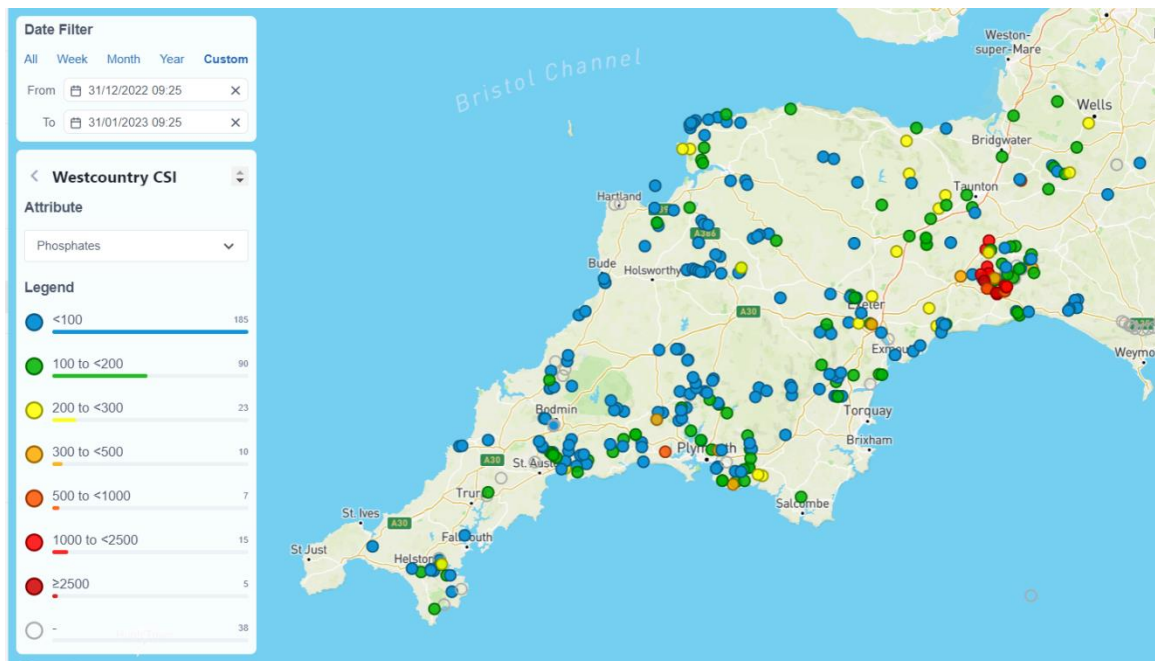
Ranges on phosphate diagnostic colour chart:

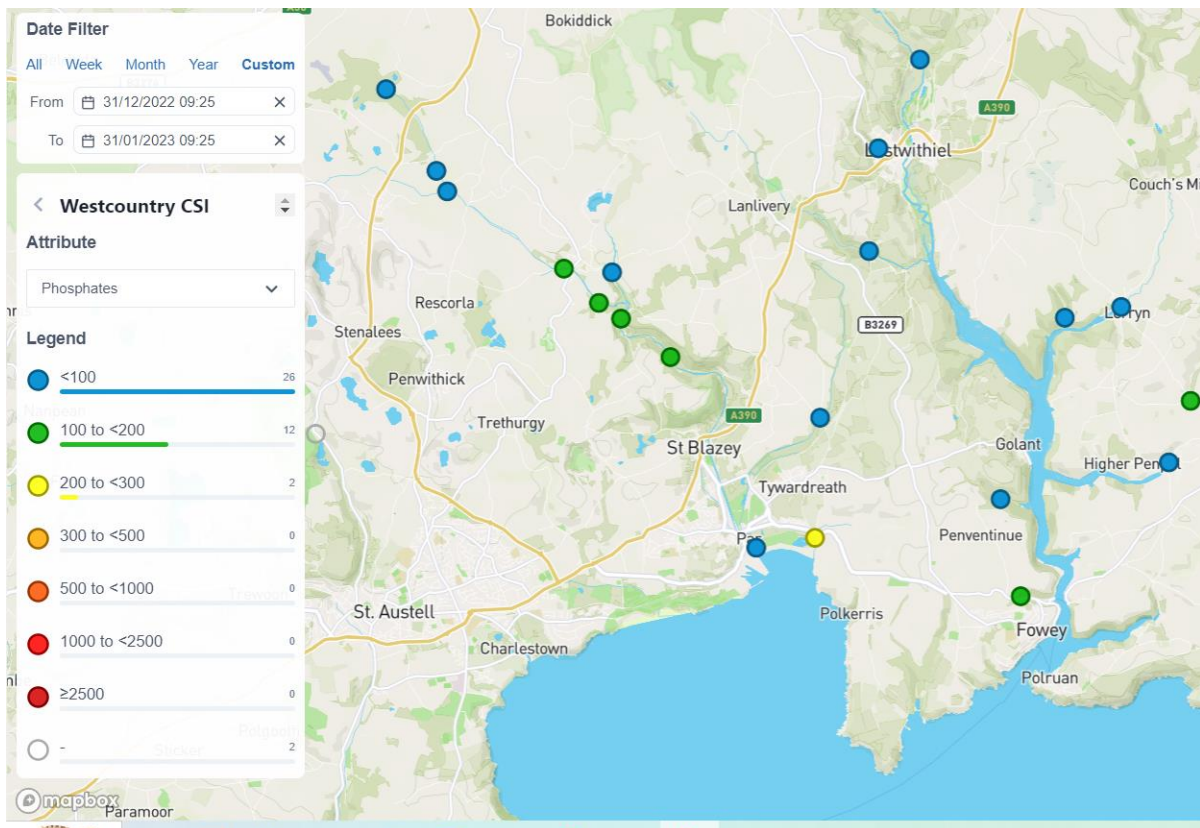
0 – 100 OK

200 – 300 HIGH

500 – 2500 – TOO HIGH

2. **Geographical comparison.** Source: Cartographer





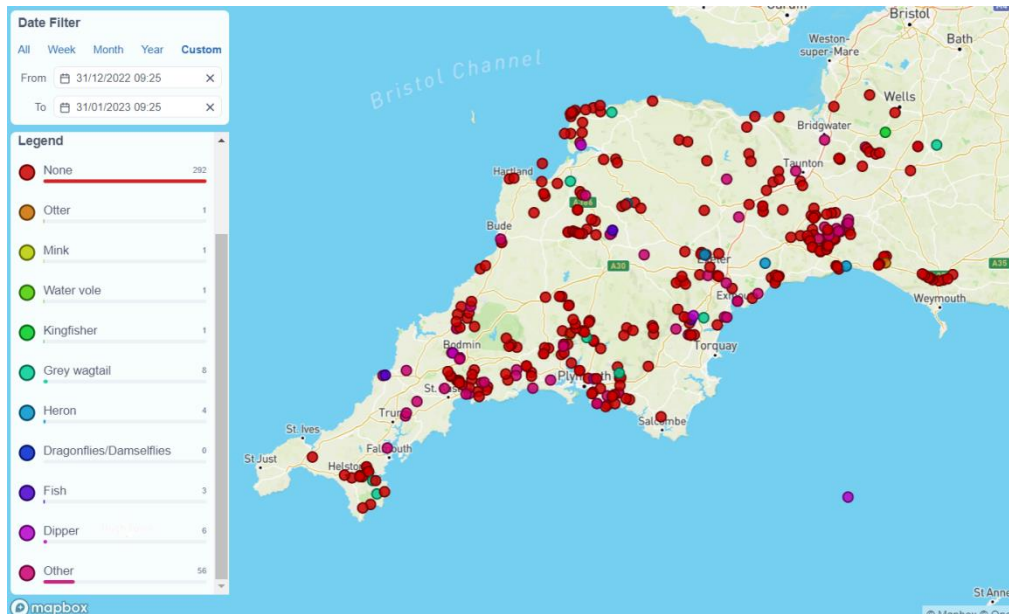
PAR RIVER/TRIBUTARY	LOCATION	Phosphates PPB
Par	Criggan Moors, SX 01882 61133	0
Par	South of Minorca Lane, Par River, SX 02657 59788	0
Tributary	Carbis Stream SX 02834 59401	0
Par	Luxulyan allotments, Par River, SX 04732 58045	100
Par	Cam Bridges, Par River, SX 05292 57454	0
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	0
Par	Treffry Viaduct, Par River, SX 05650 57179	100
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	100
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

H. BACTERIA (E.COLI (EC) & TOTAL COLIFORM (TC)

No samples were taken this month. Testing will resume in February.

I. WILDLIFE (FOR OTTER REPORT SEE SECTION J)

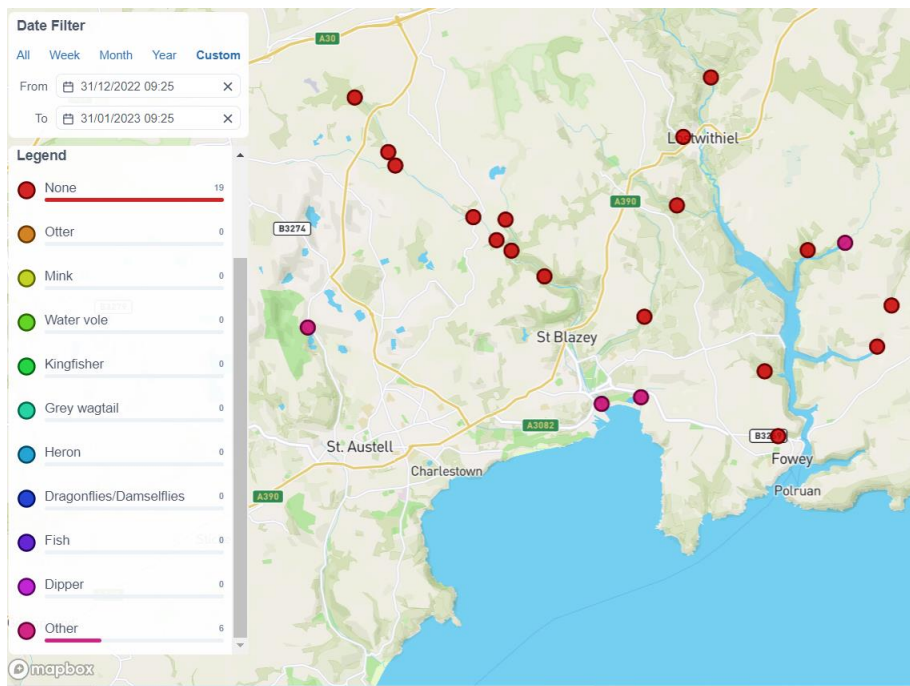
(a) Maps



Source: Cartographer.

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

(b)



Source: Cartographer

Wildlife sightings at the monitoring points included:

PAR RIVER/TRIBUTARY	LOCATION	WILDLIFE NOTED
Par	Criggan Moors, SX 01882 61133	None.
Par	South of Minorca Lane, Par River, SX 02657 59788	None
Tributary	Carbis Stream SX 02834 59401	None
Par	Luxulyan allotments, Par River, SX 04732 58045	None
Par	Cam Bridges, Par River, SX 05292 57454	None
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	None
Par	Treffry Viaduct, Par River, SX 05650 57179	None
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	None
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	None
Par	Par Beach slipway, SX 0776 53261	Ducks, Redshank
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	Mallard ducks

J. OTTER SURVEY**PAR RIVER OTTER SURVEYS****JANUARY 2023****1. SURVEY CONDITIONS**

Date & time	10/1/2023, 14/1/2023, 15/1/2023 & 29/1/2023
Surveyors	Roger Smith, Linda Smith, Josh Bonfield, Nicola Bonfield, Willow Bonfield
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, Tredinnick Stream (Saints' Way between Atwell & Tredinnick).
Weather	Heavy rain 10 th to 15 th January. Very light drizzle on 29 th .
River level	Very high – flooding on 14 th and 15 th .
River flow	Variable between steady and surging.
Water quality	Phosphate readings 100 PPB at the highest – very unusual.
Other wildlife	

2. EVIDENCE FOR OTTERS ✓

EVIDENCE	SEEN/ ORKS*	LOCATION	NOTES
Spraint - fresh	✓*	SX 05026 59031 Footbridge on Saints' Way south of Trenince Farm, Luxulyan.	Spraint not seen here for at least 10 years.

		29 th January 2023.	Very liquid, no bones or scales
Spraint – recent	✓*	SX 07312 56164 Under canal bridge at Pontoys Mill. 10 th January 2023.	Scales and bones
Spraint - old			
Anal jelly			
Sign heap			
Staining			
Tracks			
Path			
Slide			
Holt			
Hover			
Couch			
Live sighting			
Corpse			

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

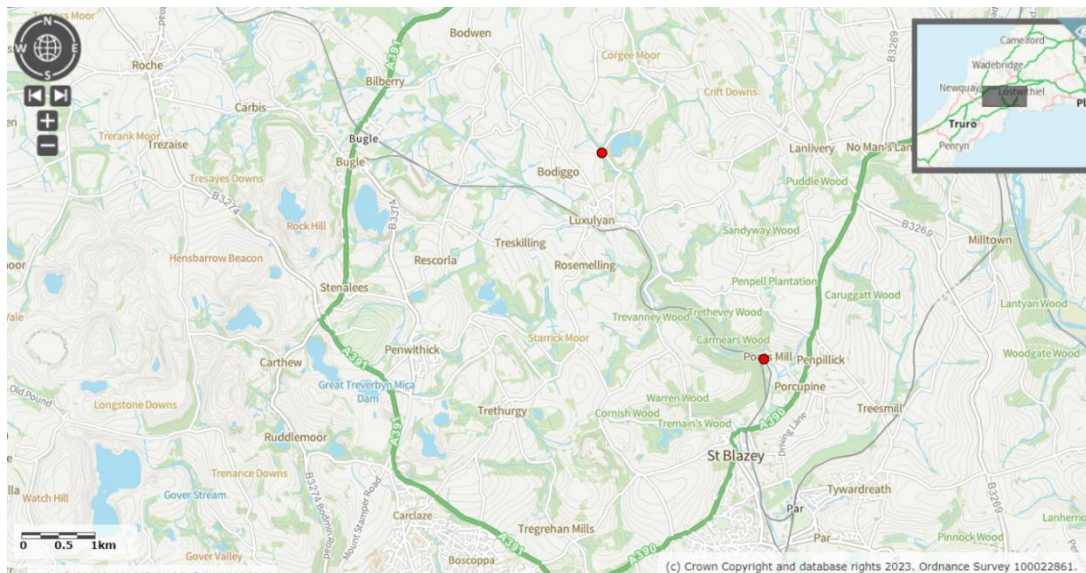
3. MAP

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.



4. PHOTOGRAPHS

(a) Spraint: 1 old, 2 recent, all containing bones and scales on stone underneath canal bridge at Ponto Mill (SX 07312 56164).



(b) Looking downstream from sprainting spot under the canal bridge at Ponto Mill. Scratch marks could be seen in the sand but it was not possible to discern clear paw prints.



(c) Fresh spraint on bridge over Tredinnick Stream near Trenince Farm (SX 05026 59031).



Photo: Josh Bonfield

(d) Location of sprainting spot. Note the clarity of the water.



Photo: Josh Bonfield

5. COMMENTS

Very high river levels meant that all of the bankside boulders that often have spraint were under water. The area of sand underneath Pontois Mill Canal Bridge was not under water. This is a location that often has spraint.

It is many years since I have found spraint next to the Tredinnick Stream (a tributary of the Bokiddick Brook, itself a tributary of the Par). The spraint found here was a thick, viscous and strong-smelling but without any signs of bones or scales. It seemed very fresh. The stream itself is shallow and narrow. The water is always clear and there is a gravel bed. Testing on the Bokiddick Brook has always shown it to have good water quality so it is reasonable to think that this stream is no different.

K. ARMI RIVERFLY SURVEY

No survey was carried out this month.

L. DISCUSSION

1. Positive observations

- (a) The presence of otters at Pontois Mill and on the Tredinnick Stream.
- (b) Phosphate levels were OK by WRT standards as a result of the high river levels.

2. Points of concern

Flooding. This was most serious in the Minorca Lane area where the public footpath was impassable (see photo below) and much of the surrounding land was underwater. Given concerns expressed in the December 2022 about the groundwater infiltration sewerage systems in the main Minorca Lane settlement, and the possible impacts on the health of residents and of the river, and the likelihood of more frequent flooding, this may be something that deserves attention.



Report compiled by Dave Burrell, Joan Farmer & Roger Smith for the Par River Monitoring Group, 31st January 2023.