

MONITORING OF THE PAR RIVER AND ITS TRIBUTARIES

The monitoring group operates under the citizen science scheme run by the Westcountry Rivers Trust. Comments and opinions in this report are those of the authors only

NOVEMBER 2023



Winter sunshine on the mouth of the Par River.

Photo: Brian Harrison

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A. NOVEMBER 2023 FINDINGS AT A GLANCE

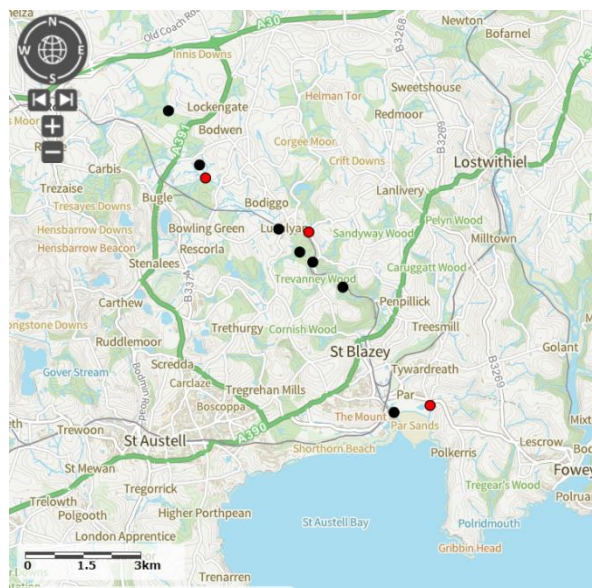
A. OUR NOVEMBER 2023 FINDINGS AT A GLANCE (SEE SECTIONS C TO J FOR FULL PICTURE)

We sampled at 11 locations. The **red** highlighting shows points of concern.

CRITERIA	UPPER PAR (UPSTREAM OF CONFLUENCE WITH BOKIDDICK STREAM NEAR BLACK HILL CAR PARK) 4 TESTING LOCATIONS	LOWER PAR (FROM CONFLUENCE WITH BOKIDDICK STREAM TO SEA) 3 TESTING LOCATIONS	TRIBUTARIES OF UPPER PAR (CARBIS STREAM, BOKIDDICK STREAM) 2 TESTING LOCATIONS	TRIBUTARY OF LOWER PAR (POLMEAR STREAM) 2 TESTING LOCATIONS
TEMPERATURE (SHOULD NOT EXCEED 18° CELSIUS)	Average 9.8° Celsius	Average 11.96° Celsius	Average 9.8° Celsius	Average 14.25° Celsius
TOTAL DISSOLVED SOLIDS (SHOULD NOT EXCEED 300 PPM)	90.25 PPM	105 PPM	114.5 PPM	134 PPM
TURBIDITY (SHOULD BE <12 ON SECCHI TUBE. FOR AVERAGING ANY READING <12 IS COUNTED AS 11)	0	0	0	6.5
PHOSPHATES (SHOULD NOT EXCEED 100 PPB)	150 PPB	200 PPB	0 PPB	100 PPB
RIVERFLY TRIGGER LEVEL (SHOULD BE ≥ 6)	N/A	Sampling suspended until next spring.	N/A	N/A
WILDLIFE EVIDENCE	None.	Treecreeper or nuthatch, mallard ducks	None	None
VISIBLE EVIDENCE OF POLLUTION	Foam	Smell (Cam Bridges), foam.	Debris, china clay	None

B. NOVEMBER 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	15/11/2023	CSI sample & Cartographer record.	Roger Smith
South of Minorca Lane, Par River, SX02668 59747	15/11/2023	CSI sampling. Cartographer record.	Roger Smith
Carbis Stream SX 02834 59401	15/11/2023	CSI sampling. Cartographer record.	Roger Smith
Luxulyan allotments, Par River, SX 04732 58045	15/11/2023	CSI sampling. Cartographer record.	Roger Smith
Cam Bridges, Par River, SX 05292 57454	15/11/2023	CSI sampling. Cartographer record.	Roger Smith
Gatty's Bridge, Bokiddick Stream SX 05531 57953	15/11/2023	CSI sampling. Cartographer record.	Joan Farmer
Treffry Viaduct, Par River, SX 05650 57179	15/11/2023	CSI sampling. Cartographer record.	Joan Farmer
Lady Rashleigh Mine, Par River, SX 06451 56509	15/11/2023	CSI sampling. Cartographer record.	Dave Burrell, Veronica Jones, Joan Farmer, Roger Smith
Treesmill, Tywardreath Stream, SX 08873 55385	13/11/2023	CSI sampling. Cartographer record.	Maggie Tagney
Par Beach slipway, SX 0776 53261	13/11/2023	CSI sampling. Cartographer record.	Brian Harrisson
Polmear Stream, Ship Inn SX 08749 53417	13/11/2023	CSI sampling. Cartographer record.	Simon Tagney

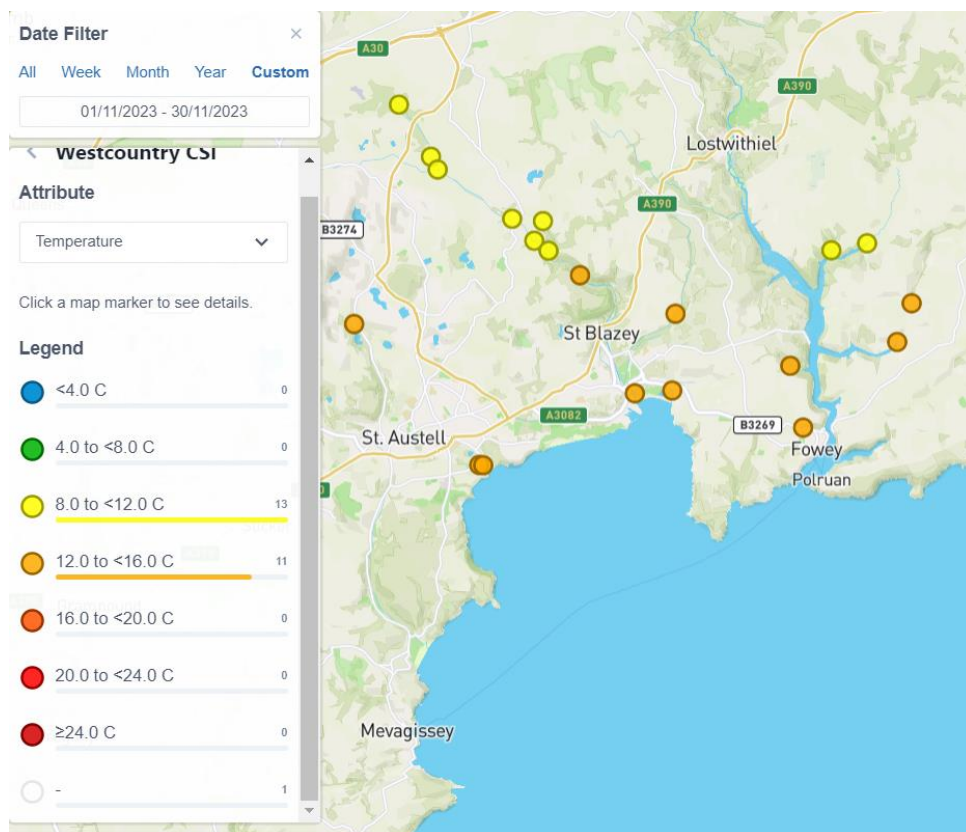
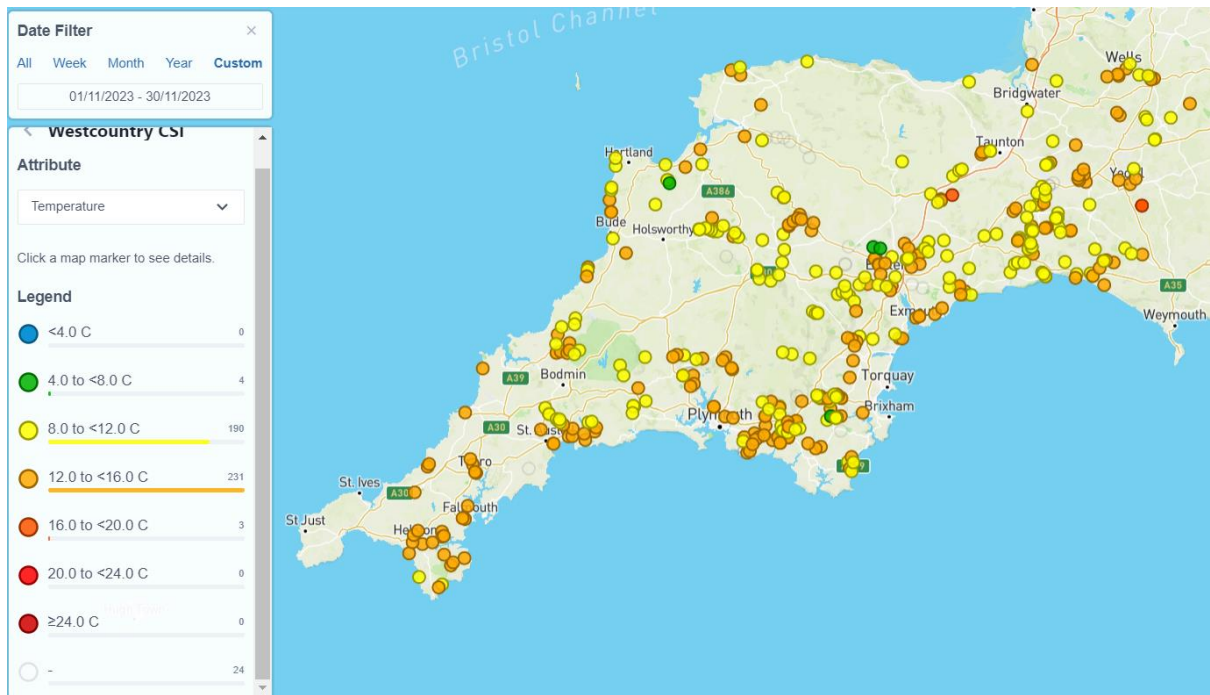
C. TEMPERATURE

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 November 2023

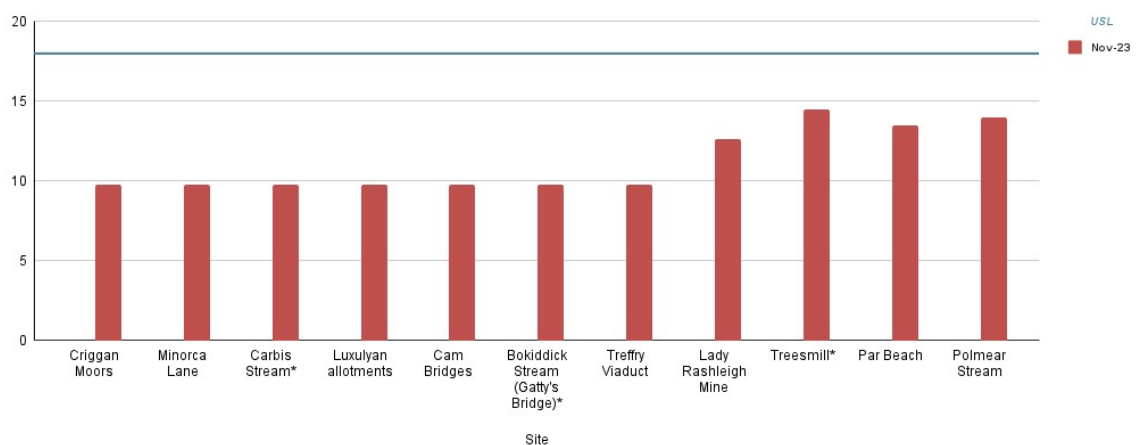
PAR RIVER/TRIBUTARY	LOCATION	Temperature °Celsius
Par	Criggan Moors, SX 01882 61133	9.8
Par	South of Minorca Lane, Par River, SX 02657 59788	9.8
Tributary	Carbis Stream SX 02834 59401	9.8
Par	Luxulyan allotments, Par River, SX 04732 58045	9.8
Par	Cam Bridges, Par River, SX 05292 57454	9.8
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	9.8
Par	Treffry Viaduct, Par River, SX 05650 57179	9.8
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	12.6
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	14.5
Par	Par Beach slipway, SX 0776 53261	13.5
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	14

Results above the temperature at which fish and other organisms can function healthily will be shown in red. At present, 18 °Celsius is being used as the upper safe limit for fish and other creatures, although 20° Celsius has recently been suggested by WRT instead.

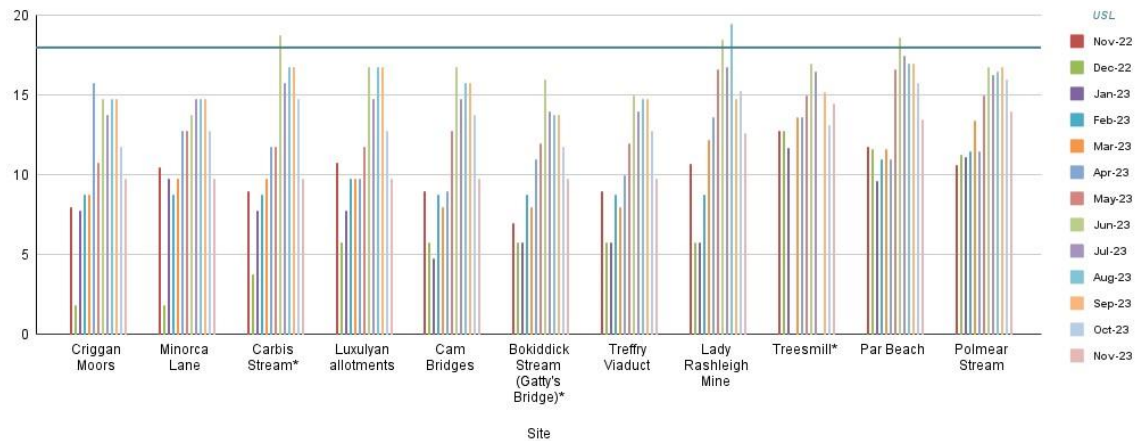
4. Graphs

(a) This month

Par River Temperature (°Celsius) - Filtered



*Indicates a tributary.

(b) From 1st November 2022 to now**Par River Temperature (°Celsius) - Filtered**

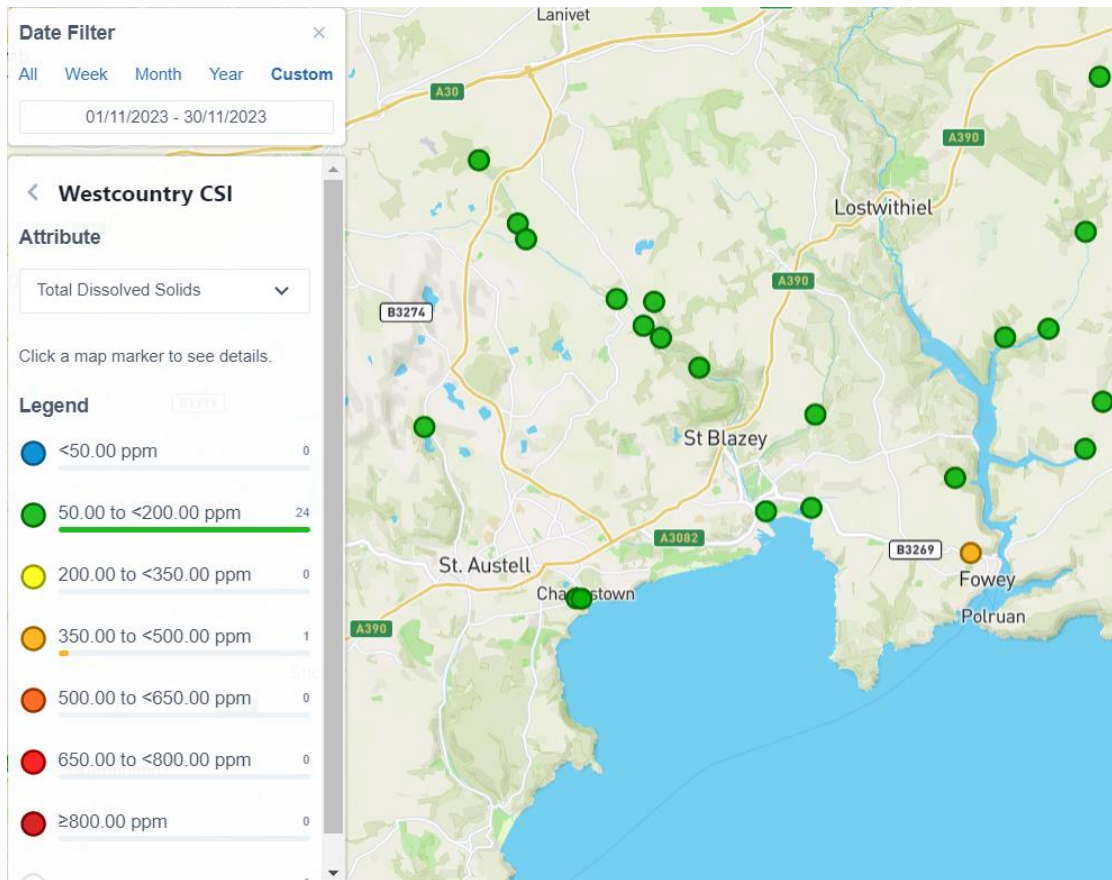
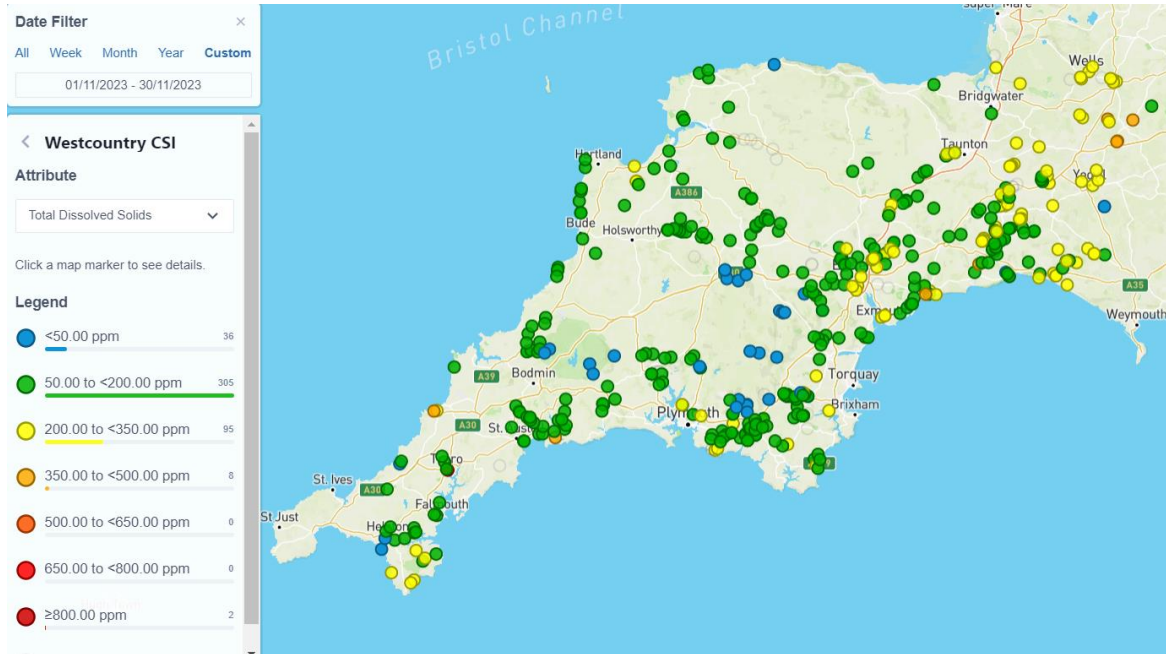
*Indicates a tributary.

D. 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 November 2023

PAR RIVER/TRIBUTARY	LOCATION	Total Dissolved Solids PPM
Par	Criggan Moors, SX 01882 61133	77
Par	South of Minorca Lane, Par River, SX 02657 59788	71
Tributary	Carbis Stream SX 02834 59401	144
Par	Luxulyan allotments, Par River, SX 04732 58045	110
Par	Cam Bridges, Par River, SX 05292 57454	103
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	85
Par	Treffry Viaduct, Par River, SX 05650 57179	101
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	86
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	109
Par	Par Beach slipway, SX 0776 53261	128
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	159

*Indicates a tributary.

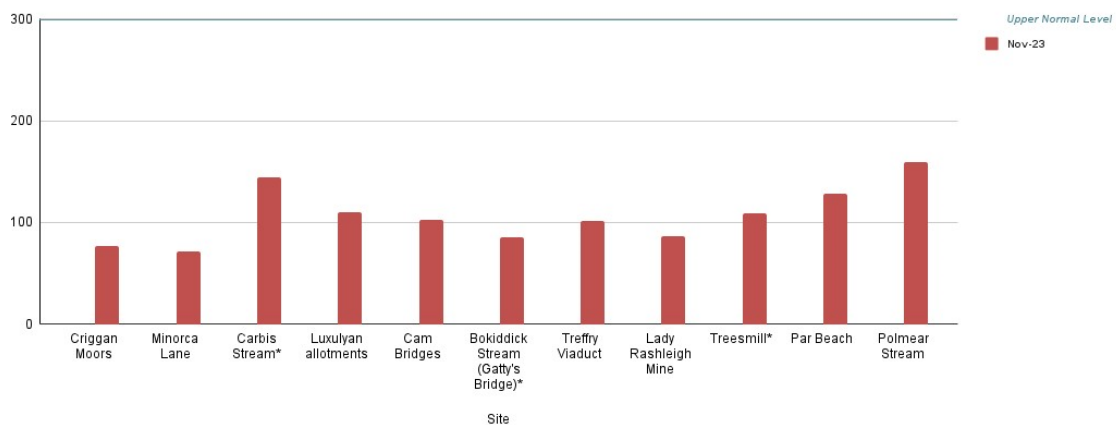
Upper Normal Level

The WRT advice for this river is that it should not exceed 300 ppb.

4. Graphs

(a) This month

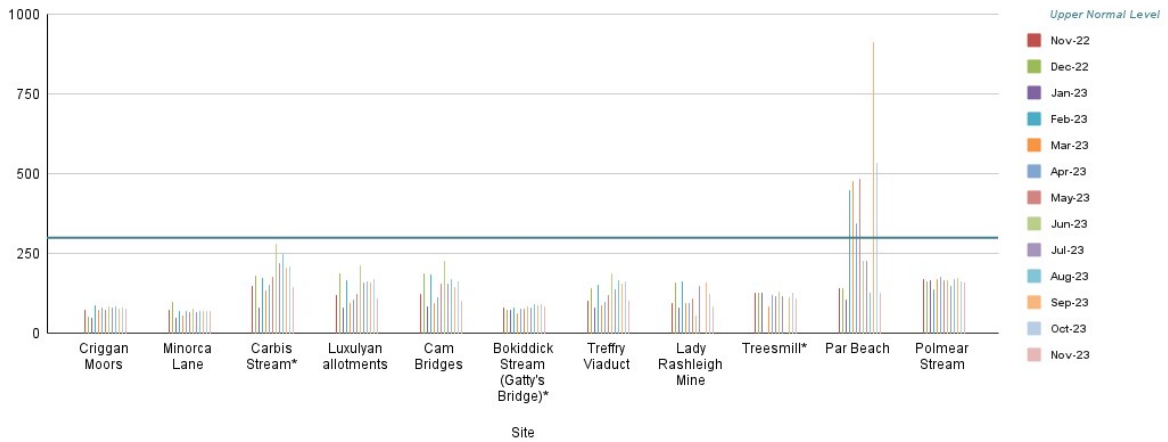
Par River Total Dissolved Solids (PPM) - Filtered



*Indicates a tributary.

(b) From 1st November 2022 until now:

Par River Total Dissolved Solids (PPM) - Filtered



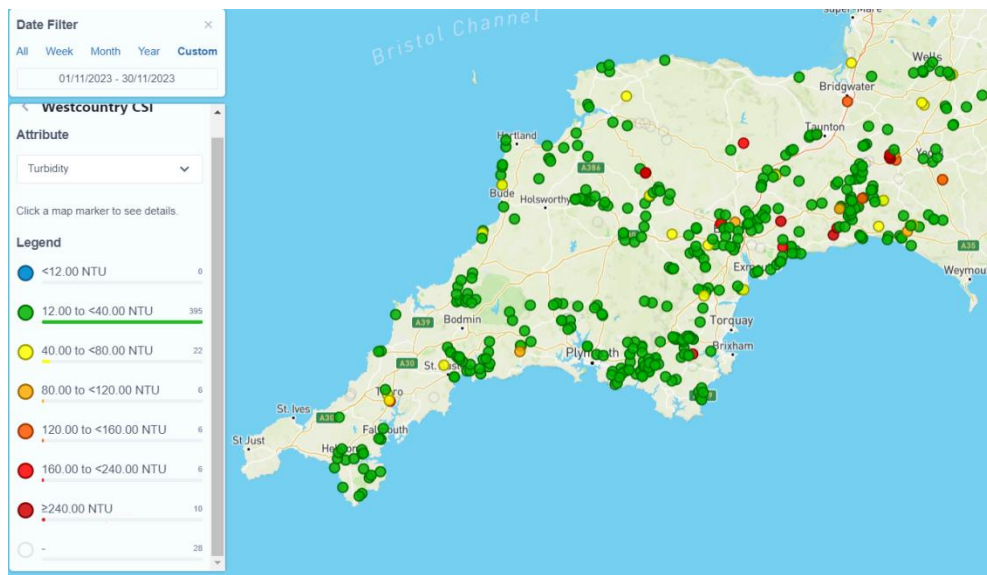
*Indicates a tributary.

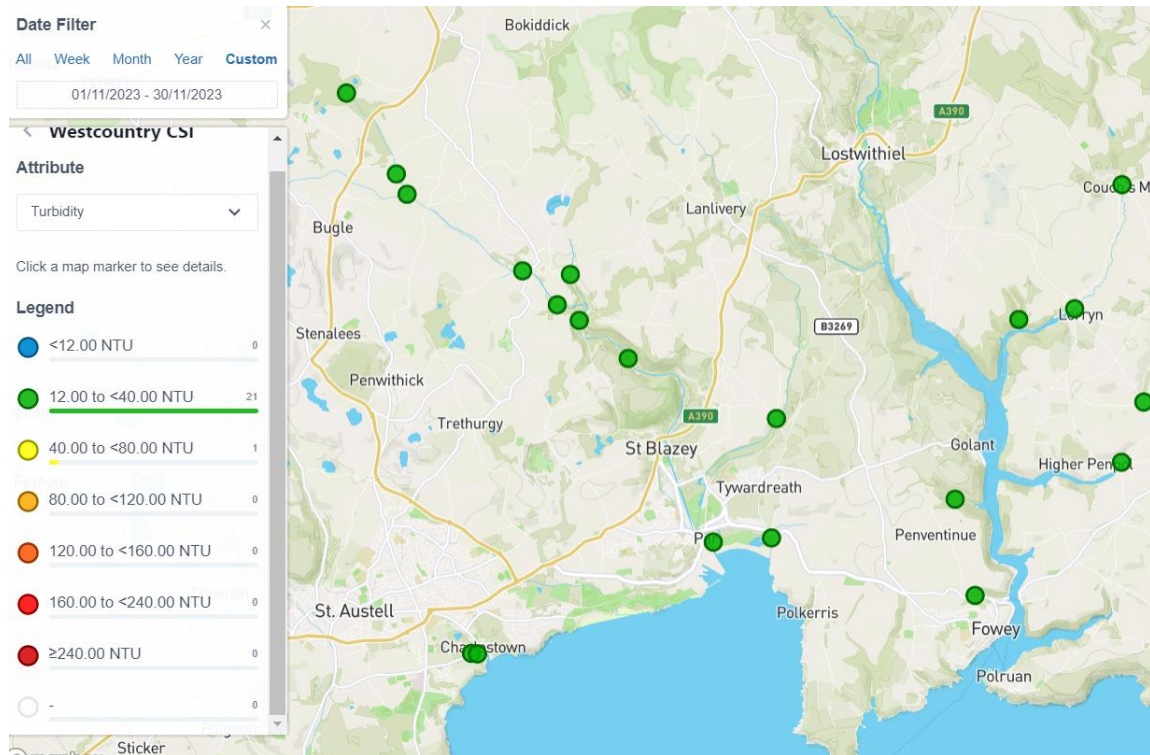
E. TURBIDITY

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. With the exception of Par Beach, all our readings were <12, so should be shown by a blue, not a green, dot. Why Cartographer shows a green dot is not known.

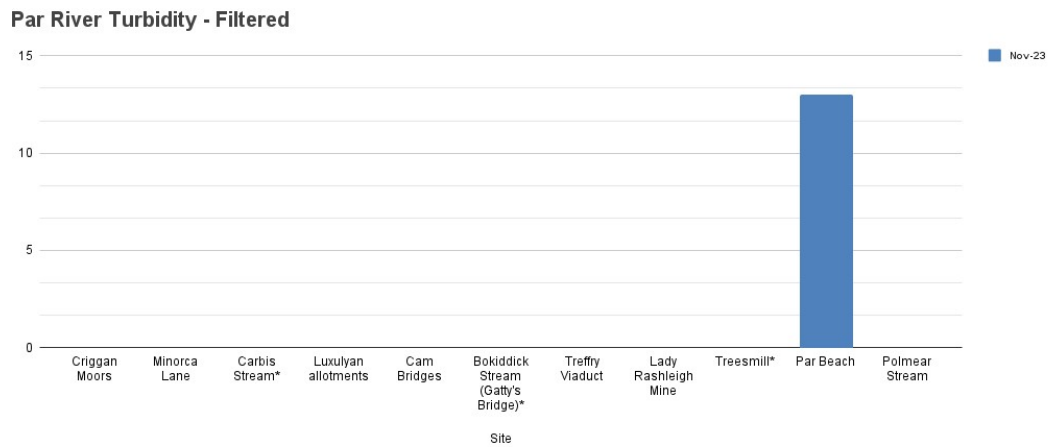
3. Results October 2023

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	0
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	13
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	0

*Indicates a tributary.

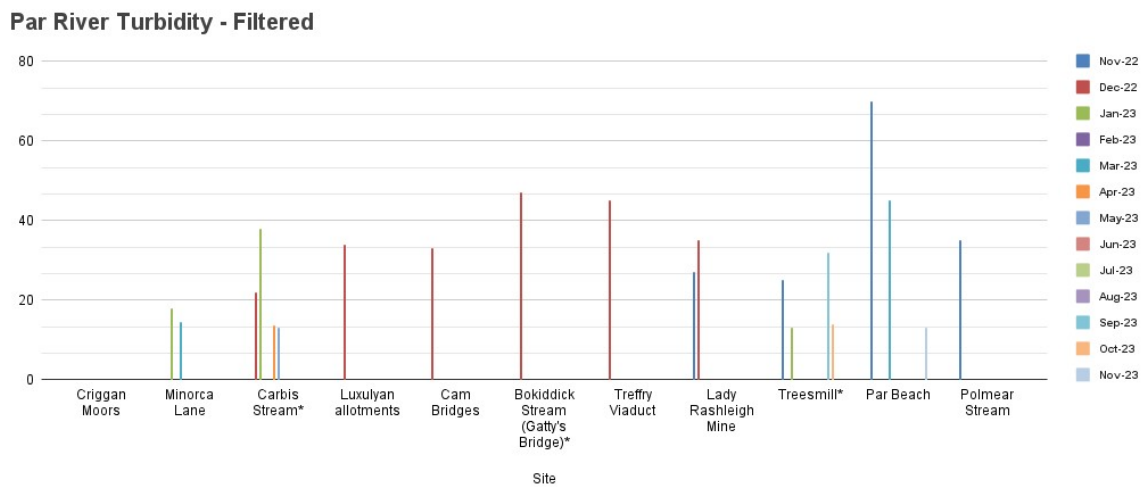
4. Graphs

(a) This month



*Indicates a tributary.

(b) From 1st November 2022 until now:



*Indicates a tributary.

F. 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.)

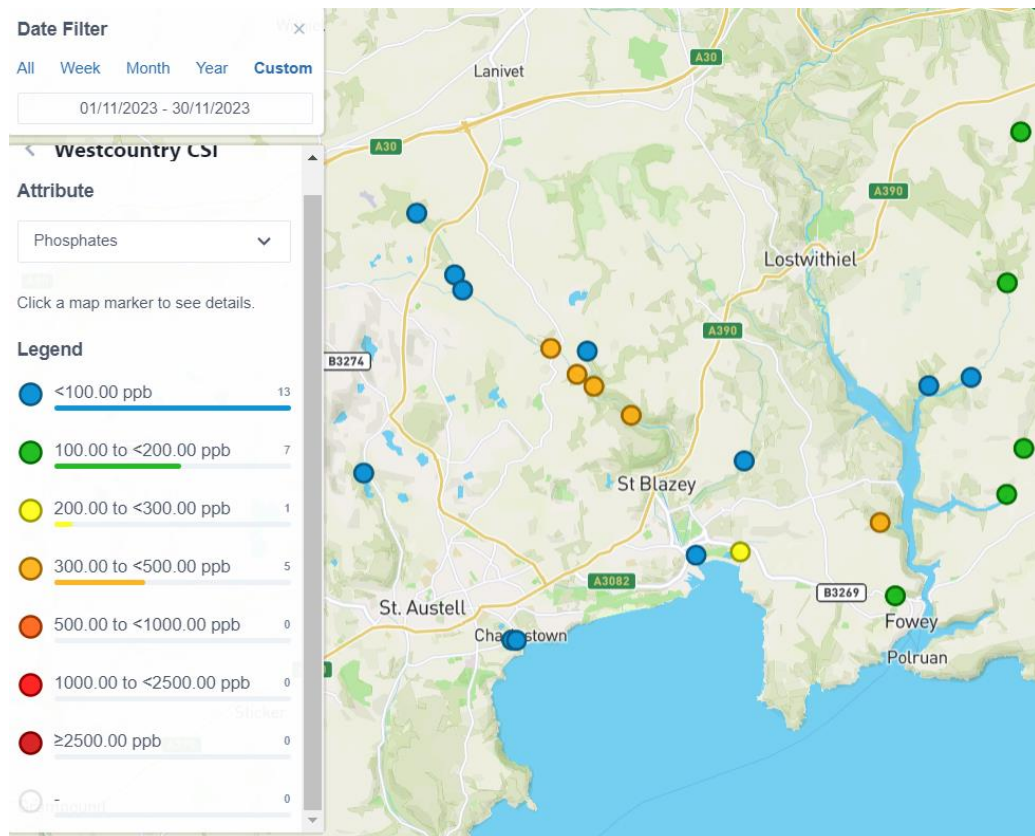
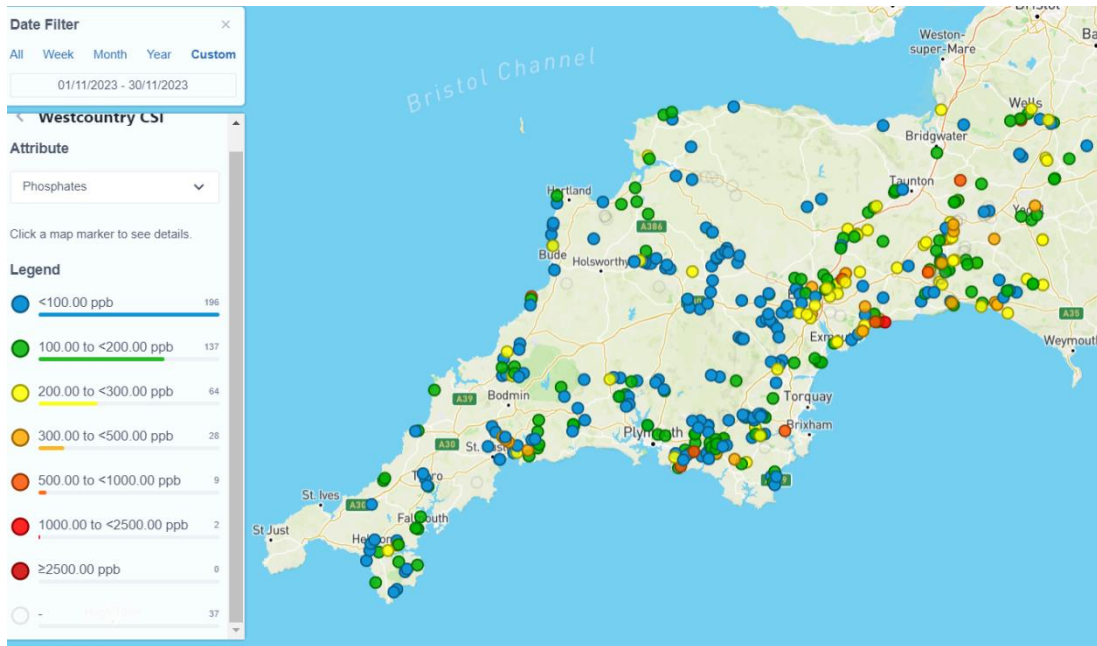
Ranges on phosphate diagnostic colour chart:

0 – 100 OK

200 – 300 HIGH

500 – 2500 – TOO HIGH

2. Geographical comparison. Source: Cartographer



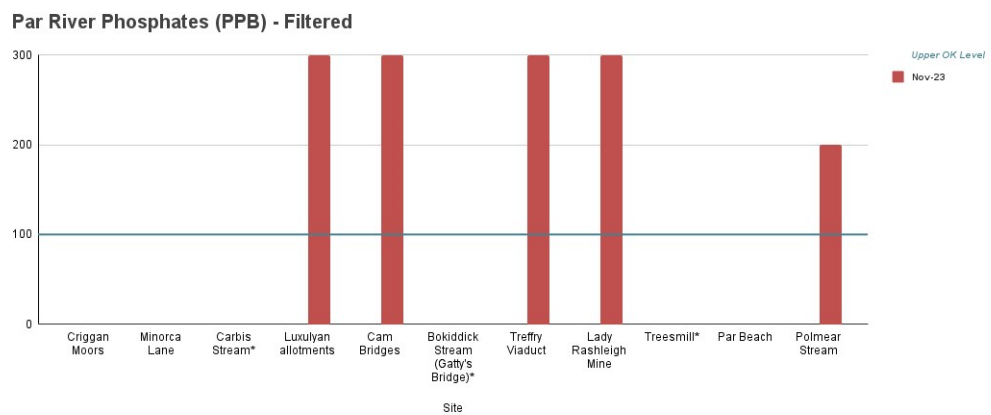
3. Results November 2023

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	300
Par	Cam Bridges, Par River, SX 05292 57454	300
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	0
Par	Treffry Viaduct, Par River, SX 05650 57179	300
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	300
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	0
Par	Par Beach slipway, SX 0776 53261	0
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	200

Results in red show phosphate levels that are Too High (WRT advice).

4. Graphs

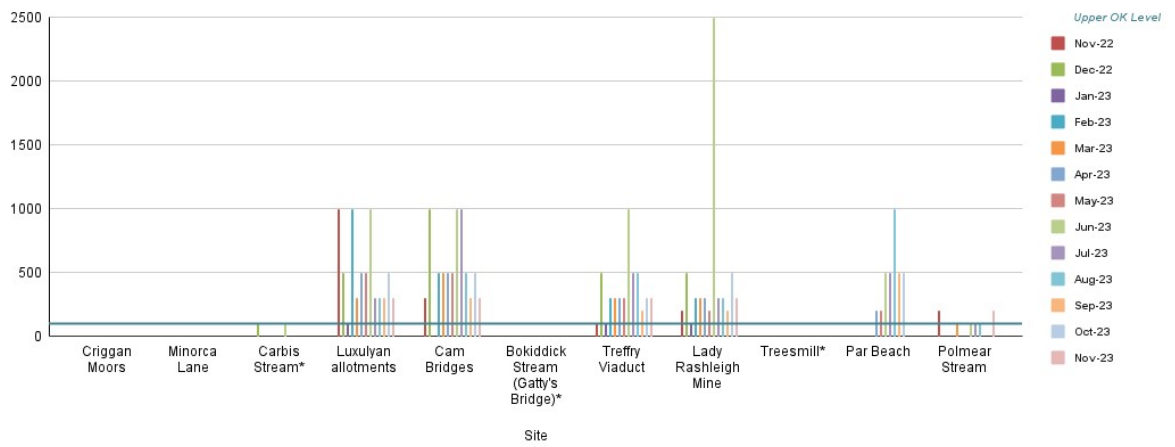
(a) This month



*Indicates a tributary.

(b) From 1st November 2022 until now:

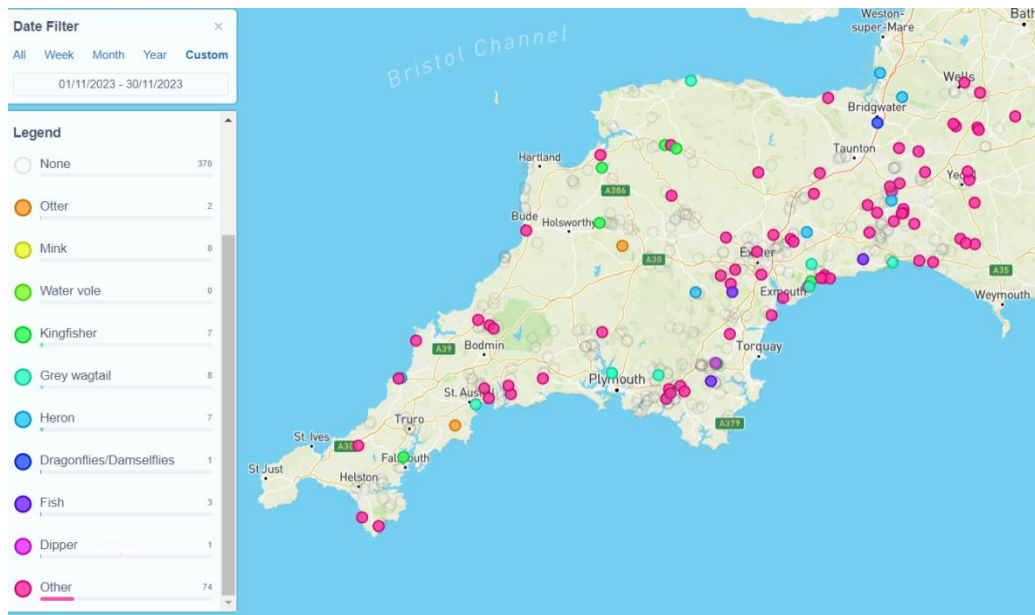
Par River Phosphates (PPB) - Filtered

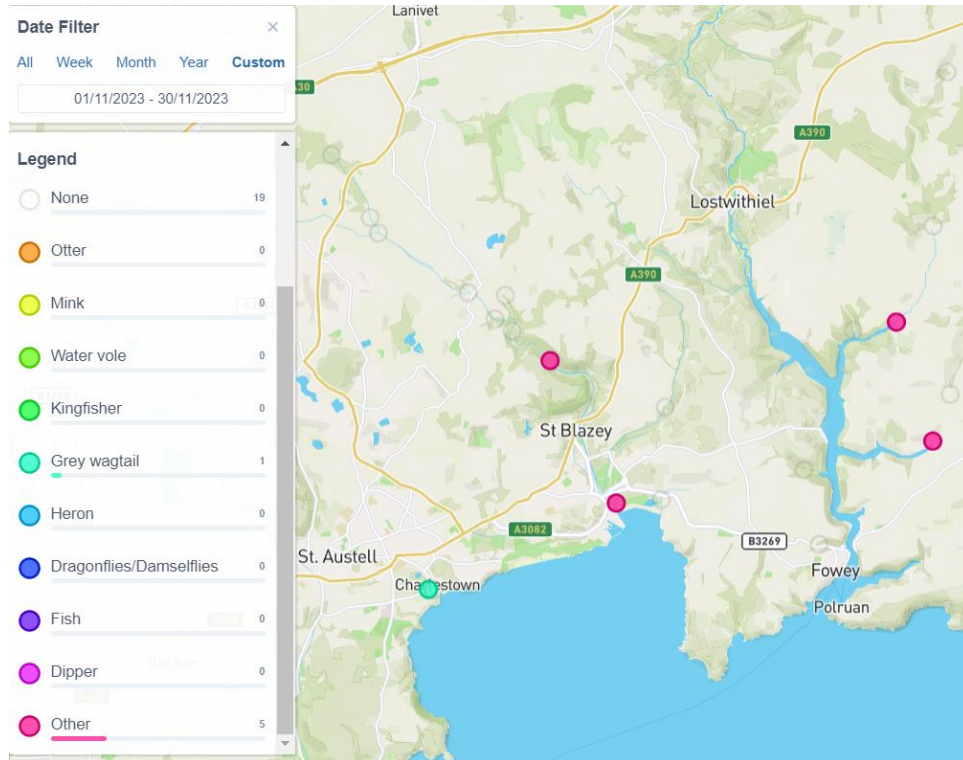


*Indicates a tributary.

G. WILDLIFE (FOR OTTER REPORT SEE SECTION I) & INVASIVE PLANTS

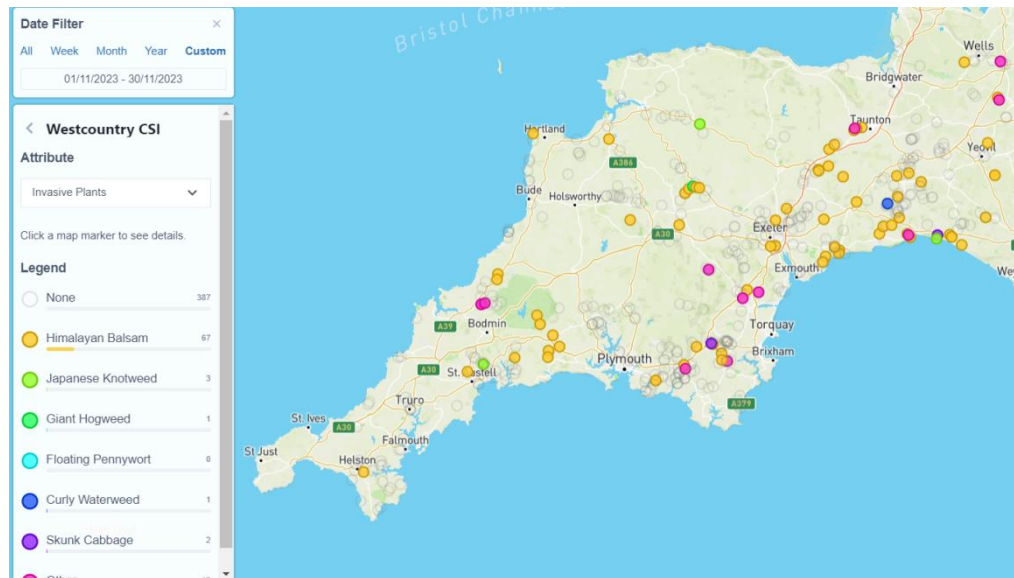
(a) Wildlife maps

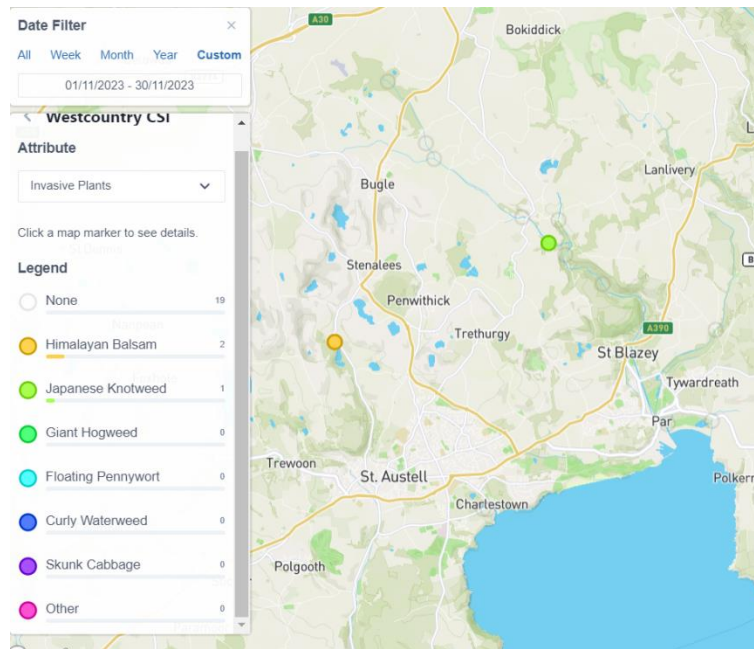




N.B. Otter spraint was found at Ponds Mill but this is not a water testing site.

(b) Invasive plants maps



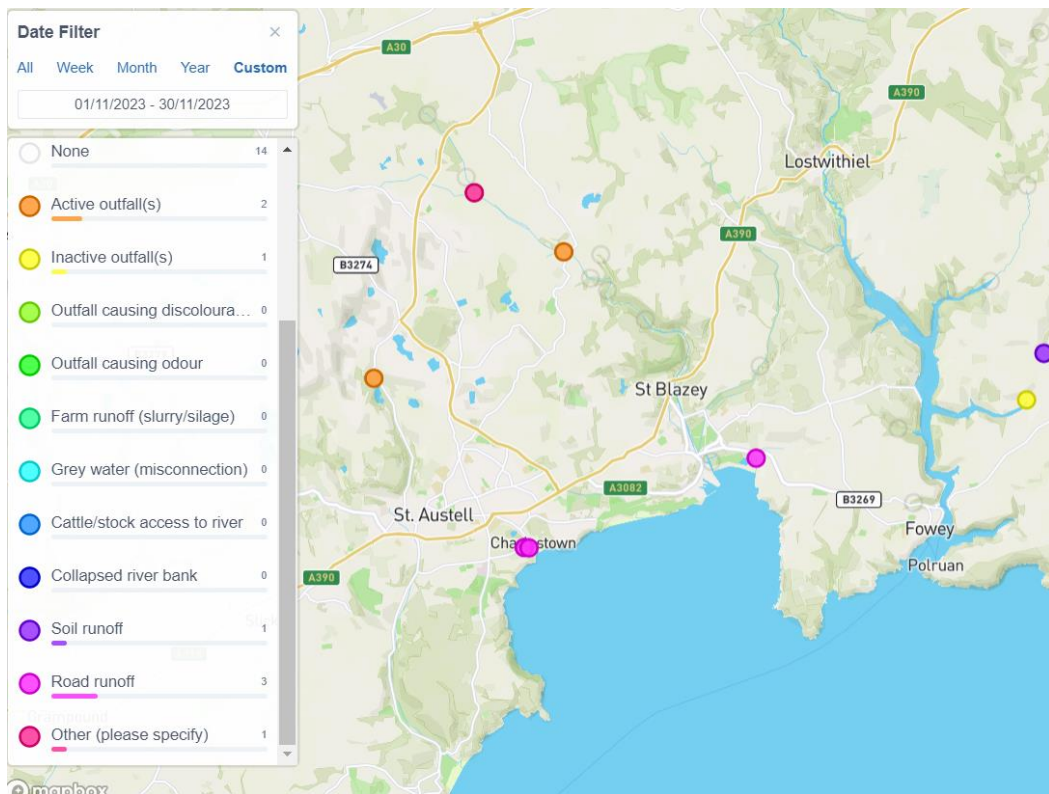
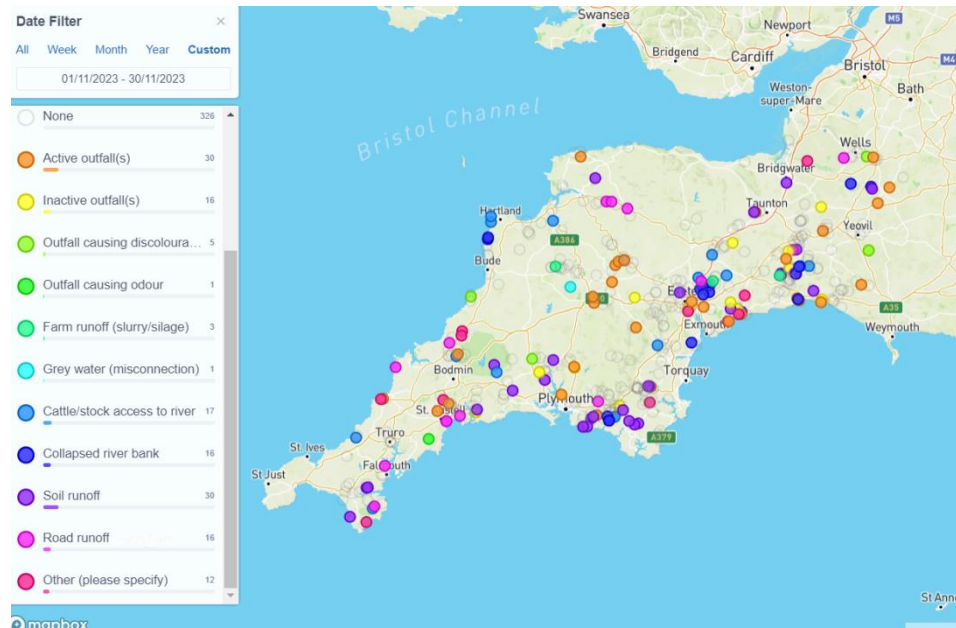


(c) Wildlife & Invasive Plants sightings at the monitoring points included:

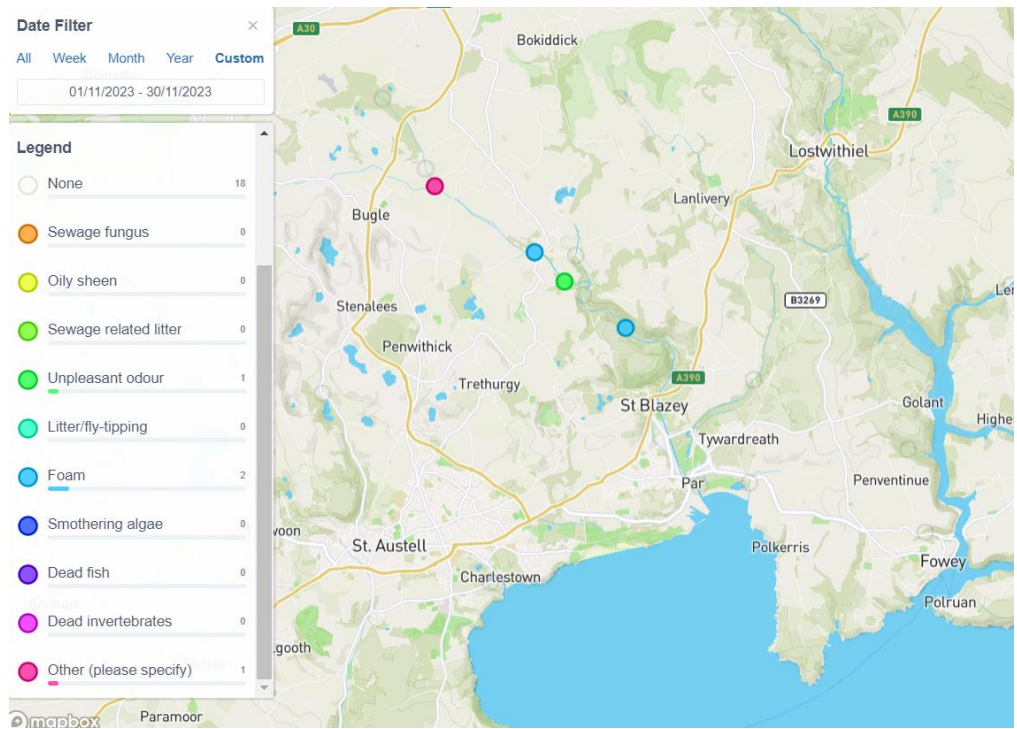
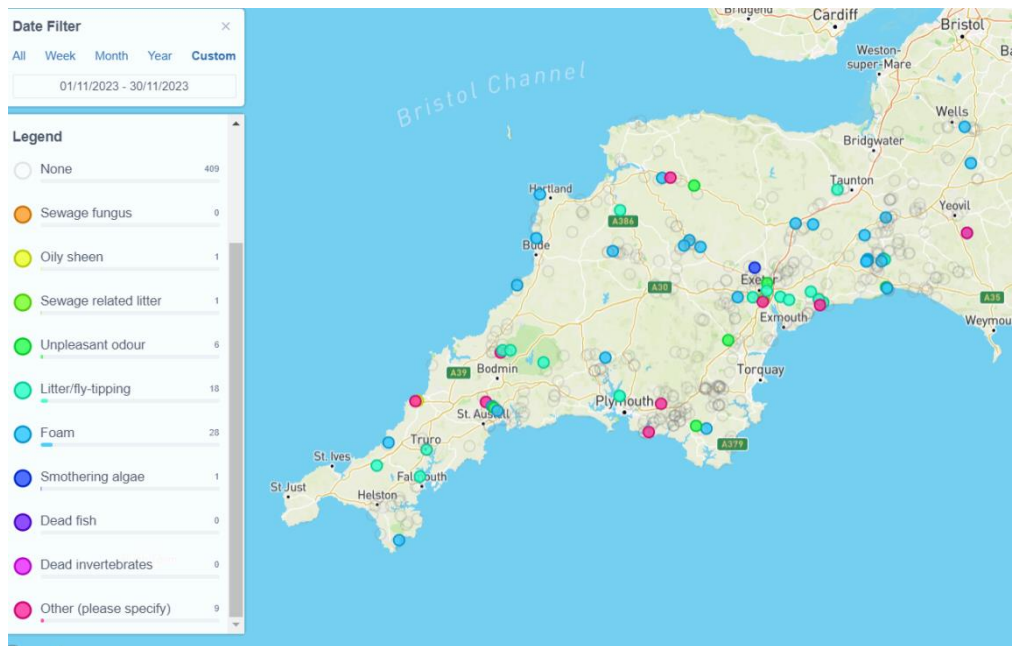
PAR RIVER/TRIBUTARY	LOCATION	WILDLIFE NOTED	INVASIVE PLANTS NOTED
Par	Criggan Moors, SX 01882 61133	None	None
Par	South of Minorca Lane, Par River, SX 02657 59788	None	None
Tributary	Carbis Stream SX 02834 59401	None	None
Par	Luxulyan allotments, Par River, SX 04732 58045	None	None
Par	Cam Bridges, Par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

H. POLLUTION SOURCES AND EVIDENCE

1. Pollution sources



2. Evidence of recent pollution:



I. OTTER SURVEY, NOVEMBER 2023

1. SURVEY CONDITIONS

Date & time	15/11/2023
Surveyors	Roger Smith, Dave Burrell, 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 south of Prideaux Wood china clay works.
Weather	Light rain in previous 24 hours
River level	High
River flow	Steady to surging
Water quality	Phosphate readings 300 PPB at the highest (Luxulyan allotments), 300 at Cam Bridges, 300 at Treffry Viaduct and 300 at Lady Rashleigh Mine and 0 at Par Beach slipway. All readings zero upstream from the allotments.
Other wildlife	Nuthatch or Treecreeper at Lady Rashleigh Mine.

2. EVIDENCE FOR OTTERS ✓

EVIDENCE	SEEN/ ORKS*	LOCATION	NOTES
Spraint - fresh			
Spraint – recent	✓*	SX 07312 56164 Under the canal bridge at Pontois Mill.	
Spraint - old			
Anal jelly			
Sign heap			
Staining			
Tracks	✓*	SX 07312 56164 Under the canal bridge at Pontois Mill. Very faint.	
Path			
Slide			
Holt			
Hover			
Couch			
Live sighting			
Corpse			

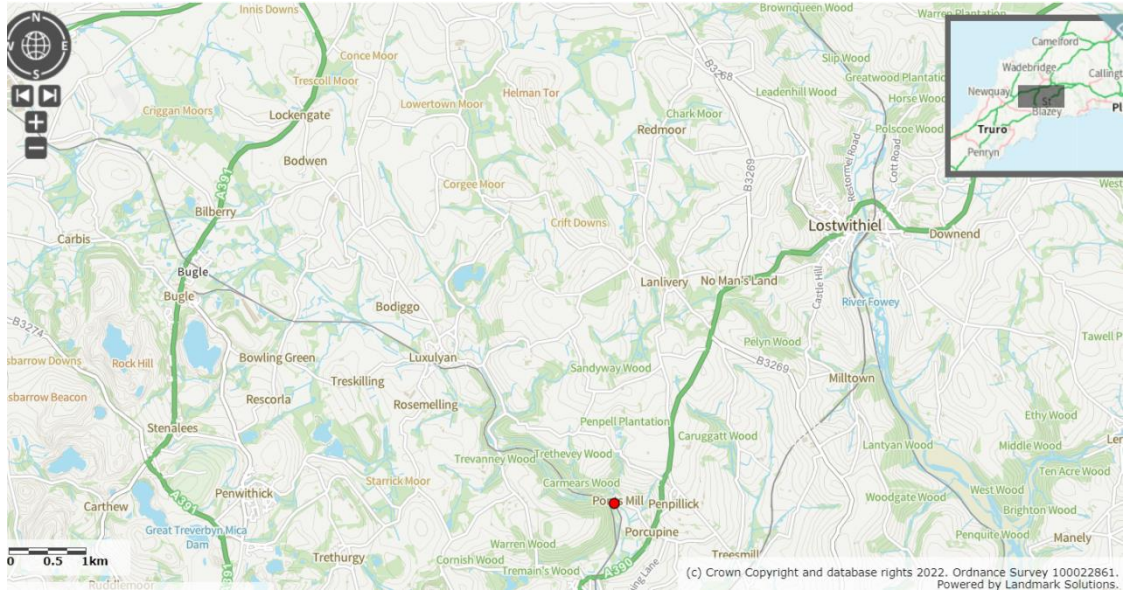
*Report sent to ORKS: <https://erccis.org.uk/>

3. MAP

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.



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

4. PHOTOGRAPHS



Recent spraint under the canal bridge at Pons Mill.

5. COMMENTS

High river levels meant that regular sprainting spots were submerged.

L. DISCUSSION

1. Positive observations

Even though high water levels obscured boulders where otter spraint is often found, some was found at Pontois Mill.

2. Points of concern

(a) Phosphate levels were *Too High* (WRT classification) downstream from St Austell North STW although the high volume of water probably diluted it. A reading of 200 PPB on the Polmear Stream, which is not affected by a STW, is concerning.

(b) Our temperature readings vary according to the thermometer used. The higher readings come from the newer instruments.

3. Areas of doubt

We have suspended riverfly monitoring for the winter months which limits our knowledge of river quality.

M. OUR GROUP AND SUPPORTERS

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, Lloyd Paynter, Chloe Lake, David Edwards, Claire and Gary Phillips, Chris Bartram, Jenny Heskett, Nick Taylor, Jeremy Roberts, Mat Bateman, Colin Pringle, Matt Healey, Simon Browning, Lydia Deacon, Layla Ousley, Eva Edgeworth, Jack Middleton, Anna Seal, Jade Neville, Nicola Rogers and Callum Lewis is greatly appreciated. The interest and encouragement offered by Environment Agency officers, especially Lisa Best, Lisa Goodall and Peter Scobie, have been invaluable.

Report compiled by Dave Burrell, Joan Farmer and Roger Smith, December 2023