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.

MARCH 2024

Turbulence at Cam Bridges weir

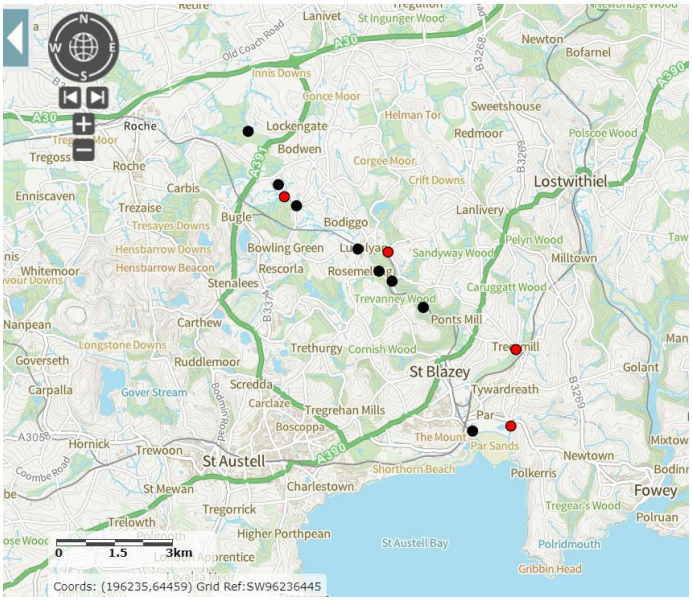
A. OUR MARCH 2024 FINDINGS AT A GLANCE (SEE SECTIONS C TO J FOR FULL PICTURE)

We sampled at 12 locations, including a new one on the Upper Par near Lavrean. The red highlighting shows points of concern.

CRITERIA	UPPER PAR (UPSTREAM OF CONFLUENCE WITH BOKIDDICK STREAM NEAR BLACK HILL CAR PARK) 5 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 11.4 ˚ Celsius	Average 12.8˚ Celsius	Average 11.9˚ Celsius	Average 14.8˚ Celsius
TOTAL DISSOLVED SOLIDS (SHOULD NOT EXCEED 300 PPM)	76.8 PPM	94.6 PPM	81 PPM	130.5 PPM
TURBIDITY (SHOULD BE <12 ON SECCHI TUBE. FOR AVERAGING ANY READING <12 IS COUNTED AS 11)	0	0	7	7.5
PHOSPHATES (SHOULD NOT EXCEED 100 PPB)	100 PPB	**150 PPB**	0 PPB	50 PPB
RIVERFLY TRIGGER LEVEL (SHOULD BE ≥ 6)	N/A	Sampling suspended until next spring.	N/A	N/A
WILDLIFE EVIDENCE	Squirrel, plus fox & deer tracks	Dipper, grey wagtail, gulls, pigeon	None	Chiffchaff (song)
EVIDENCE OF POLLUTION	Smell (Cam Bridges), foam.	None	China clay	None

B. MARCH 2024 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



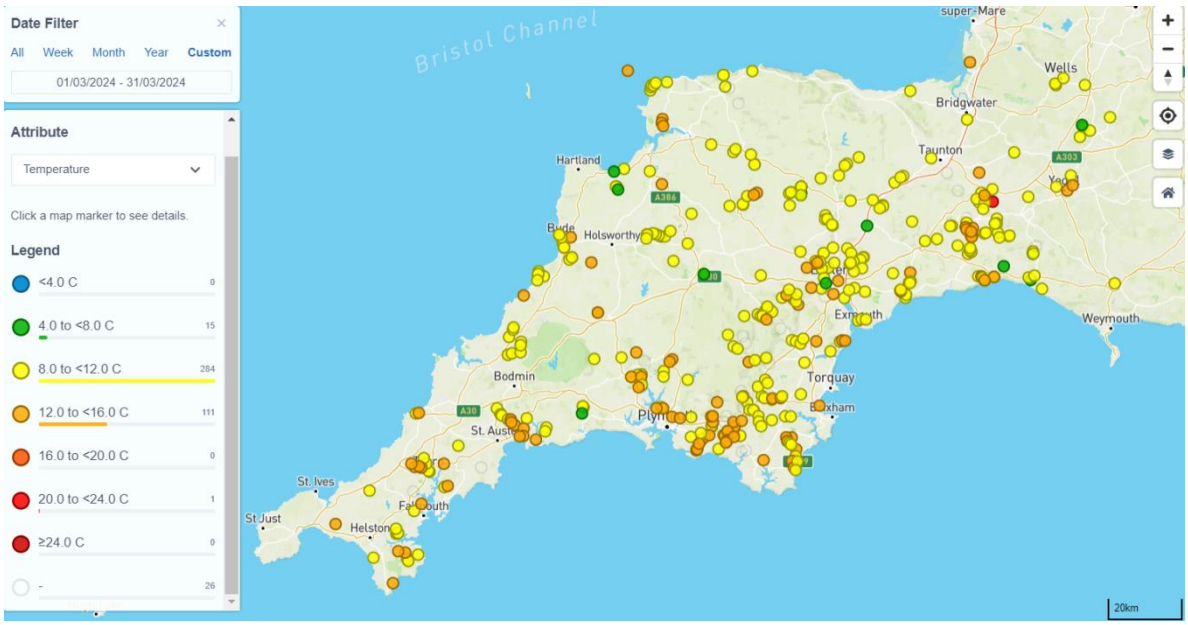
LOCATION	DATE	TYPE OF CHECK	MONITORED BY
Criggan Moors, Par River, SX 01882 61133	13/3/2024	CSI sample & Cartographer record.	Roger Smith
South of Minorca Lane, Par River, SX02668 59747	13/3/2024	CSI sampling. Cartographer record.	Roger Smith
Carbis Stream SX 02834 59401	13/3/2024	CSI sampling. Cartographer record.	Roger Smith
Lavrean, Par River SX 03134 59164 NEW SITE	13/3/2024	CSI sampling. Cartographer record.	Roger Smith
Luxulyan allotments, Par River, SX 04732 58045	13/3/2024	CSI sampling. Cartographer record.	Roger Smith
Cam Bridges, Par River, SX 05292 57454	13/3/2024	CSI sampling. Cartographer record.	Roger Smith
Gatty's Bridge, Bokiddick Stream SX 05531 57953	13/3/2024	CSI sampling. Cartographer record.	Joan Farmer
Treffry Viaduct, Par River, SX 05650 57179	13/3/2024	CSI sampling. Cartographer record.	Joan Farmer
Lady Rashleigh Mine, Par River, SX 06451 56509	13/3/2024	CSI sampling. Cartographer record.	Joan Farmer, Roger Smith
Treesmill, Tywardreath Stream, SX 08873 55385	18/3/2024	CSI sampling. Cartographer record.	Maggie Tagney
Par Beach slipway, SX 0776 53261	20/3/2024	CSI sampling. Cartographer record.	Brian Harrisson
Polmear Stream, Ship Inn SX 08749 53417	18/3/2024	CSI sampling. Cartographer record.	Simon Tagney

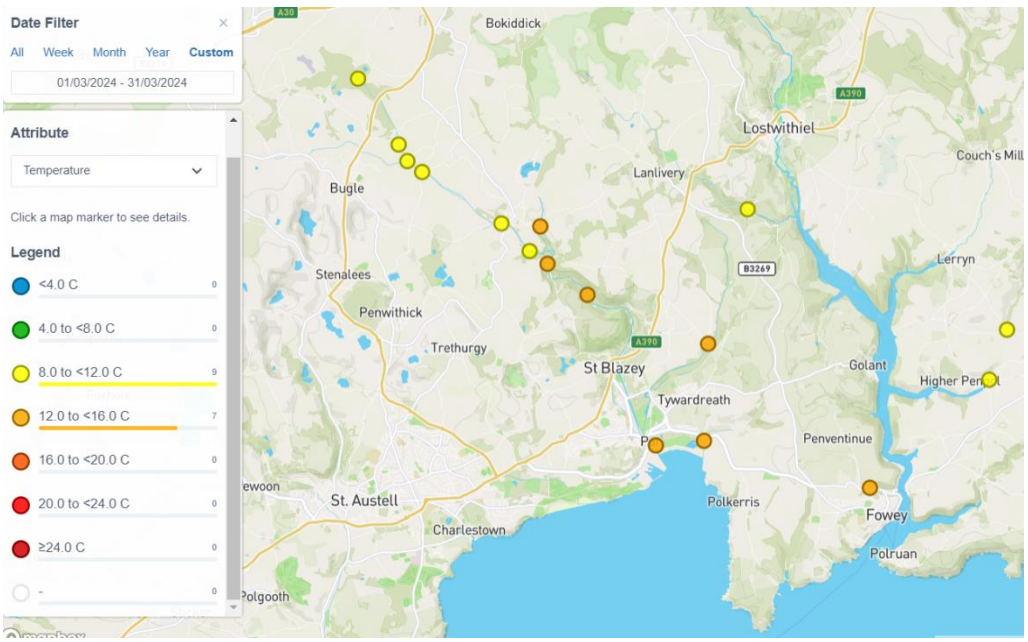
C. TEMPERATURE

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.

Geographical comparison. Source: Cartographer.





3. Results March 2024

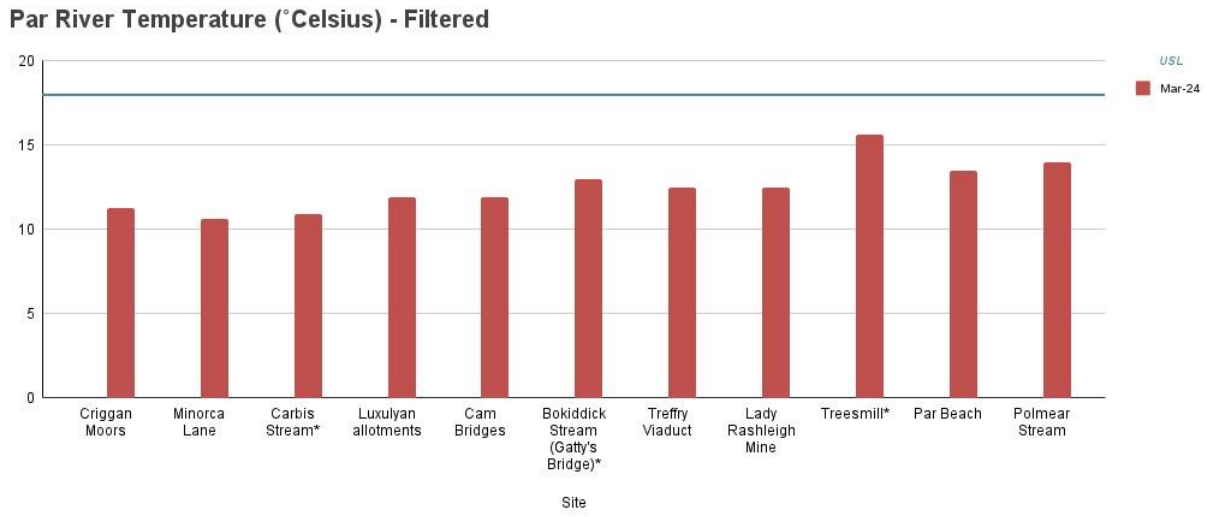
PAR RIVER/TRIBUTARY	LOCATION	Temperature ˚Celsius
Par	Criggan Moors, SX 01882 61133	11.3
Par	South of Minorca Lane, Par River, SX 02657 59788	10.6
Tributary	Carbis Stream SX 02834 59401	10.9
Par	Lavrean, Par River SX 03134 59164 NEW SITE	11.3
Par	Luxulyan allotments, Par River, SX 04732 58045	11.9
Par	Cam Bridges, Par River, SX 05292 57454	11.9
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	13
Par	Treffry Viaduct, Par River, SX 05650 57179	12.5
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	12.5
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	15.6
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.

From December 2023 all readings have been taken with the new thermometer/TDS device. Previously, all Upper Par readings, except for Lady Rashleigh Mine, have been taken with the old device. There is a worrying discrepancy with the readings on the older devices.

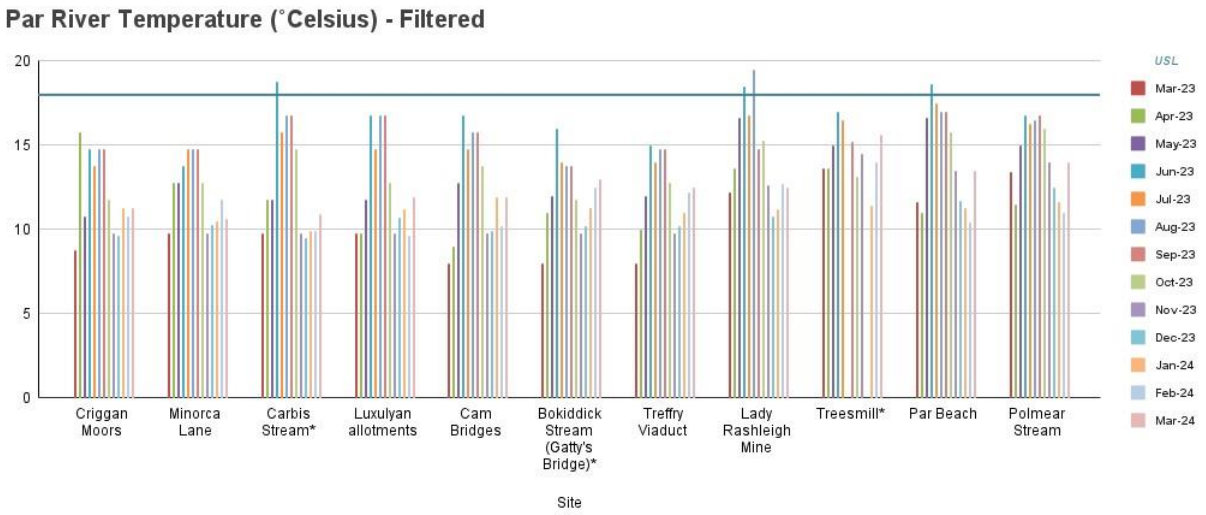
4. Graphs

(a) This month



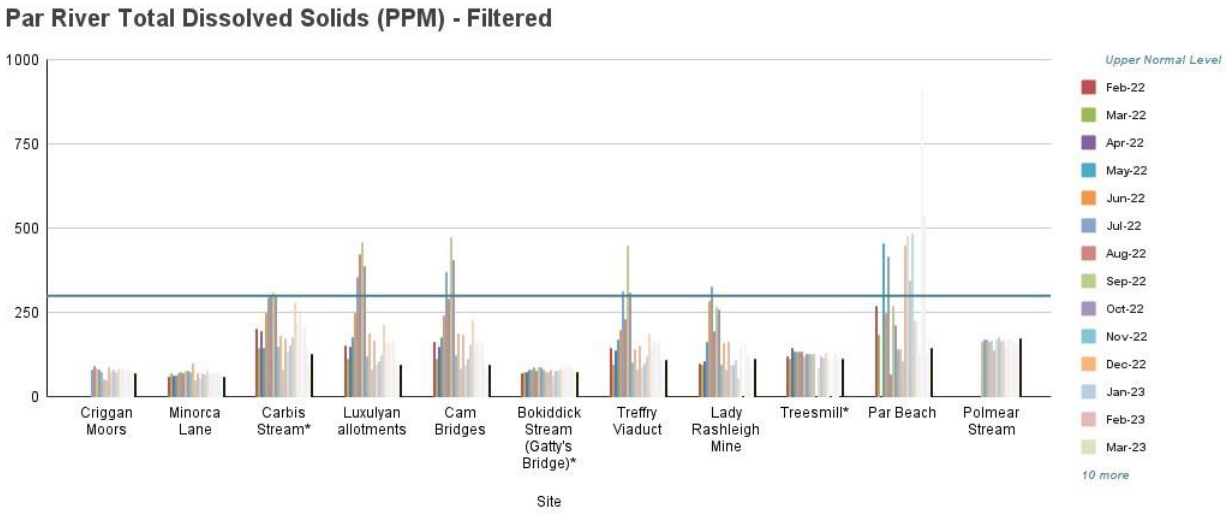
*Indicates a tributary.

(b) From 1st March 2023 until now:



*Indicates a tributary.

(c) From 1st March 2022 until now:



* Indicates a tributary.

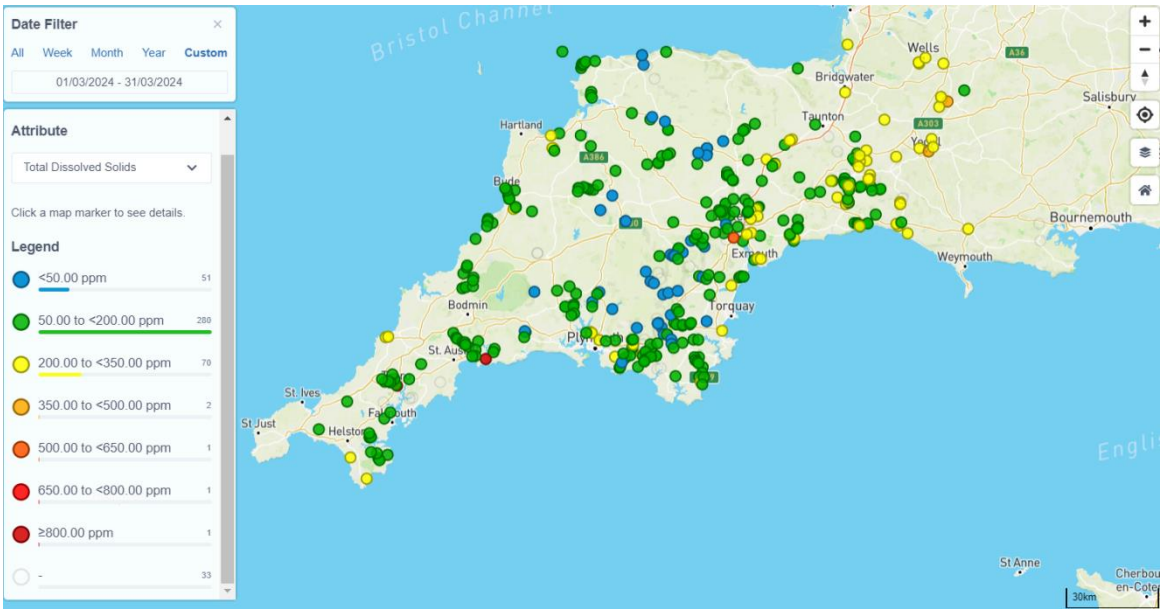
D. TOTAL DISSOLVED SOLIDS

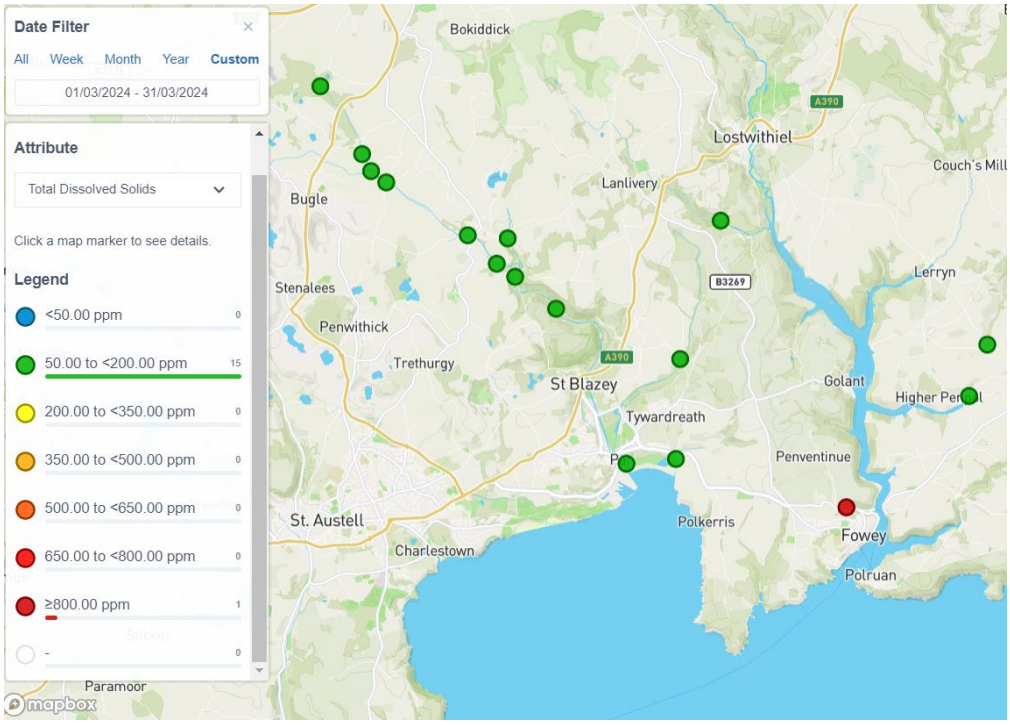
1. We measure these in ppm (parts per million). This is the WRT's explanation:

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 March 2024

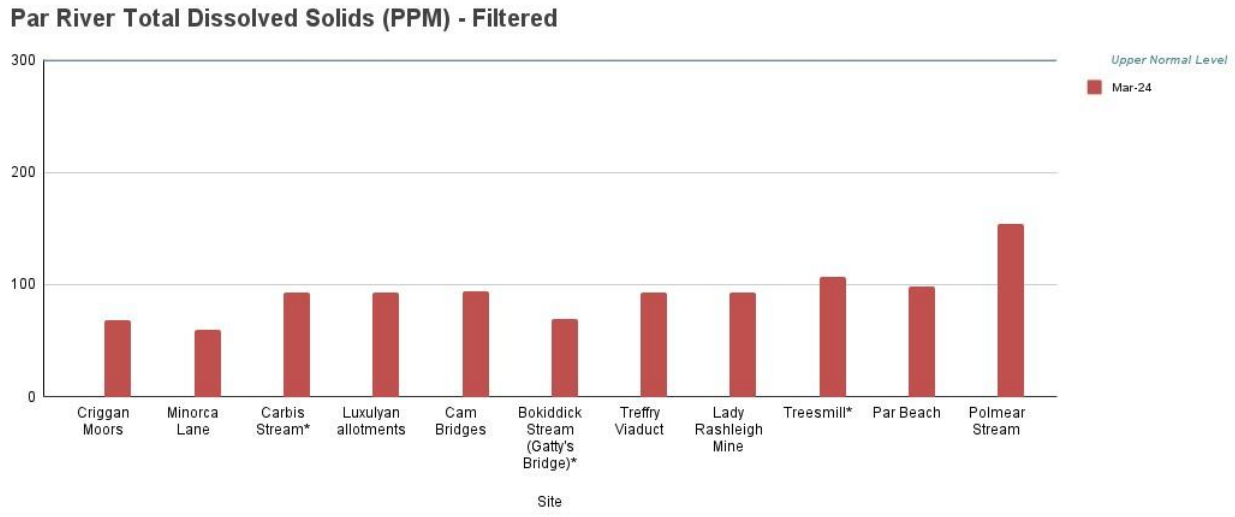
PAR RIVER/TRIBUTARY	LOCATION	Total Dissolved Solids PPM
Par	Criggan Moors, SX 01882 61133	68
Par	South of Minorca Lane, Par River, SX 02657 59788	60
Tributary	Carbis Stream SX 02834 59401	93
Par	Lavrean, Par River SX 03134 59164 NEW SITE	69
Par	Luxulyan allotments, Par River, SX 04732 58045	93
Par	Cam Bridges, Par River, SX 05292 57454	94
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	69
Par	Treffry Viaduct, Par River, SX 05650 57179	93
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	93
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	107
Par	Par Beach slipway, SX 0776 53261	98
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	154

Upper Normal Level

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

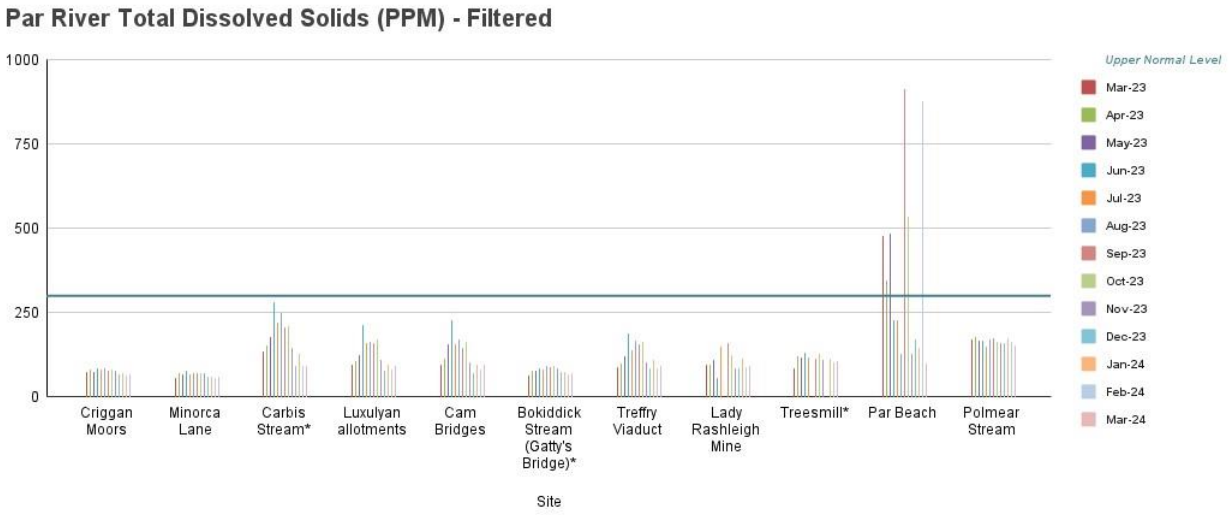
4. Graphs

(a) This month



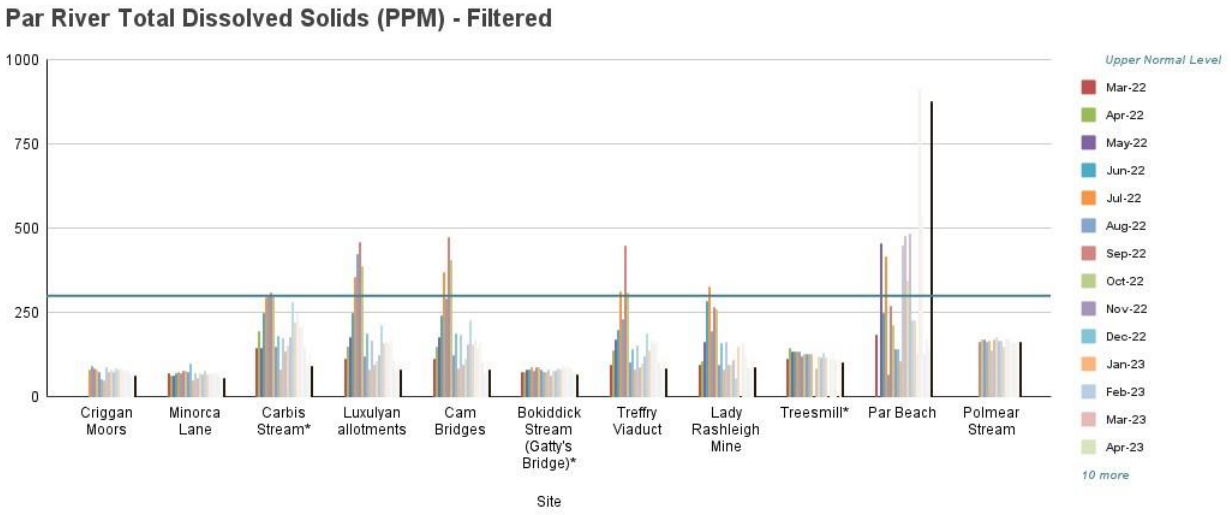
* Indicates a tributary.

(b) From 1st March 2023 until now:



* Indicates a tributary.

(c) From 1st March 2022 until now:



* Indicates a tributary.

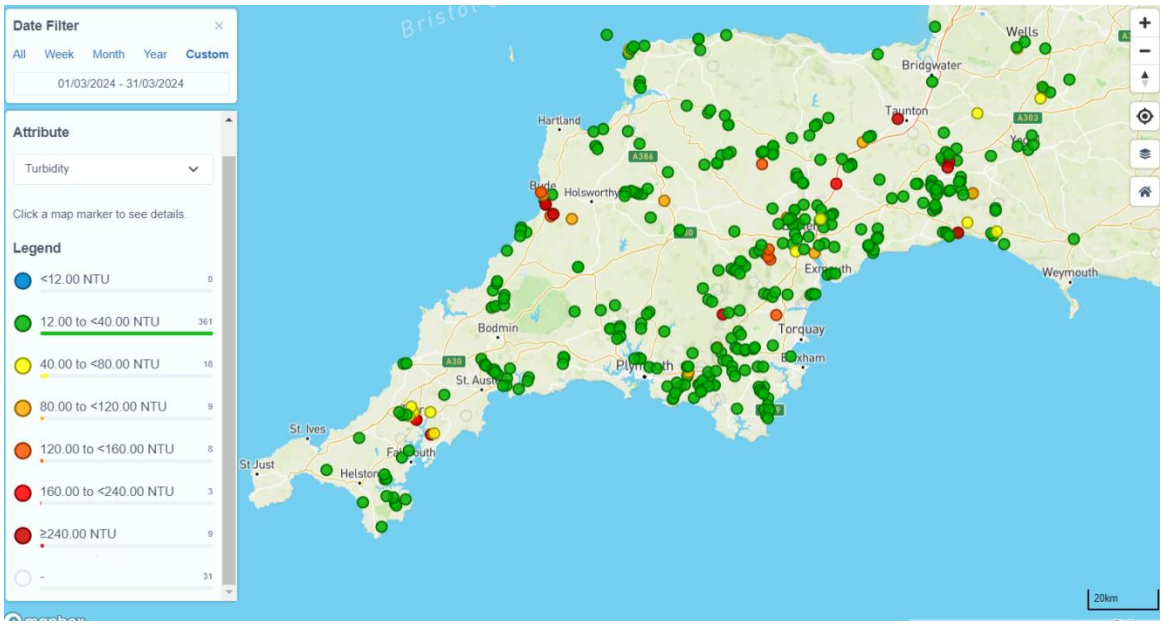
E. TURBIDITY

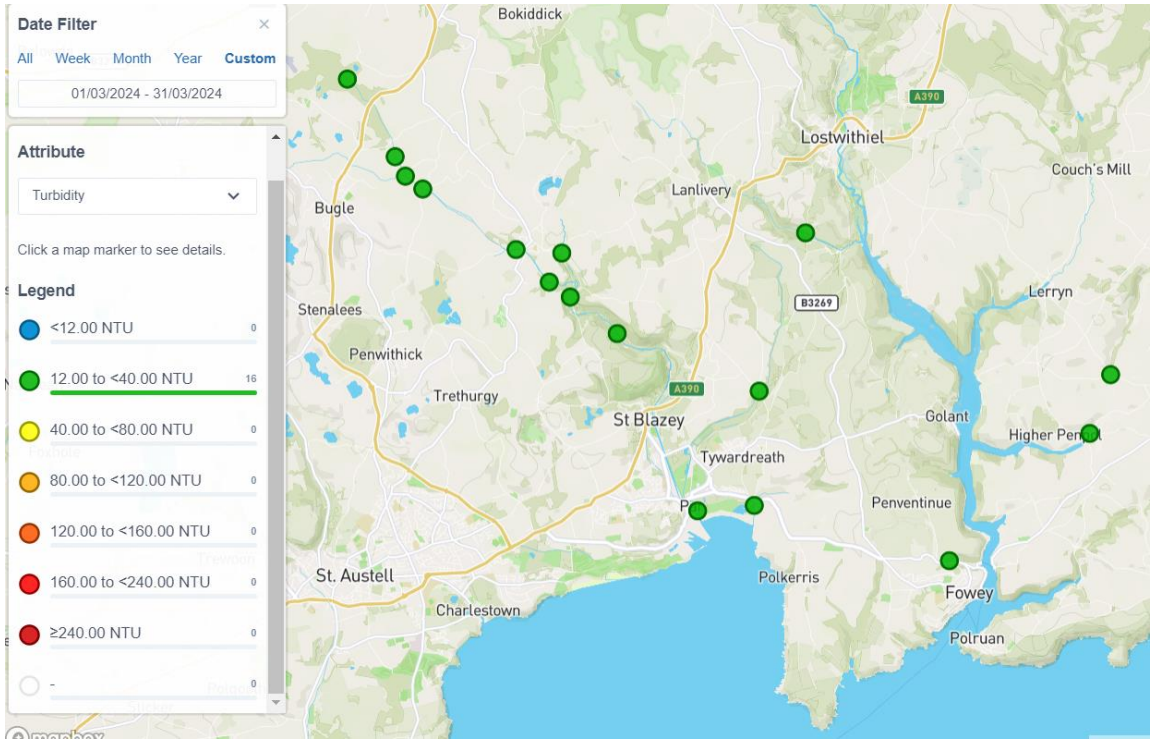
1. This is the WRT explanation of this measure:

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. Most of our results should have blue dots (<12) but Cartographer shows them as 12 (green dots).



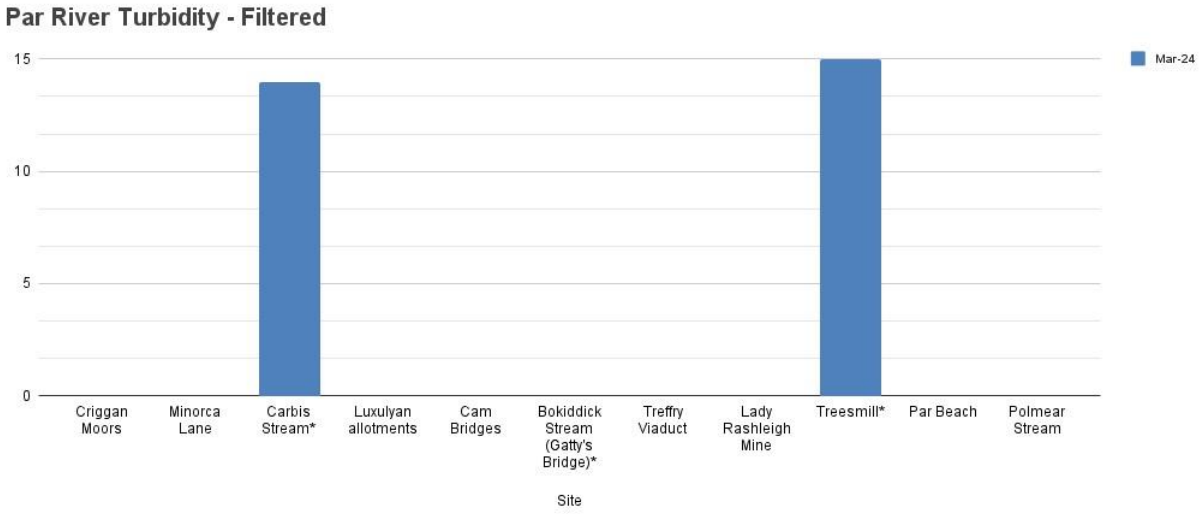


3. Results March 2024

PAR RIVER/TRIBUTARY	LOCATION	Turbidity
Par	Criggan Moors, SX 01882 61133	<12
Par	South of Minorca Lane, Par River, SX 02657 59788	<12
Tributary	Carbis Stream SX 02834 59401	14
Par	Lavrean, Par River SX 03134 59164 NEW SITE	<12
Par	Luxulyan allotments, Par River, SX 04732 58045	<12
Par	Cam Bridges, Par River, SX 05292 57454	<12
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	<12
Par	Treffry Viaduct, Par River, SX 05650 57179	<12
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	<12
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	15
Par	Par Beach slipway, SX 0776 53261	<12
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	<12

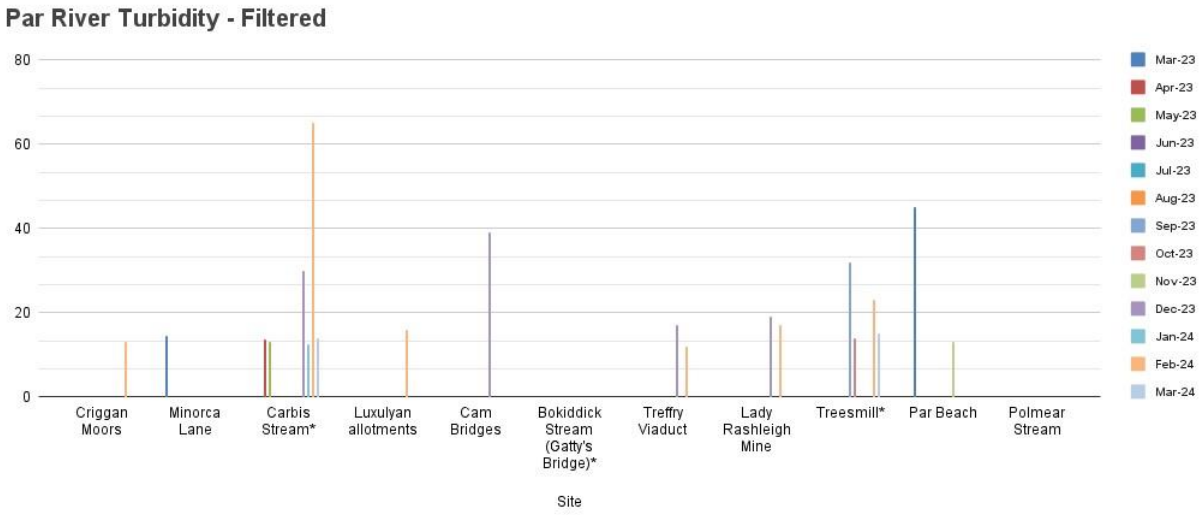
4. Graphs

(a) This month



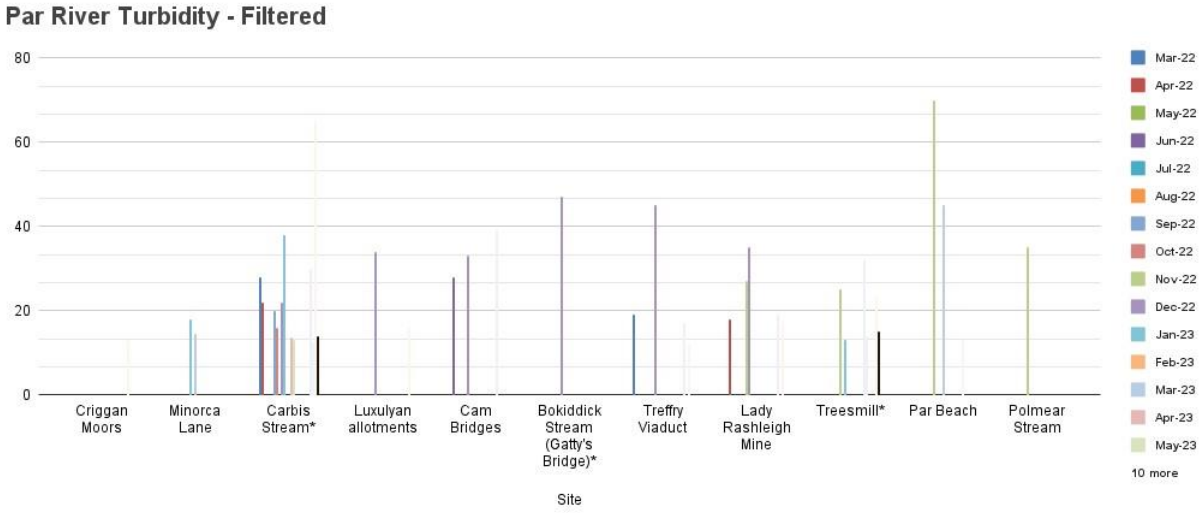
*Indicates a tributary

(b) From 1st March 2023 until now:



* Indicates a tributary

(c) From 1st March 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.)

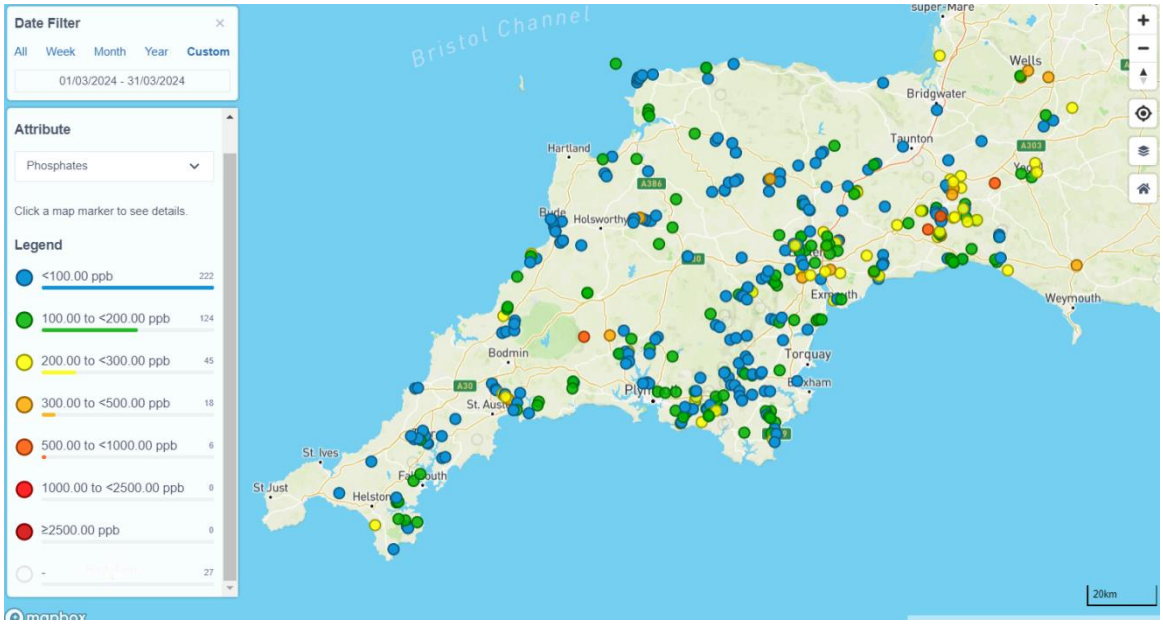
Ranges on phosphate diagnostic colour chart:

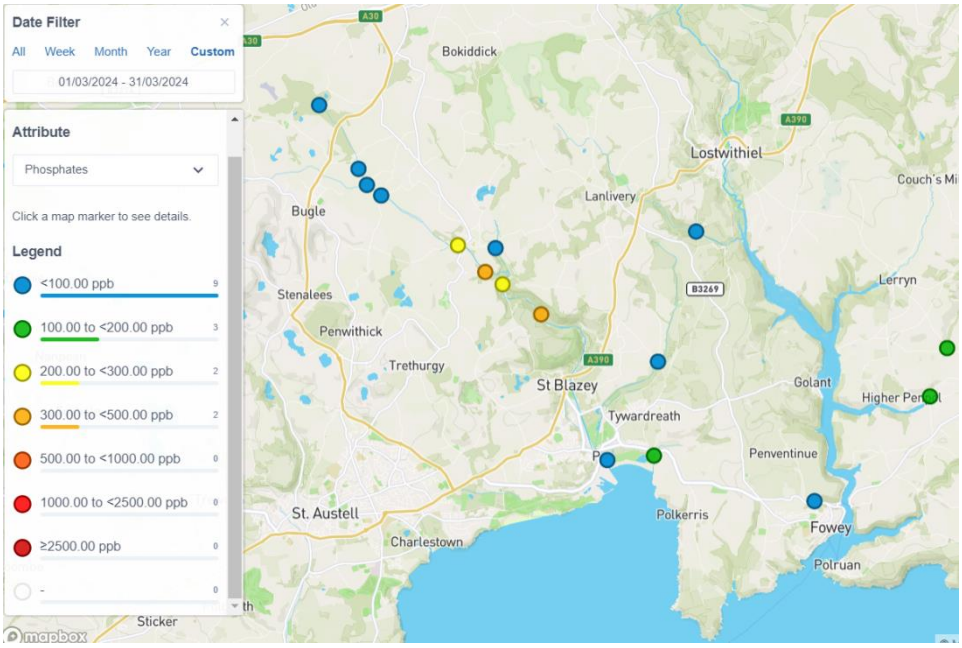
0 – 100 OK

200 – 300 HIGH

500 – 2500 – TOO HIGH

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





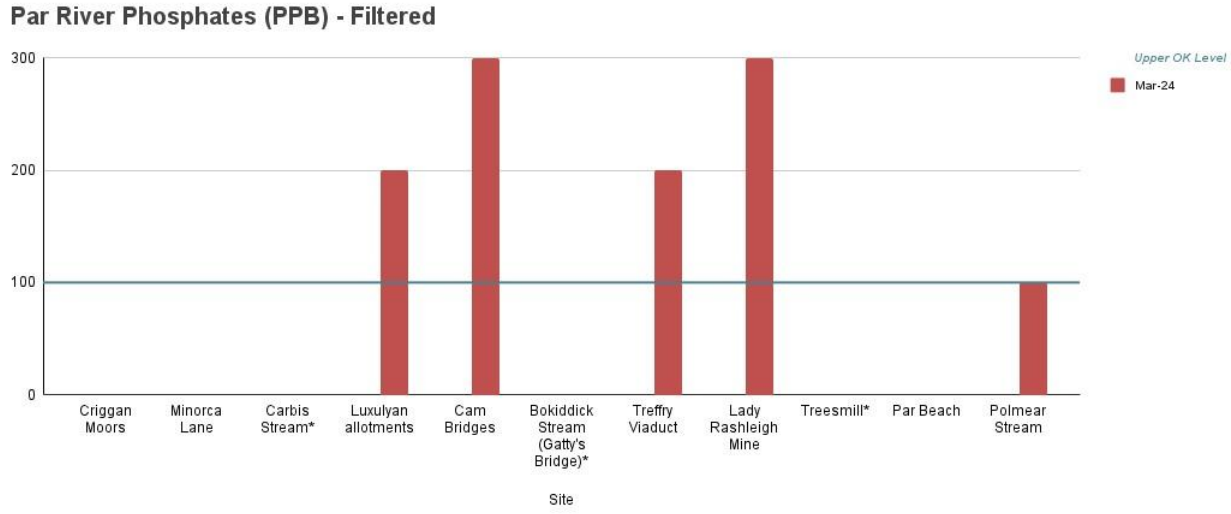
3. Results March 2024

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	Lavrean, Par River SX 03134 59164 NEW SITE	**0**
Par	Luxulyan allotments, Par River, SX 04732 58045	**200**
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	**200**
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	**100**

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

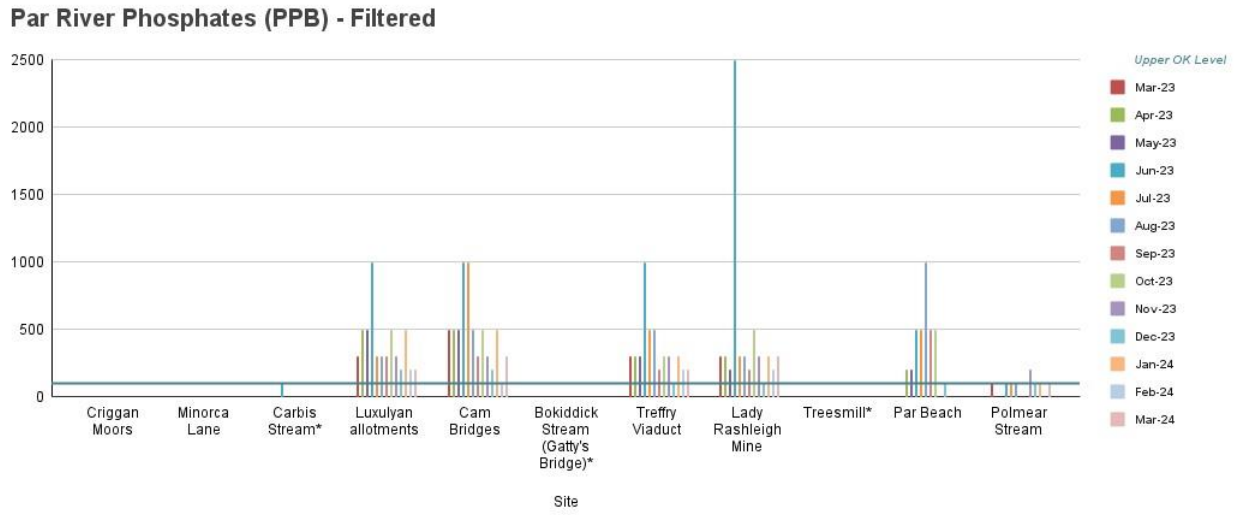
4. Graphs

(a) This month



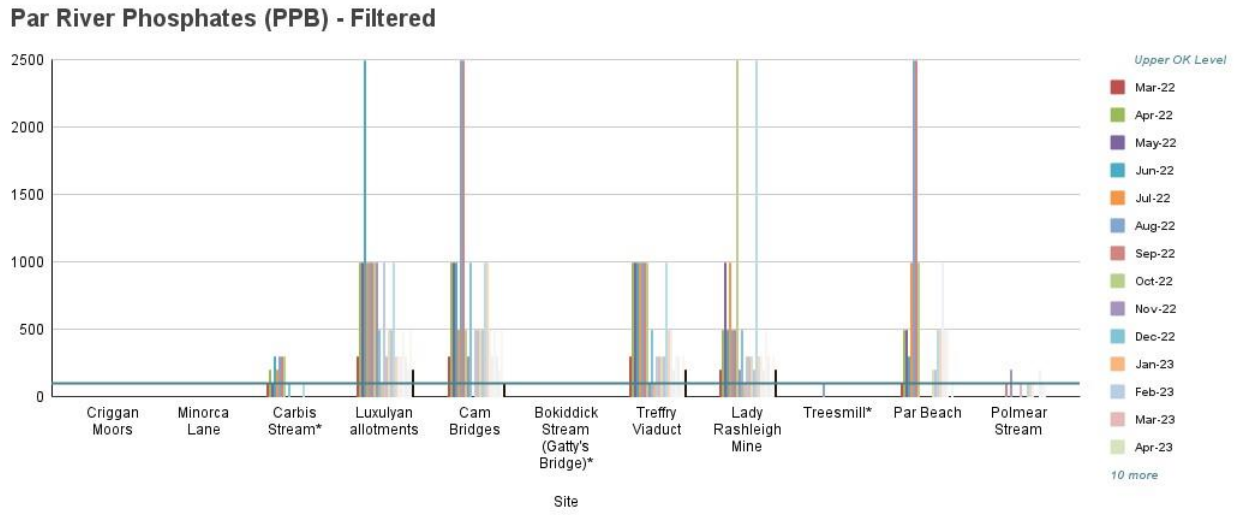
* Indicates a tributary

(b) From 1st March 2023 until now:



* Indicates a tributary

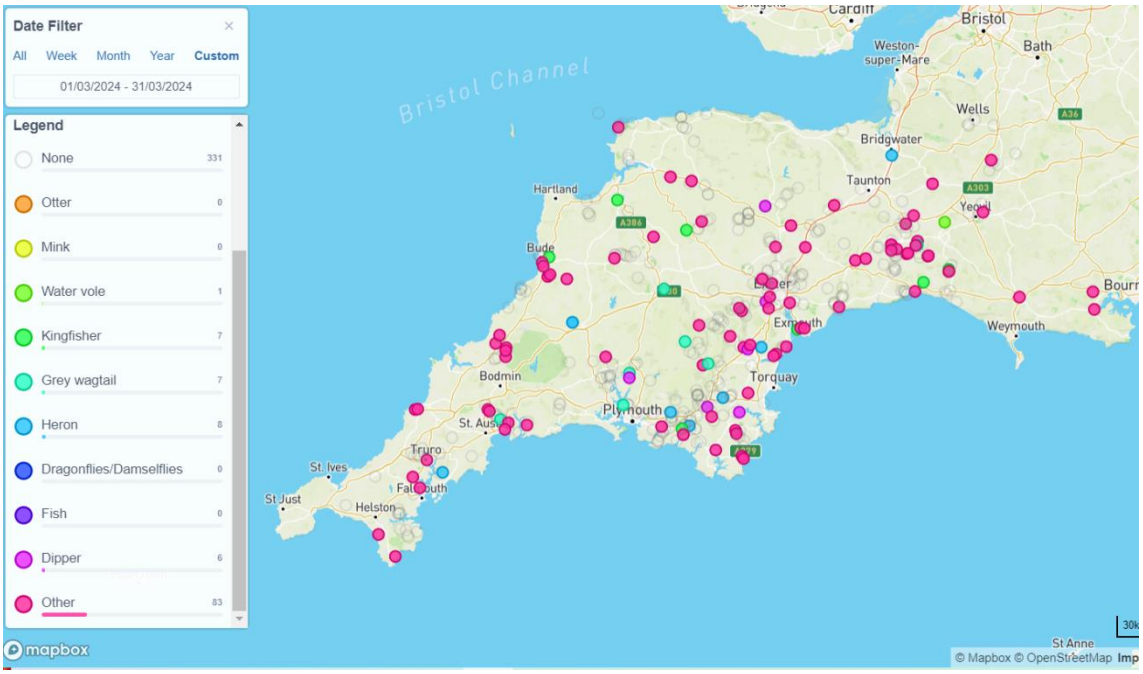
(c) From 1st March 2022 until now:

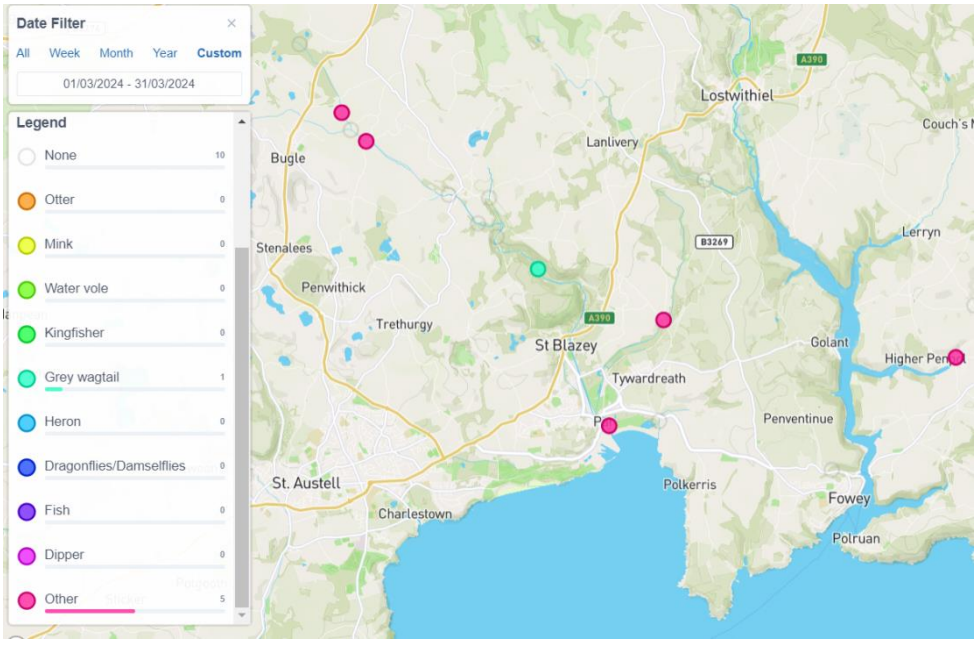


* Indicates a tributary

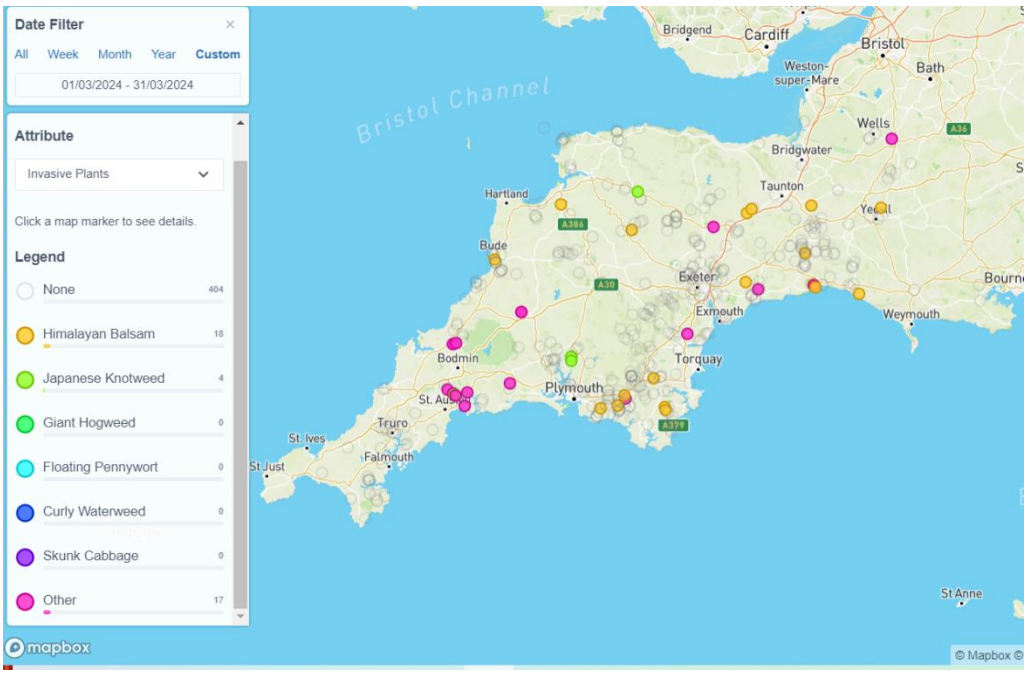
G. WILDLIFE (FOR OTTER REPORT SEE SECTION I) & INVASIVE PLANTS

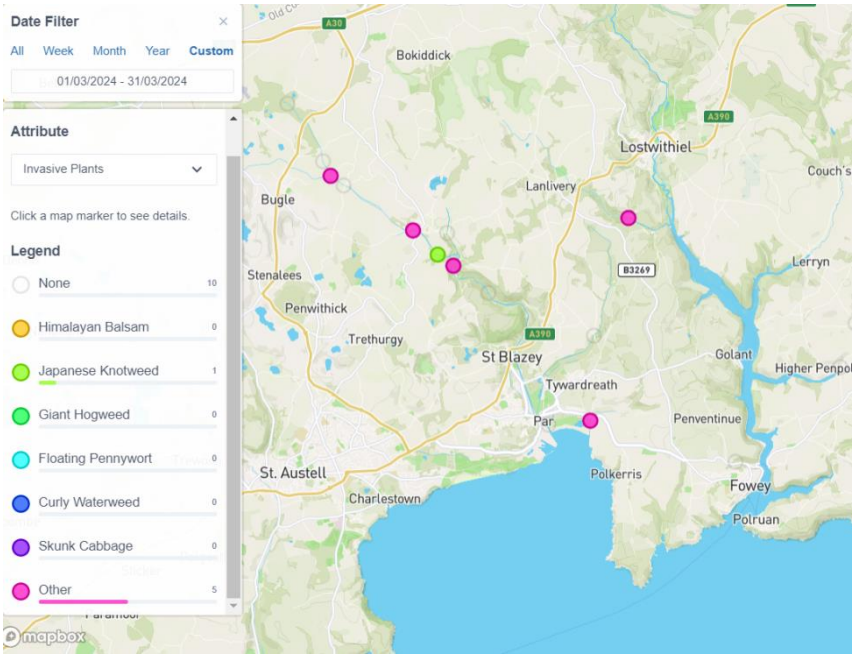
(a) Wildlife maps





(b) Invasive plants maps





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

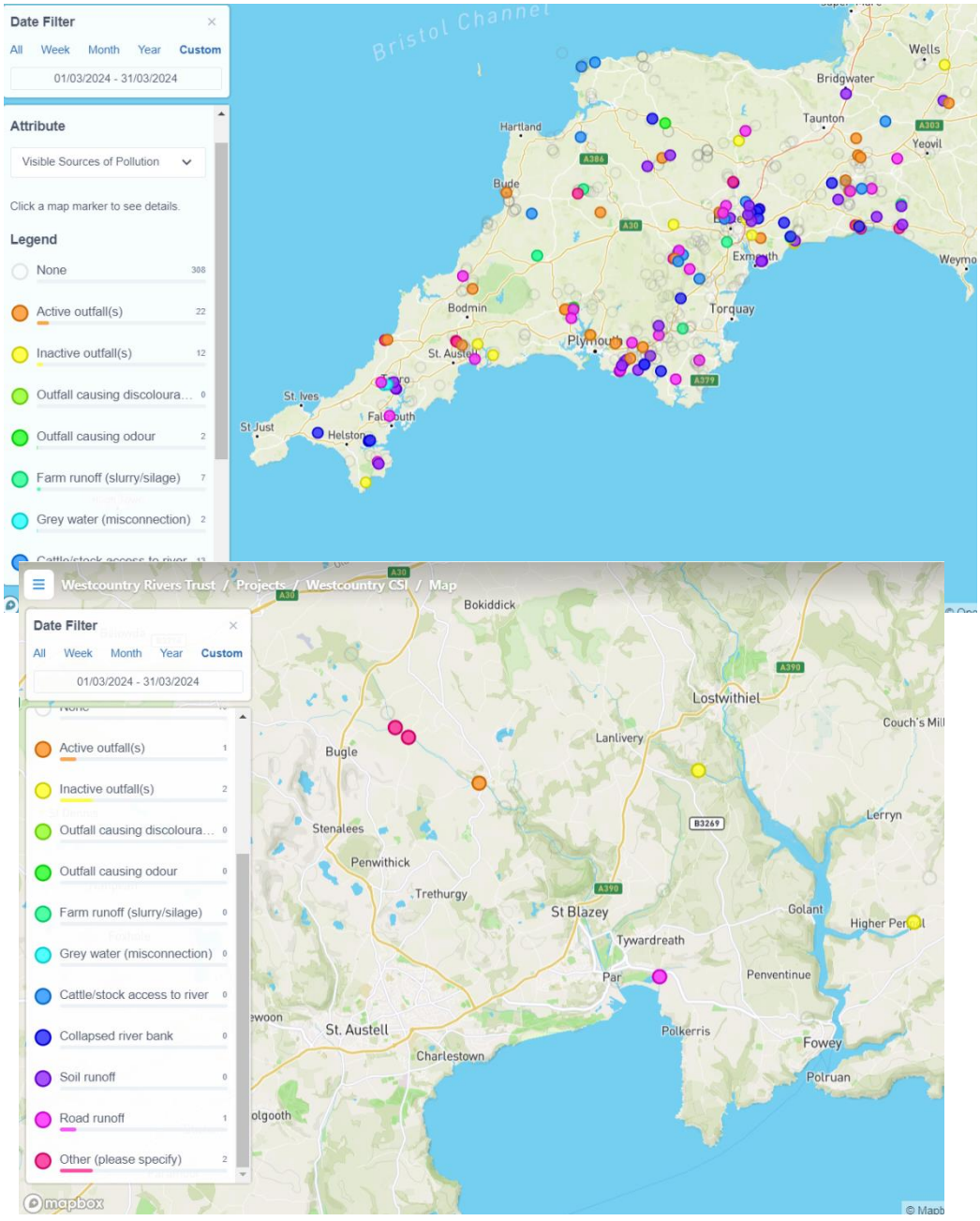
PAR RIVER/TRIBUTARY	LOCATION	WILDLIFE NOTED	INVASIVE PLANTS NOTED
Par	Criggan Moors, SX 01882 61133	None	None
Par	South of Minorca Lane, Par River, SX 02657 59788	Squirrel. Fox and deer tracks.	None
Tributary	Carbis Stream SX 02834 59401	None	Hemlock water dropwort
Par	Lavrean, Par River SX 03134 59164 NEW SITE	None	Hemlock water dropwort
Par	Luxulyan allotments, Par River, SX 04732 58045	None	Hemlock water dropwort, Japanese Knotweed
Par	Cam Bridges, Par River, SX 05292 57454	None	Hemlock water dropwort
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	None	None
Par	Treffry Viaduct, Par River, SX 05650 57179	None	Hemlock water dropwort
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	Dipper, grey wagtail	None
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	Chiffchaff (heard not seen)	None
Par	Par Beach slipway, SX 0776 53261	Gulls, pigeon	None
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	None	Hemlock water dropwort

No otter spraint was found other than old spraint (noted in February) under the canal bridge at Ponts Mill.

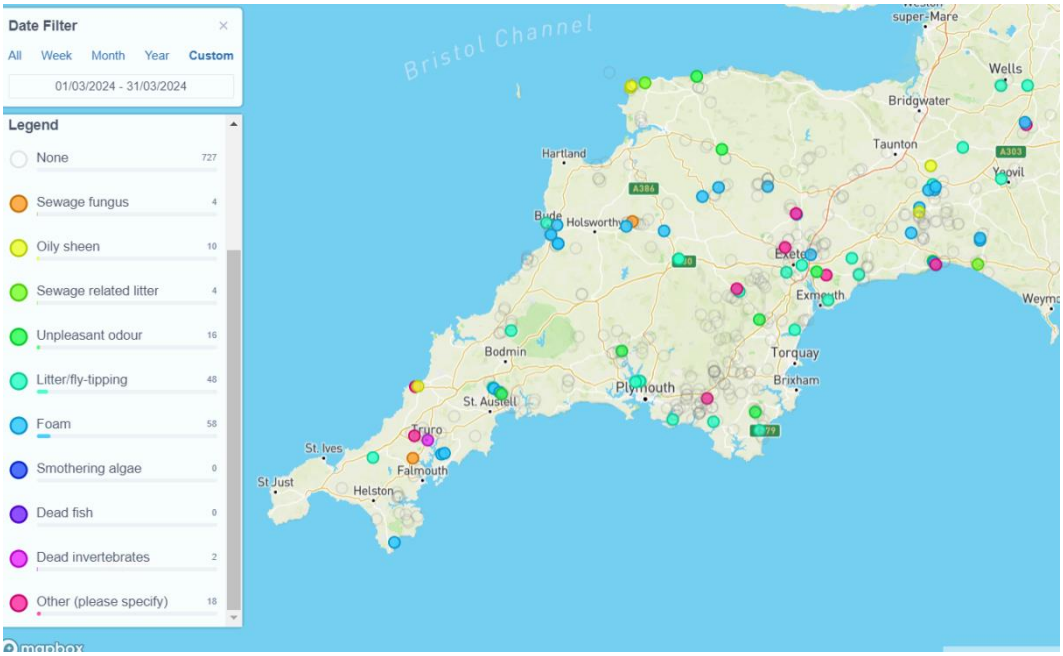
Presumed fox footprint near Minorca Lane (photo lightened)

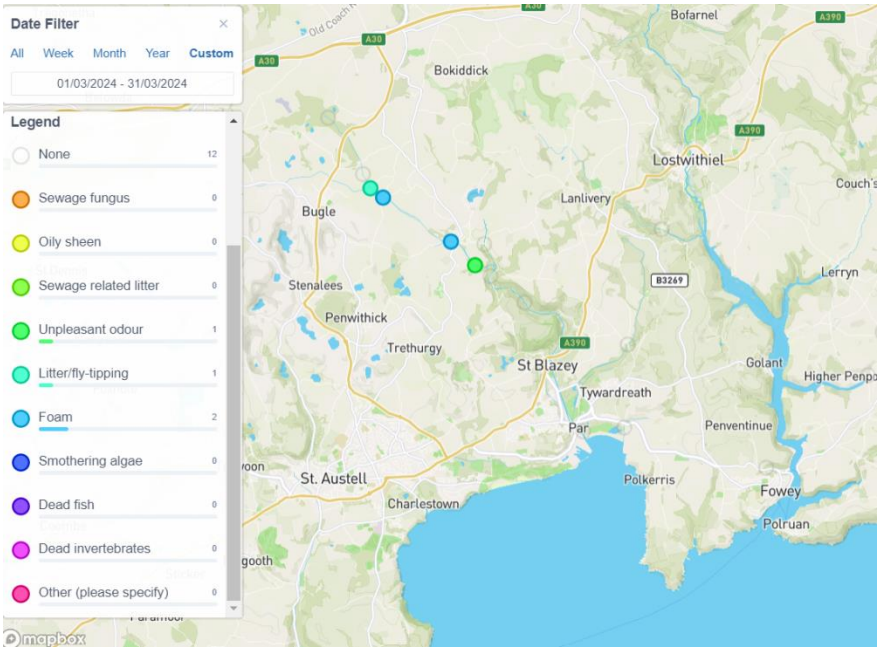
H. POLLUTION SOURCES AND EVIDENCE

1. Pollution sources



2. Pollution evidence





I. OTTER SURVEY, MARCH 2024

1. SURVEY CONDITIONS

Date & time	9 & 13/3/2024
Surveyors	Roger Smith, Joan Farmer
Areas surveyed	Upper Par (Criggan Moors and Minorca Lane); Par River from STW to Cam Bridges; Par River from Treffry Viaduct to Ponts Mill sluice gates
Weather	Light rain in previous 24 hours (13/3/2024)
River level	High
River flow	Steady to surging
Water quality	Phosphate readings 200 PPB at the highest (Luxulyan allotments, Treffry Viaduct) and 300 at Cam Bridges and Lady Rashleigh Mine. All readings zero upstream from the allotments.
Other wildlife	Grey wagtail and dipper

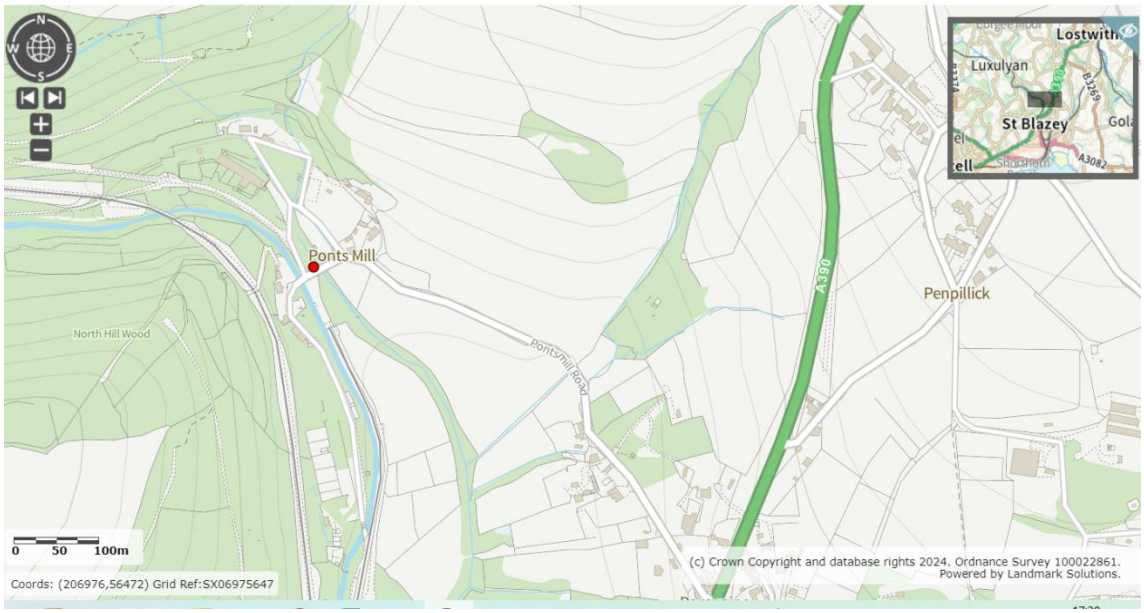
2. EVIDENCE FOR OTTERS ✓

EVIDENCE	SEEN/ ORKS*	LOCATION	NOTES
Spraint - fresh			
Spraint – recent			
Spraint - old	✓	Under the canal bridge at Ponts Mill but almost certainly this has been recorded in a previous month.	
Anal jelly			
Sign heap			
Staining			
Tracks			
Path			
Slide			
Holt			
Hover			
Couch			
Live sighting			
Corpse			

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

3. MAP

Red dots – definite evidence but not recorded on ORKS because it may have been recorded before.
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

Old spraint with fish bones and scales below Ponts Mill canal bridge. Probably recorded before.

5. COMMENTS

High river levels meant that regular sprainting spots were submerged.

J. DISCUSSION

1. Positive observations

(a) Apart from phosphate levels, none of the other water quality measures (Temperature, Total Dissolved Solids, and Turbidity) gave particular cause for concern.

(b) Some wildlife sightings, including dippers and grey wagtails in Luxulyan Valley.

2. Points of concern

(a) Even with the very high river level, which has a diluting effect, phosphate readings were High downstream from St Austell North STW at Luxulyan.

(b) Quite possibly the wet weather and subsequent high river levels may have led to STW using CSOs (Combined Sewer Overflows) to discharge into waterways but we have not made any observations this month to suggest the presence of sewage, other than the mention of a smell at Cam Bridges. Two online sources do provide information about spills:

https://theriverstrust.org/key-issues/sewage-in-rivers

https://top-of-the-poops.org/rivers

The Rivers Trust map shows the locations of SWW sewage discharges, 6 of those shown discharge into the Par or tributaries (Victoria is on the watershed and discharges into the River Camel):

The Rivers Trust map is being updated so this table attempts to combine information from both sites. The locations are listed from upstream to downstream. The source is either Rivers Trust (RT) or Top of the Poops (TOTP). There are numerous other sewage treatment arrangements in the catchment that are not owned by SWW.

LOCATION	DESCRIPTION (RT)	2022 SPILLS (RT)	2023 SPILLS (TOTP).	PARLIAMENTARY CONSTITUENCY
Roche CSO (South West Water)	Permit number: 301682 Discharging into the Par River.	**42** times for a total of **24.39** hours The reason why an overflow may have high spill counts in that period: N/a - Ongoing Investigation	59 dumps for 46 hours	St Austell & Newquay
Molinnis Combined Sewer Overflow (South West Water)	Permit number: 301683 discharging into the Tributary Of River Par.	Spilled **7** times for a total of **3.40** hour, discharging into the Tributary Of River Par. The reason why event duration monitors may have provided information for <90% of the relevant return period was: Sensor Failure / Issue.	38 dumps for 65 hours. Reporting 91.3%	St Austell & Newquay
Rescorla CSO (South West Water)	Permit number: 301681 Discharging into the Trib Of Par Sands (S).	Spilled **0** times for a total of **0.00** hours	No data	St Austell & Newquay
St Austell North STW (South West Water)	Permit number: SWWA 146 Discharging into the (S) River Par.	Spilled **36** times for a total of **574.84** hours The reason why an overflow may have high spill counts in that period: N/a - Ongoing Investigation.	No data	South East Cornwall
Tredenham Close CSO(South West Water)	Permit number: EPRYB 3993NQ Discharging into the St Blazey Stream.	Spilled **6** times for a total of **11.56** hours	No data	St Austell & Newquay
Par No2 Pumping Station (South West Water)	Permit number: 031750/PC/01 Discharging into the River Par.	Spilled **5** times for a total of **8.73** hours	Spilled 8 times for 16 hours. 100% reporting.	St Austell & Newquay

Although most of the river is in the South East Cornwall constituency, most of the CSOs listed are in St Austell & Newquay. Top of the Poops ranks those constituencies with sewage overflows (which is why it is out of 542 not 650):

Rank	Constituency	MP	MP Party	Sewage Dumps	Change	Duration	Change
180	St Austell and Newquay	Steve Double	Conservative	1,792	↑ 342	7,298	↑ 3,339

Showing 1 to 1 of 1 entries (filtered from 542 total entries)

Rank	Constituency	MP	MP Party	Sewage Dumps	Change	Duration	Change
12	South East Cornwall	Sheryll Murray	Conservative	5,704	↑ 2,090	50,216	↑ 22,625

(c) The absence of any evidence for otters is almost certainly due to high river levels washing away spraint and covering soft riverside margins where prints might be seen. It is rare to find nothing but not unprecedented.

3. Areas of doubt

(a) Our most useful indicator of river health is the ARMI Riverfly survey which we plan to resume in April.

(b) The unexpected release of beavers near Helman Tor took Cornwall Wildlife by surprise but their impact, if any, on the Bokiddick Stream will be interesting.

K. 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 Harrisson. 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, Tony Hawkins (River Co-ordinator YEM) 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.

The CSI work being undertaken by Tony Hawkins and colleagues in the YEM group looking at the River Yealm in Devon is an exemplar for us all: https://yemcorridor.com/. Their most recent report is here: https://yemcorridor.com/images/YealmDipperReportofWRTCSIfindingsCIRCULATED07Mar241.pdf .

Report compiled by Dave Burrell, Joan Farmer and Roger Smith, March 2024