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.

DECEMBER 2022

CONTENTS & PAGES

A. KEY POINTS FROM WRT CSI MONITORING IN DECEMBER 2022

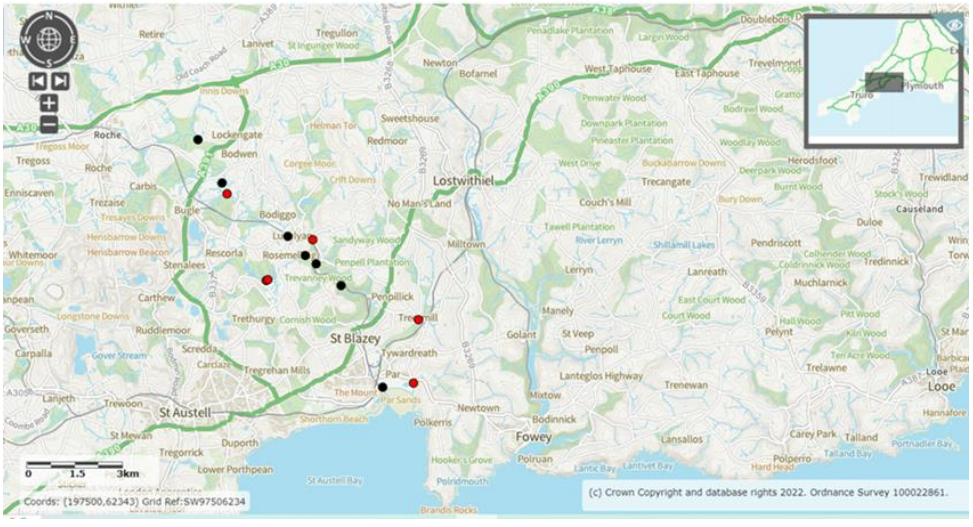
1. Surveys were carried out during very different weather conditions which occurred in this order: extreme cold; torrential rain; and mild with lighter rain showers. River levels were very high following heavy rain on 18th December.
2. Evidence for otters was found between Ponts Mill and Rock Mill quarry.
3. Although the riverfly survey at Lady Rashleigh Mine has been suspended for the season, the first seasonal checks on the Treverbyn/Treskilling Stream near Innis were carried out. This will be done four times a year and will provide a means of assessing the impact of habitat improvements which are being done as part of WRT's Par River Improvement Plan.
4. We wish Lydia Deacon and Matt Healey well in their new jobs and would like to thank both for their help and encouragement. We look forward to working with their successors, Jack Middleton and Layla Ousley.
5. The bacteria sampling is still in its infancy so it is impossible to draw any firm conclusions yet. Dr Nicola Rogers, WRT Evidence and Engagement Officer is looking at the tests and results.

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 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, 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. DECEMBER 2022 MONITORING POINTS

This month monitoring occurred at 13 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



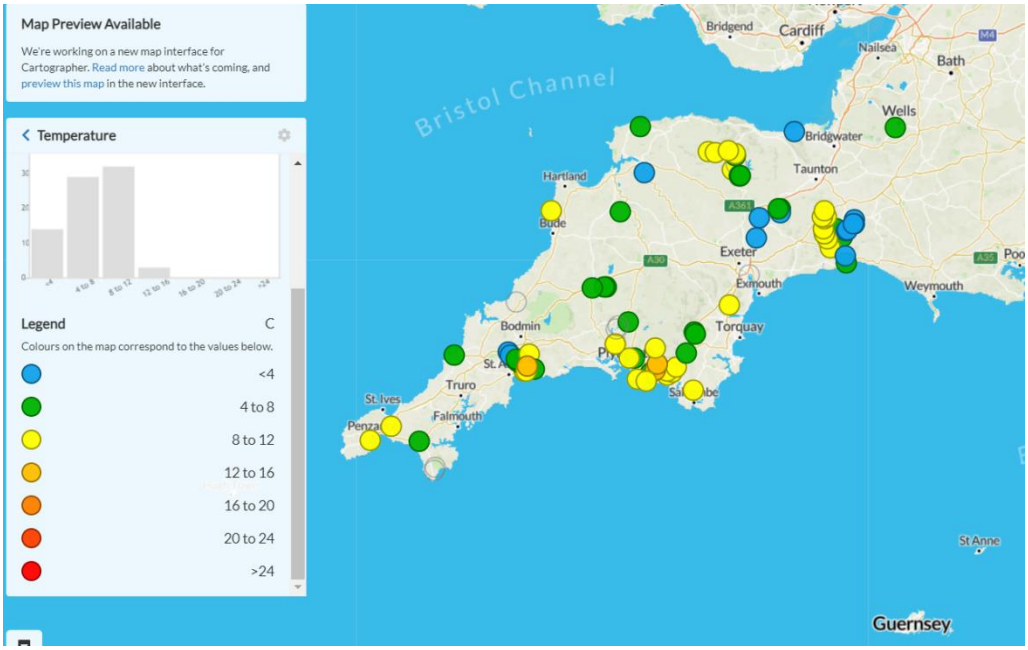
LOCATION	DATE	TYPE OF CHECK	MONITORED BY
Criggan Moors, Par River, SX 01882 61133	14/12/2022	CSI sample & Cartographer record. Water sample for bacteria testing.	Roger Smith
South of Minorca Lane, Par River, SX02668 59747	14/12/2022	CSI sampling. Cartographer record. Water sample for bacteria testing.	Roger Smith
Carbis Stream SX 02834 59401	14/12/2022	CSI sampling. Cartographer record.	Roger Smith
SX 04058 56650: Treverbyn/Treskilling Stream upstream from confluence with Innis Stream.	8/12/2022	Riverfly (winter seasonal survey). Water sample for bacteria testing.	Joan Farmer, Veronica Jones, Roger Smith, Matt Healey, Layla Ousley
SX 04113 56670: Treverbyn/Treskilling Stream downstream from confluence with Innis Stream.	8/12/2022	Riverfly (winter seasonal survey).	Joan Farmer, Veronica Jones, Roger Smith, Matt Healey, Layla Ousley
Luxulyan allotments, Par River, SX 04732 58045	18/12/2022	CSI sampling. Cartographer record. Water sample for bacteria testing.	Roger Smith
Cam Bridges, Par River, SX 05292 57454	18/12/2022	CSI sampling. Cartographer record.	Roger Smith
Gatty's Bridge, Bokiddick Stream SX 05531 57953	18/12/2022	CSI sampling. Cartographer record.	Roger Smith
Treffry Viaduct, Par River, SX 05650 57179	18/12/2022	CSI sampling. Cartographer record.	Roger Smith.
Lady Rashleigh Mine, Par River, SX 06451 56509	18/12/2022	CSI sampling. Cartographer record. Water sample for bacteria testing.	Joan Farmer, Roger Smith
Treesmill, Tywardreath Stream, SX 08873 55385	22/12/2022	CSI sampling. Cartographer record.	Maggie Tagney
Par Beach slipway, SX 0776 53261	21/12/2022	CSI sampling. Cartographer record.	Brian Harrisson
Polmear Stream, Ship Inn SX 08749 53417	21/12/2022	CSI sampling. Cartographer record.	Simon Tagney

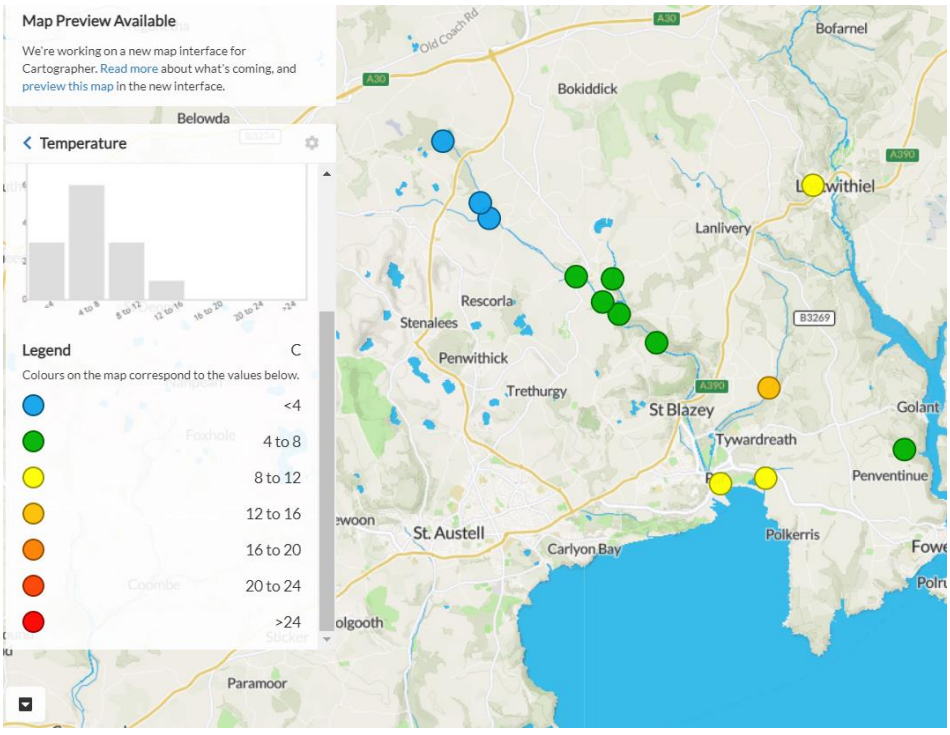
D. TEMPERATURE

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.



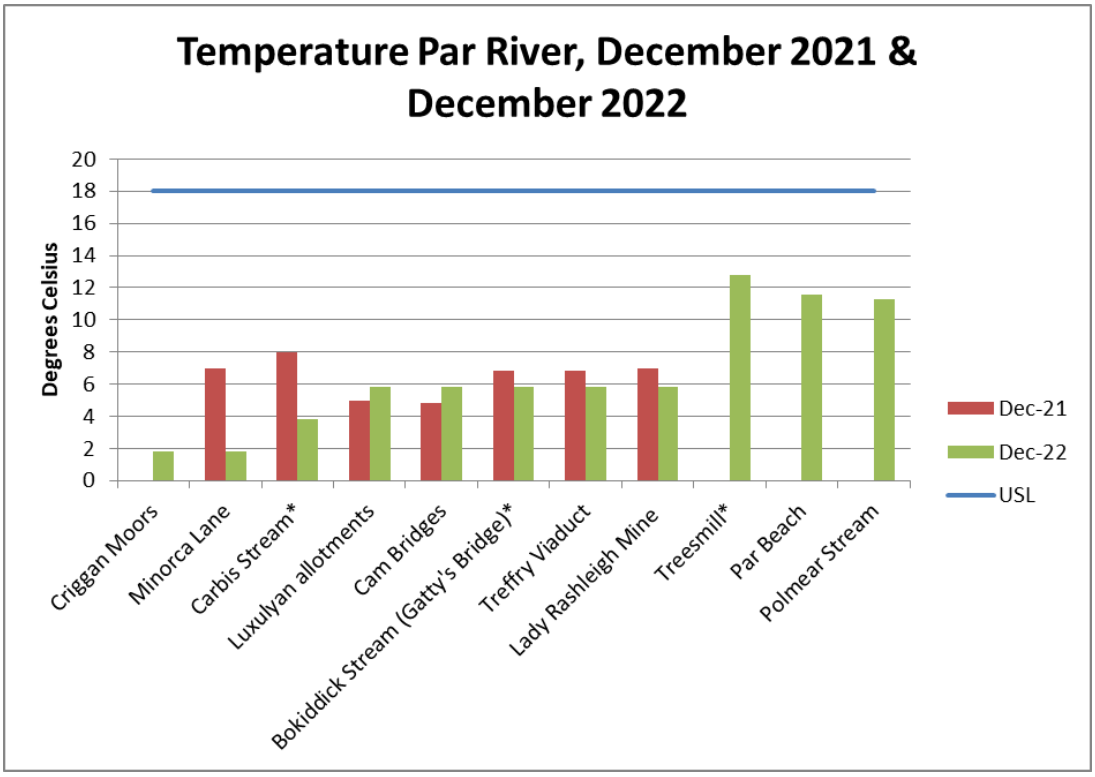


3. **Results** December 2022

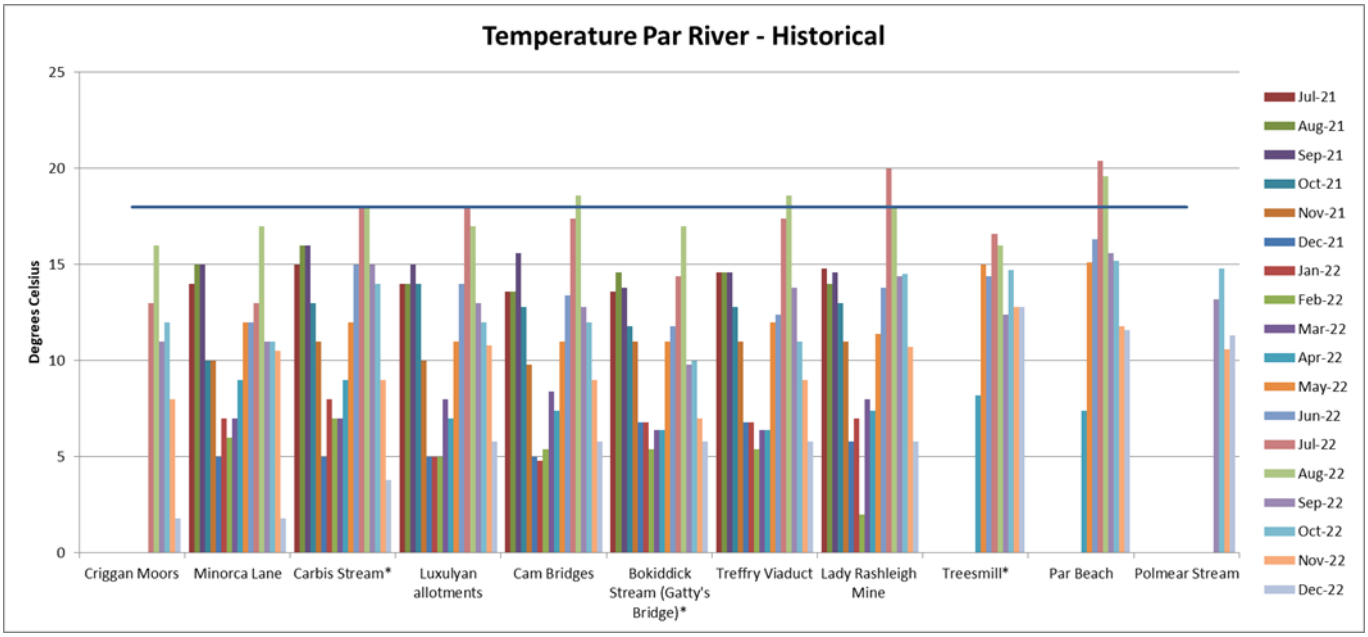
PAR RIVER/TRIBUTARY	LOCATION	Temperature ˚Celsius
Par	Criggan Moors, SX 01882 61133	1.8
Par	South of Minorca Lane, Par River, SX 02657 59788	1.8
Tributary	Carbis Stream SX 02834 59401	3.8
Par	Luxulyan allotments, Par River, SX 04732 58045	5.8
Par	Cam Bridges, Par River, SX 05292 57454	5.8
Tributary	Gatty's 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	12.8
Par	Par Beach slipway, SX 0776 53261	11.6
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	11.3

There were no significant differences in the temperatures recorded by the EA and the WRT thermometers.

4. Graph November 2022 (**and** November 2021 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:

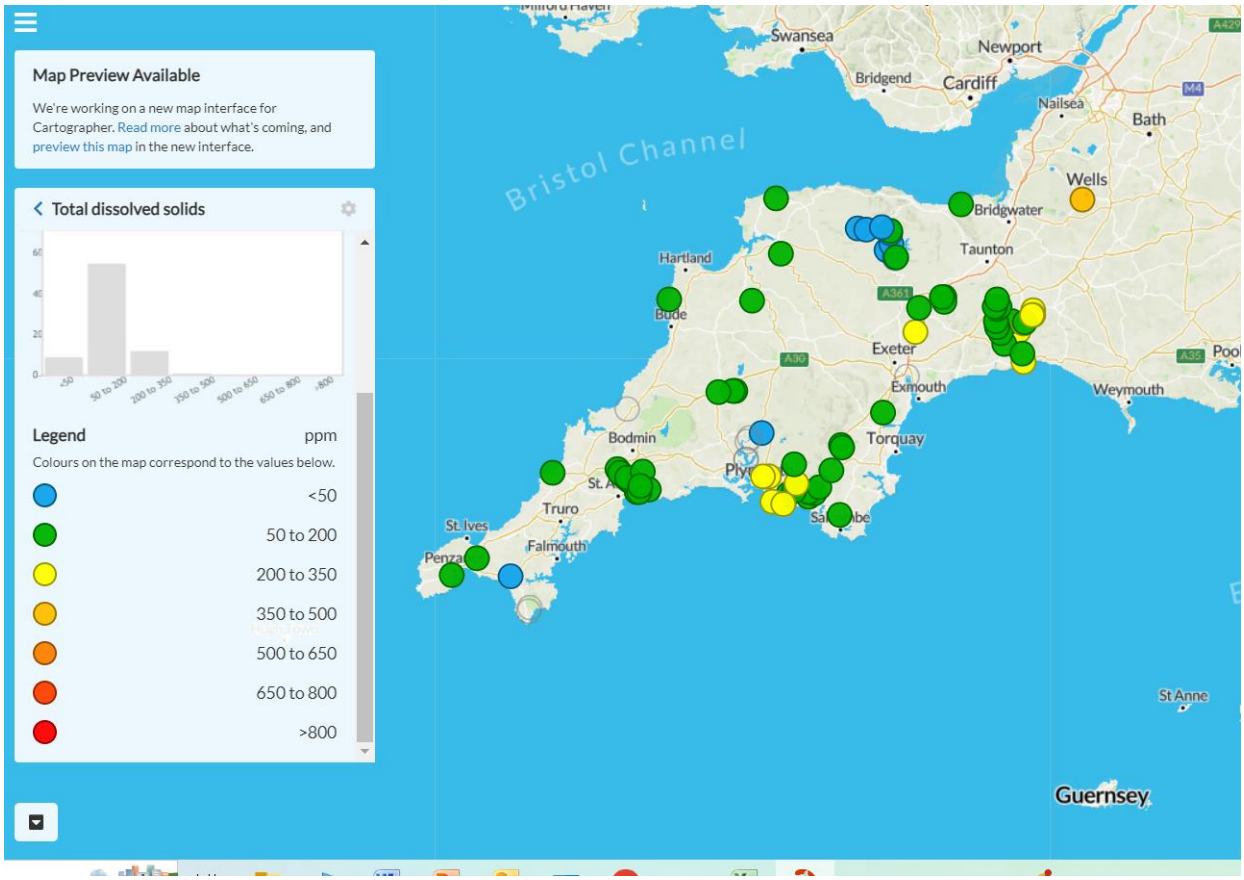


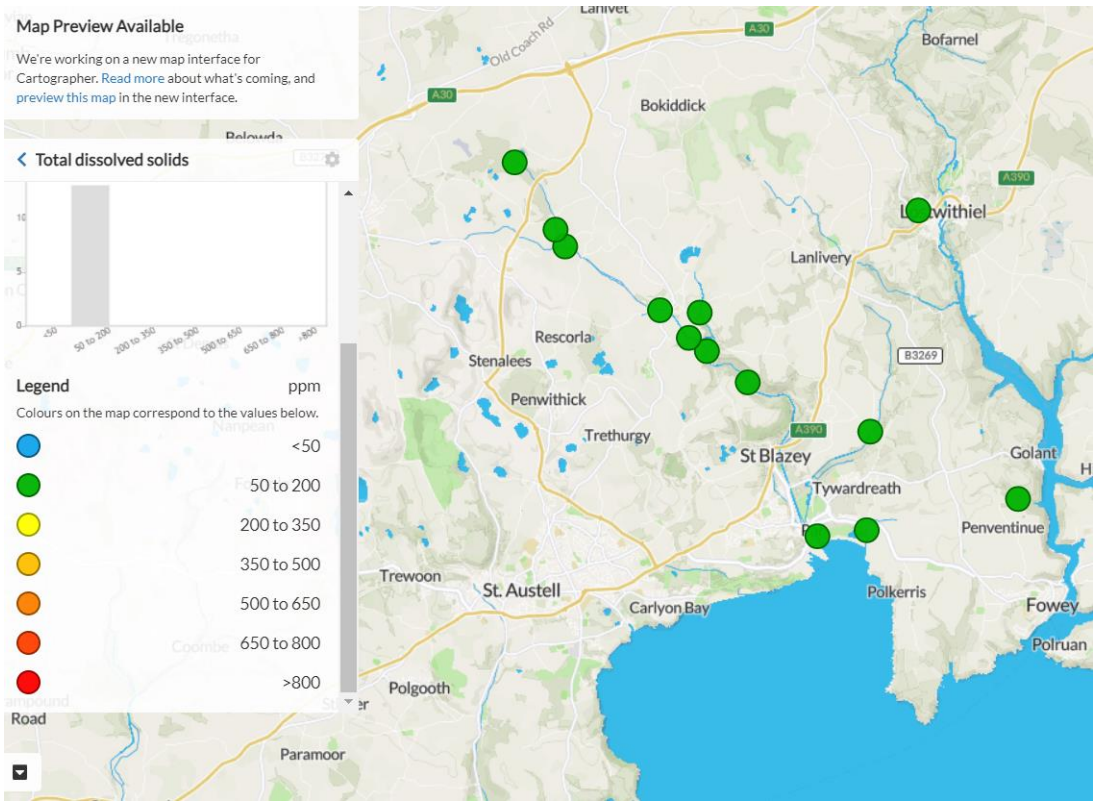
E. TOTAL DISSOLVED SOLIDS

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.

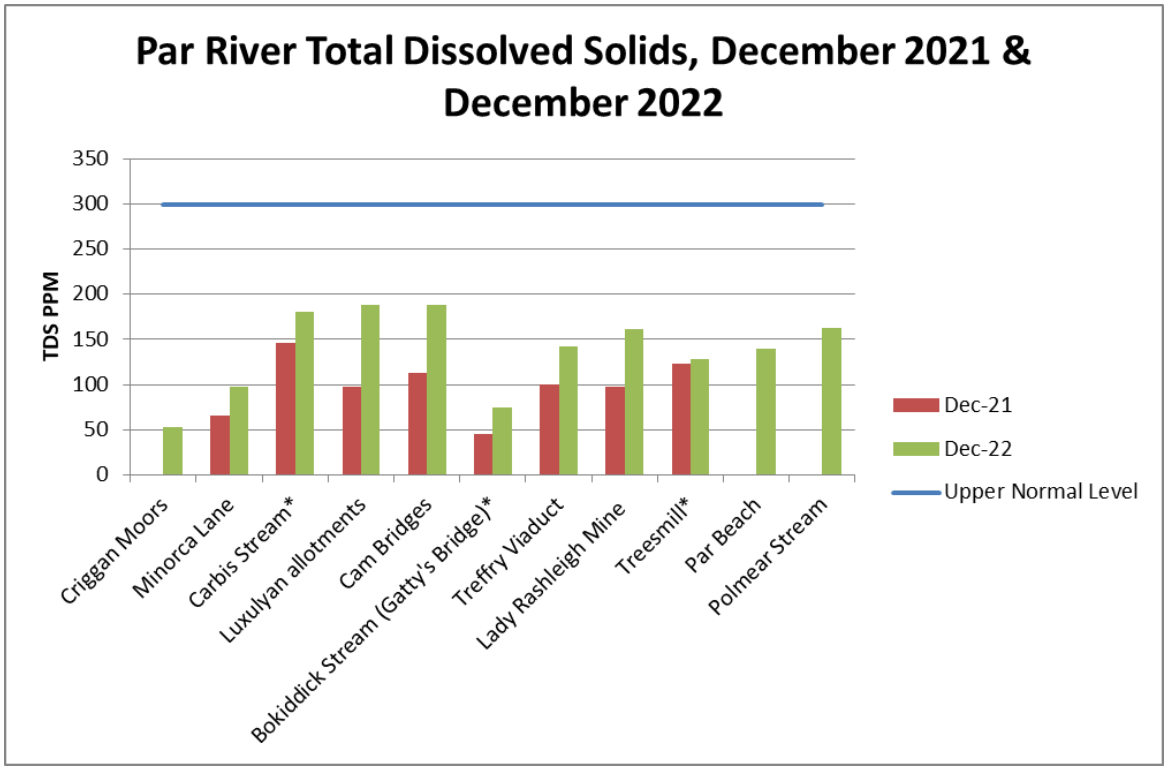
2. Geographical **comparison.** Source: Cartographer.





3. **Results** December 2022

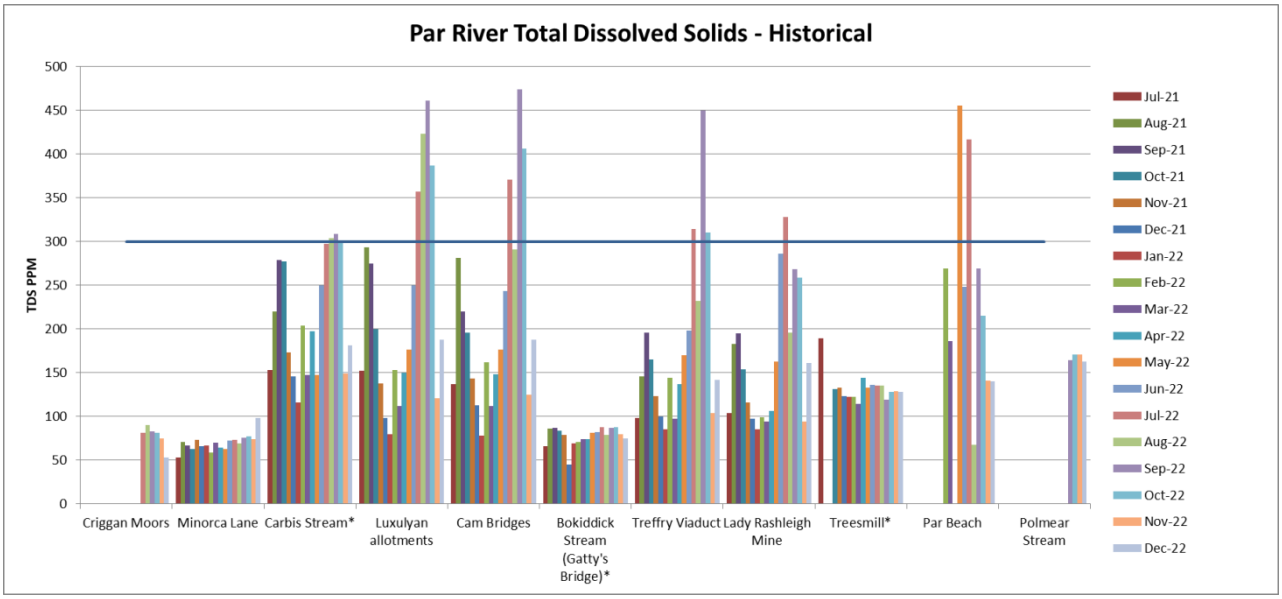
PAR RIVER/TRIBUTARY	LOCATION	Total Dissolved Solids PPM
Par	Criggan Moors, SX 01882 61133	53
Par	South of Minorca Lane, Par River, SX 02657 59788	98
Tributary	Carbis Stream SX 02834 59401	181
Par	Luxulyan allotments, Par River, SX 04732 58045	188
Par	Cam Bridges, Par River, SX 05292 57454	188
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	75
Par	Treffry Viaduct, Par River, SX 05650 57179	142
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	161
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	128
Par	Par Beach slipway, SX 0776 53261	140
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	163



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.'

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

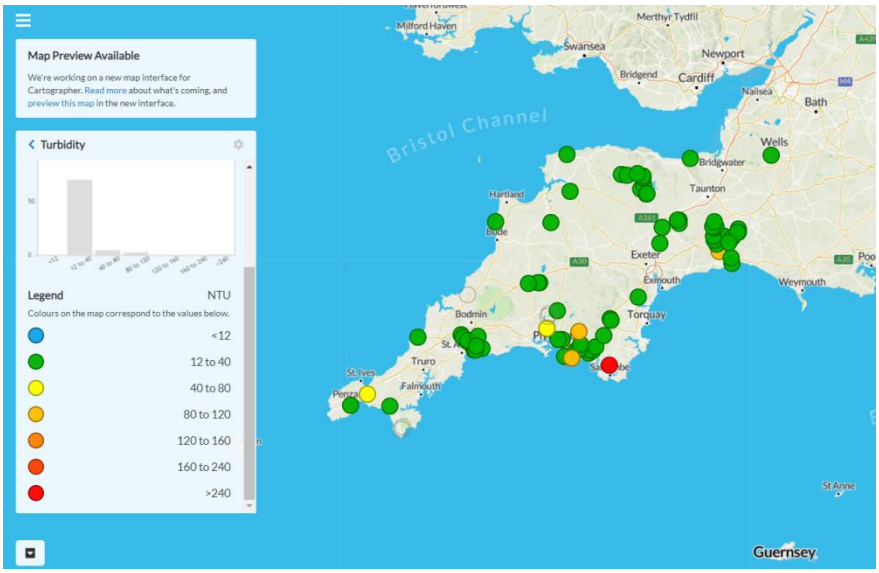


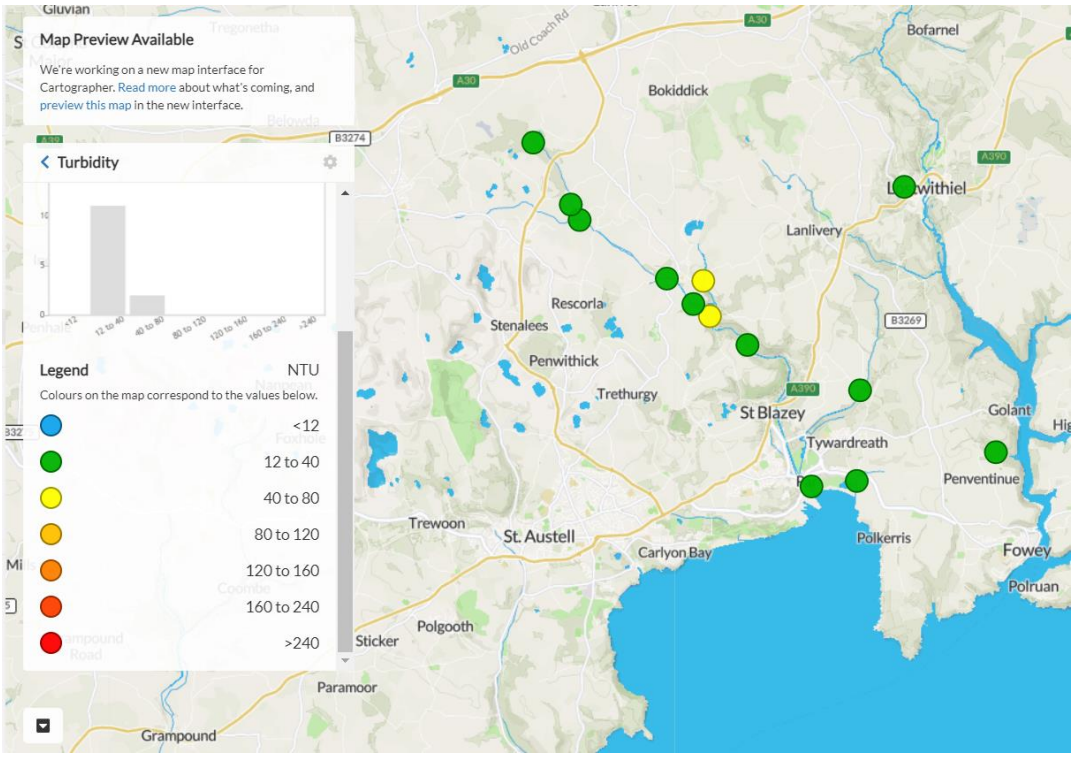
F. TURBIDITY

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.

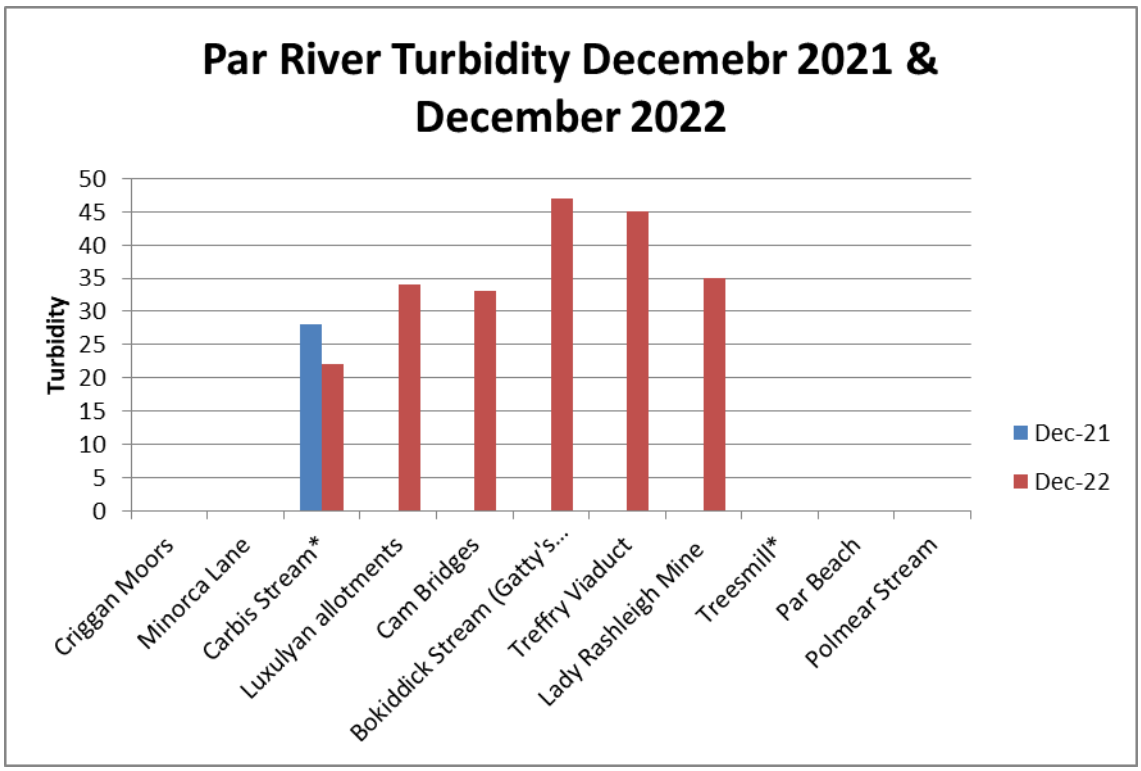




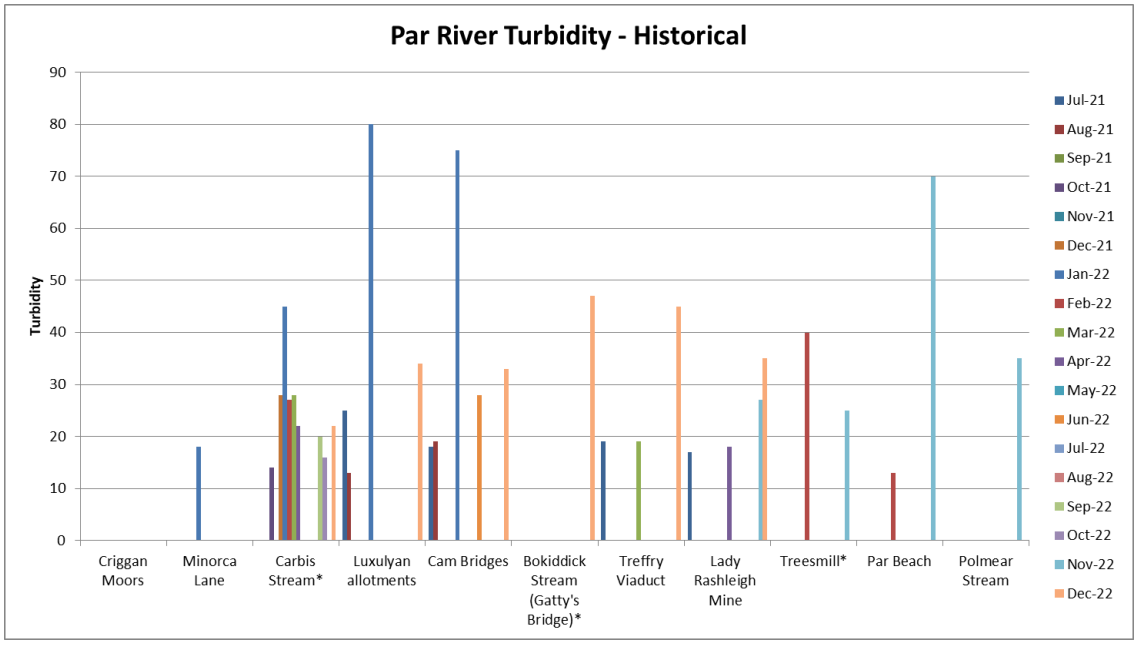
N.B. This map doesn't seem to show the zero figures found at 5 sites.

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	22
Par	Luxulyan allotments, Par River, SX 04732 58045	34
Par	Cam Bridges, Par River, SX 05292 57454	33
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	47
Par	Treffry Viaduct, Par River, SX 05650 57179	45
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	35
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

3. Results December 2022



3. 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.)

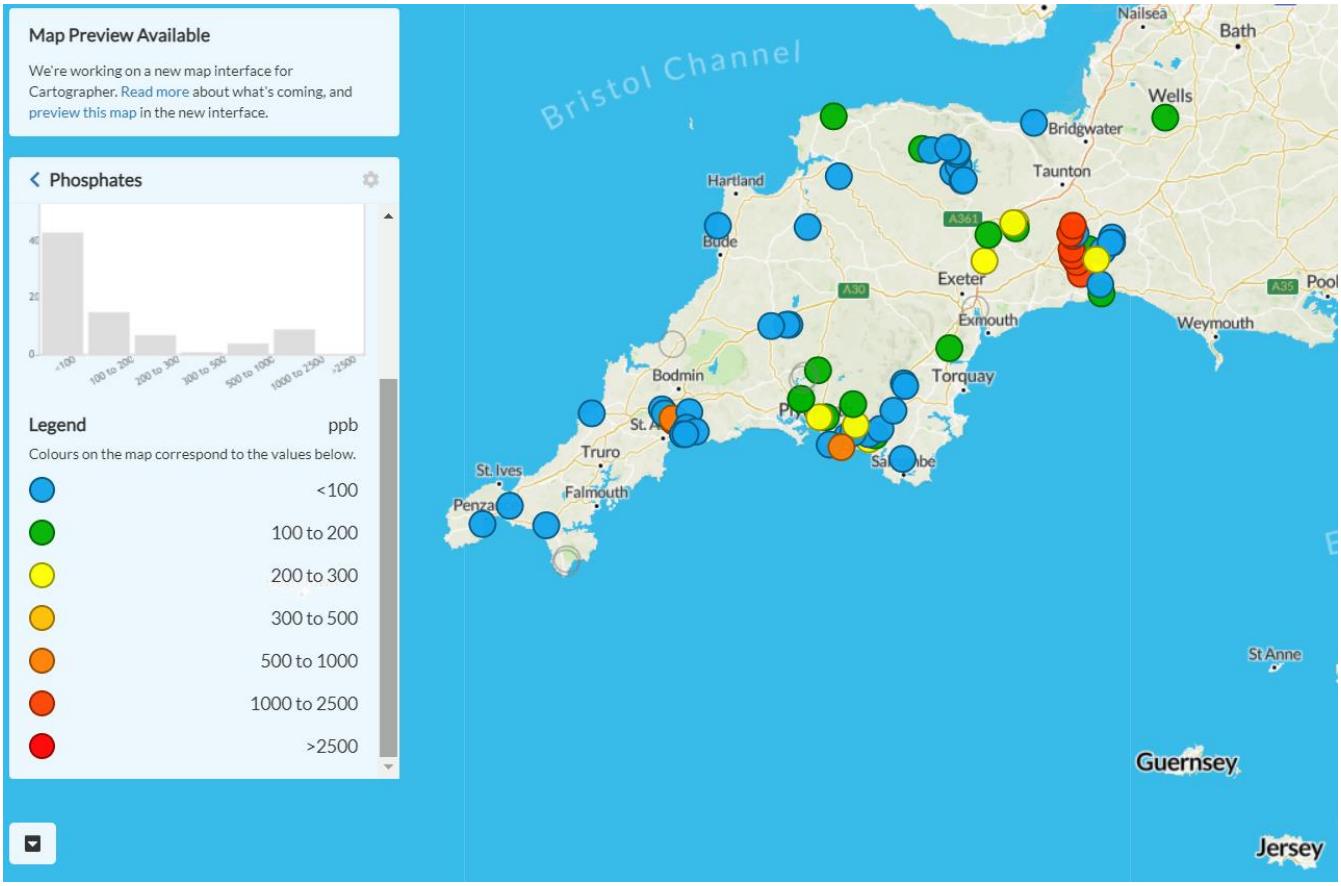
Ranges on phosphate diagnostic colour chart:

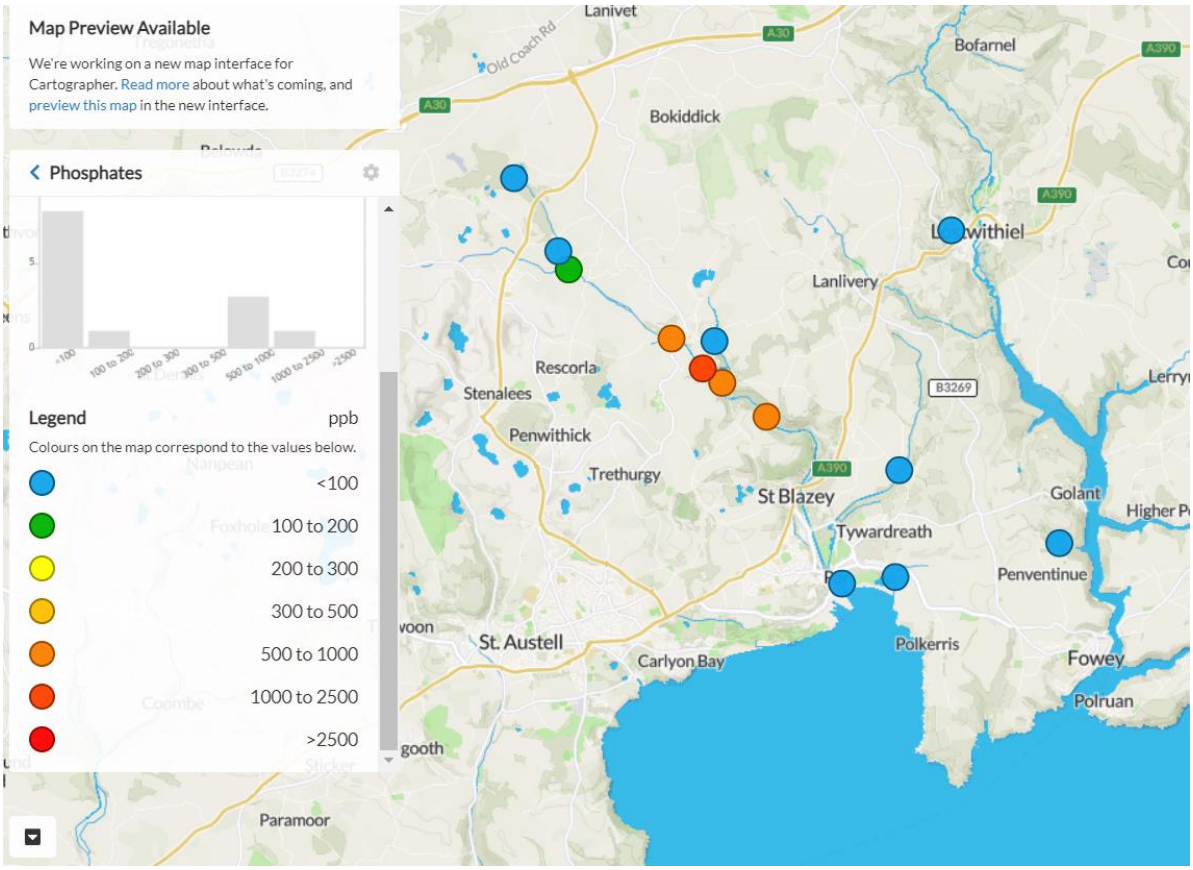
0 – 100 OK

200 – 300 HIGH

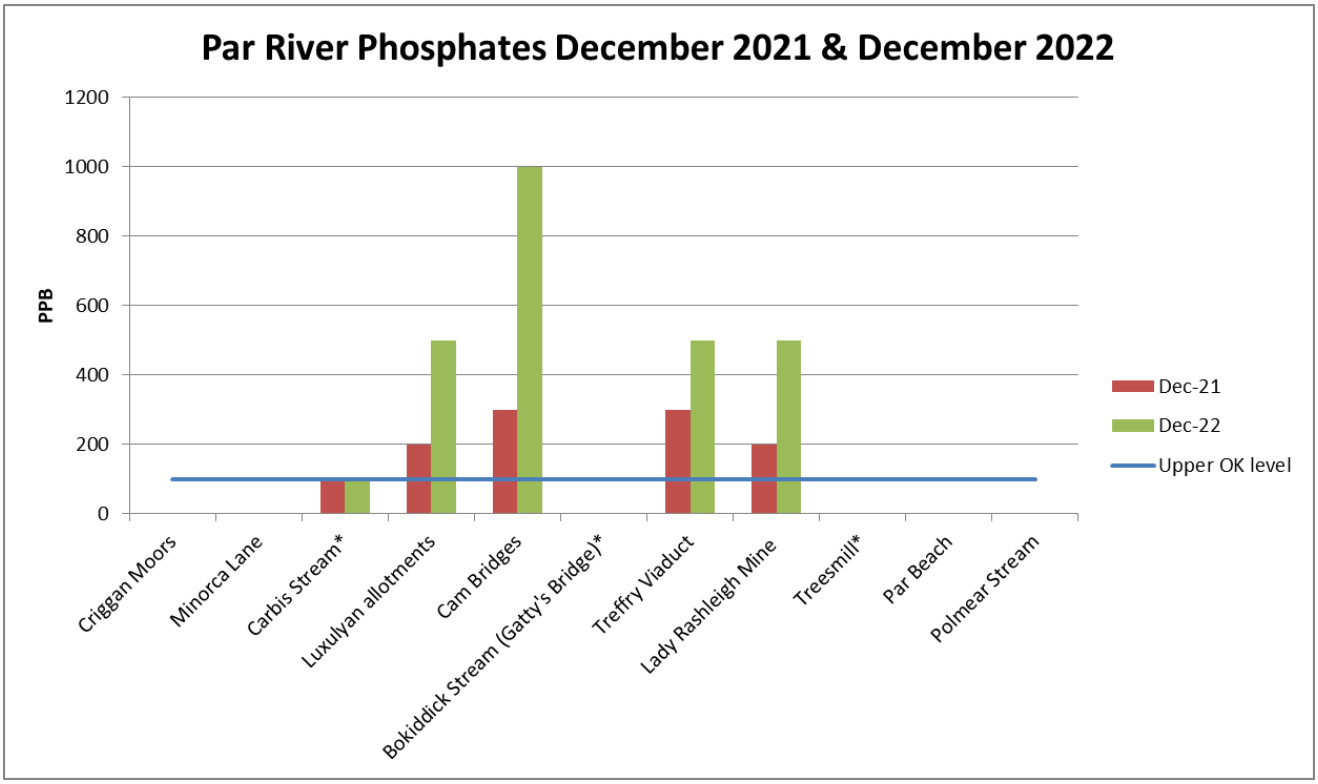
500 – 2500 – TOO HIGH

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



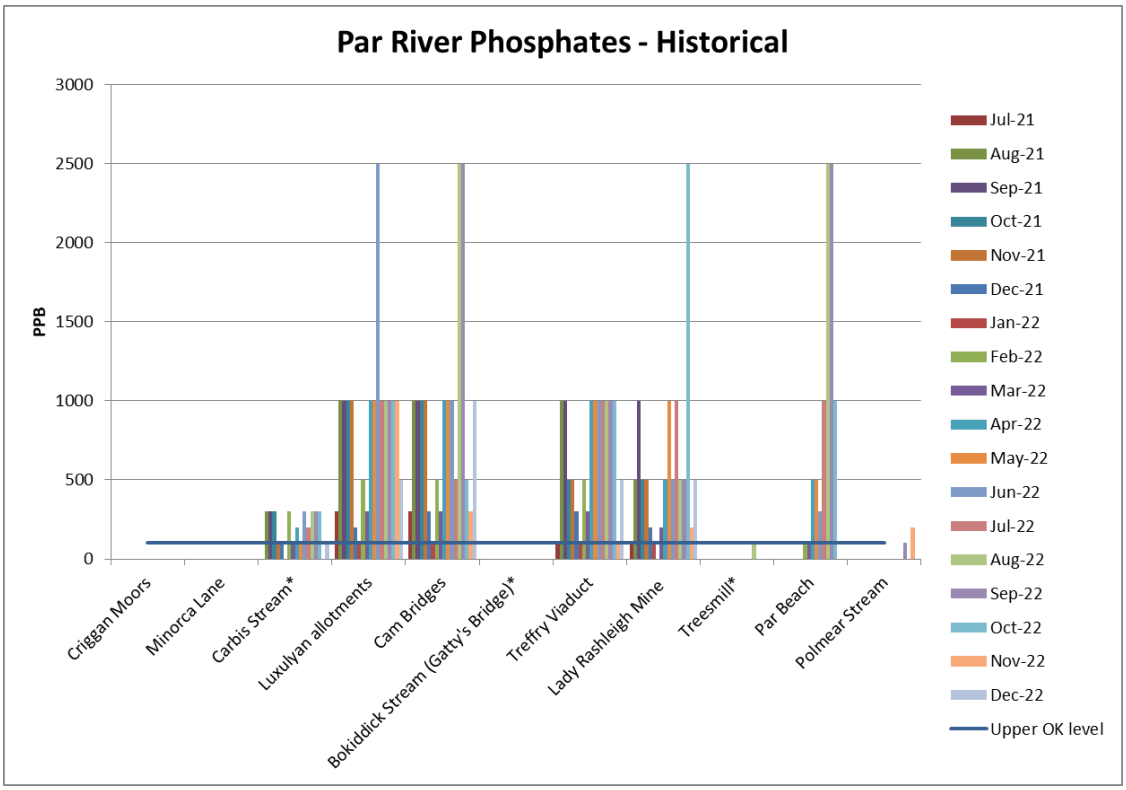


PAR RIVER/TRIBUTARY	LOCATION	Phosphates PPB
Par	Criggan Moors, SX 01882 61133	0
Par	South of Minorca Lane, Par River, SX 02657 59788	0
Tributary	Carbis Stream SX 02834 59401	100
Par	Luxulyan allotments, Par River, SX 04732 58045	500
Par	Cam Bridges, Par River, SX 05292 57454	1000
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	0
Par	Treffry Viaduct, Par River, SX 05650 57179	500
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	0
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	0



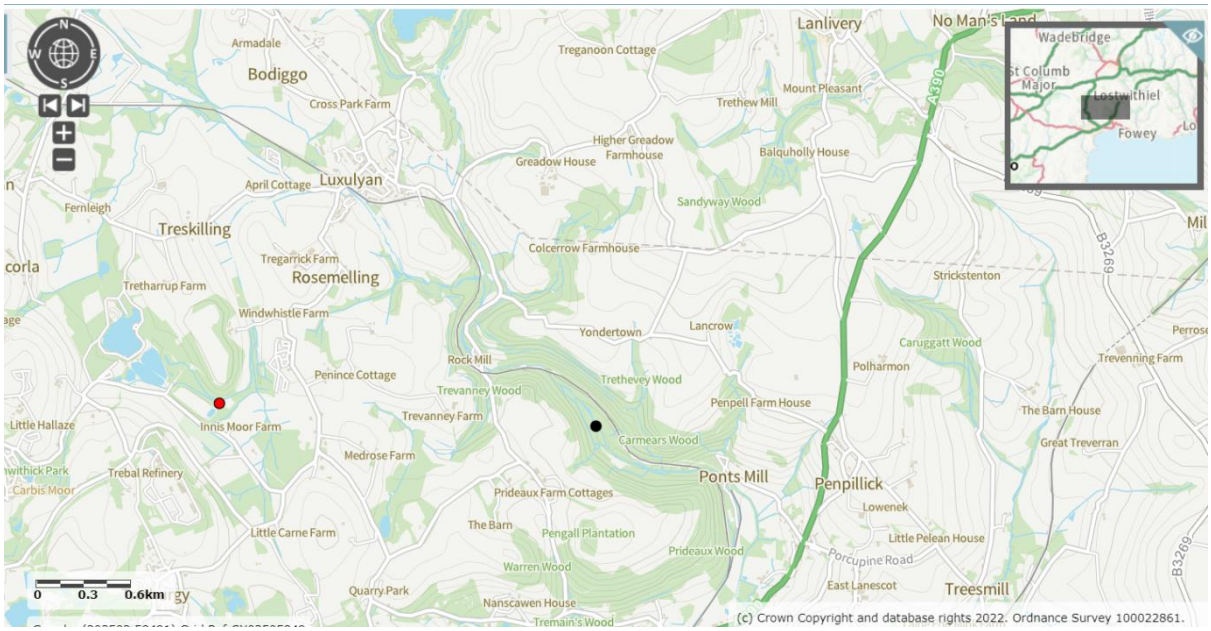
*indicates a tributary of the Par River. USL is 100 Parts Per Billion which, according to WRT, is the Upper Safe Level.

5. **Historical data on phosphates:**



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

1. This month bacteria samples were taken from the Par River Lady Rashleigh Mine (SX 06451 56509) and the Treverbyn Stream at Innis (SX 04058 56650). Joan Farmer incubated the samples.



2. Key information:

(a) 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

(b) 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.

(c) Interpreting the river group 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 Most Probable Number (MPN) 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:

4. Monthly results from the river group's 3 regular monitoring sites:

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 Dates, Score & Health Risk**	**NOTES ON WEATHER, TEST ETC**
FEBRUARY 2022				
E.coli	n/a	n/a	21/02/2022 (23/02/2022; 24/02/2022) **483**[1] **Very High/ Unsafe** **483**[2] **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**	Rain prev. 24 hrs

			Very Unsafe	
MARCH 2022				
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 **>1000**[3] **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				
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				
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				
E.coli	n/a	n/a	18/07/2022; 20/07/2022	Dry

			47 **Low Risk/Possibly Safe**[4]	
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** **Very Unsafe**	19/08/2022 **>1000** **Very Unsafe**	21/08/2022; 23/08/2022 **>1000** **Very Unsafe**	Light rain
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
OCTOBER 2022	**Criggan**	**Minorca Lane**	**Lady Rashleigh**	
E.coli	17/10/2022 **483** **Very High Risk/ Unsafe**	17/10/2022 **47** **Low Risk/Possibly Safe**	15/10/2022 **483** **Very High Risk/ Unsafe**	Dry. Light rain in previous 24 hours. River low.
Total Coliform	17/10/2022 **>1000** **Very Unsafe**	17/10/2022 **>1000** **Very Unsafe**	15/10/2022 **>1000** **Very Unsafe**	Dry. Light rain in previous 24 hours. River low.
NOVEMBER 2022	**Criggan**	**Minorca Lane**	**Lady Rashleigh**	
E.coli	No sample	16/11/2022 **483** **Very High Risk/ Unsafe**	16/11/2022 **483** **Very High Risk/ Unsafe**	Heavy rain
Total Coliform	No sample	16/11/2022 **>1000** **Very Unsafe**	16/11/2022 **>1000** **Very Unsafe**	Heavy rain
DECEMBER 2022	**Criggan**	**Minorca Lane**	**Lady Rashleigh**	
E.coli	No sample	No sample	18/12/2022 **483** **Very High Risk/ Unsafe**	Heavy rain
Total Coliform	No sample	No sample	18/11/2022	Heavy rain

			483 Very High Risk/ Unsafe 18/11/2022 >1000 Very Unsafe	

1. Readings taken twice on the 1st sample as it took 12 hours to reach the minimum temperature of 25 degrees.

2. Originally >1000 but I now believe this reading should be 483 and the traces of blue in compartment 5 had leaked out of one of the other compartments as the clip was not positioned exactly along the maximum fill line.

3. Compartments 4 and 5 had only very pale blue fluorescence in UV light, but definitely glowed with no trace of yellow. Aquagenx company confirmed that fluorescence under UV light indicates positive for total coliforms.

4. Due to hot weather, limited additional heat was added. The temperature for most of the time was between 25 and 30 so should have been left for 40-48 hours. Insufficient time given (36 hrs) so results may be wrong.

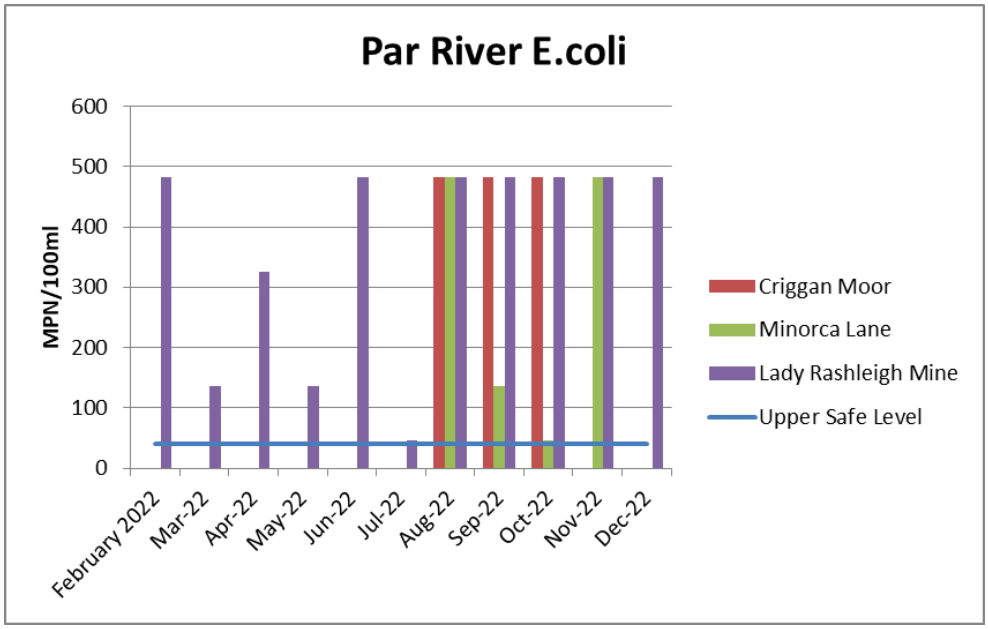
5. Bacteria samples from the Treverbyn/Treskilling Stream at Innis (winter survey)

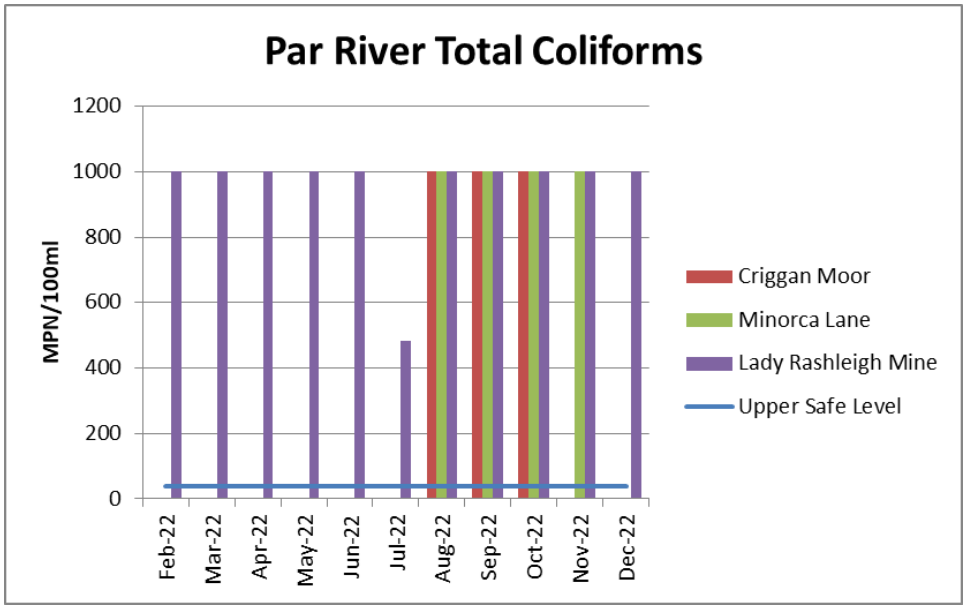
1. Joan Farmer took a water sample from Site 1 (**Site 1 Black dot SX 04058 56650** Treverbyn/Treskilling Stream upstream from confluence with Innis Stream) and tested it using the Aquagenx methodology (see map in section K **Riverfly**).

2. Results from sample taken on 8th December 2022 from Site 1:

BACTERIA	SCORE MPN/100ml	Aquagenx Health Risk Category
E.coli	**136**	**High Risk/Probably Unsafe**
Total Coliforms	**1000**	**Very Unsafe**

6. Graphs

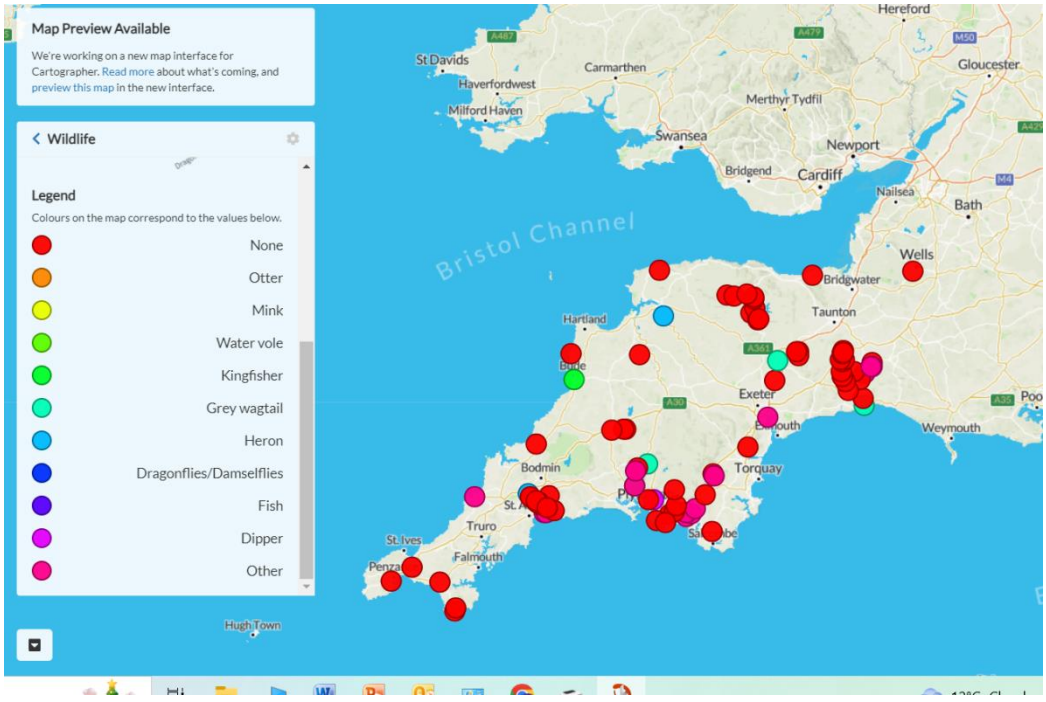




Note: readings in excess of 1000 MPN/100 ml are represented as 1001 on the graph.

I. WILDLIFE (FOR OTTER REPORT SEE SECTION K)

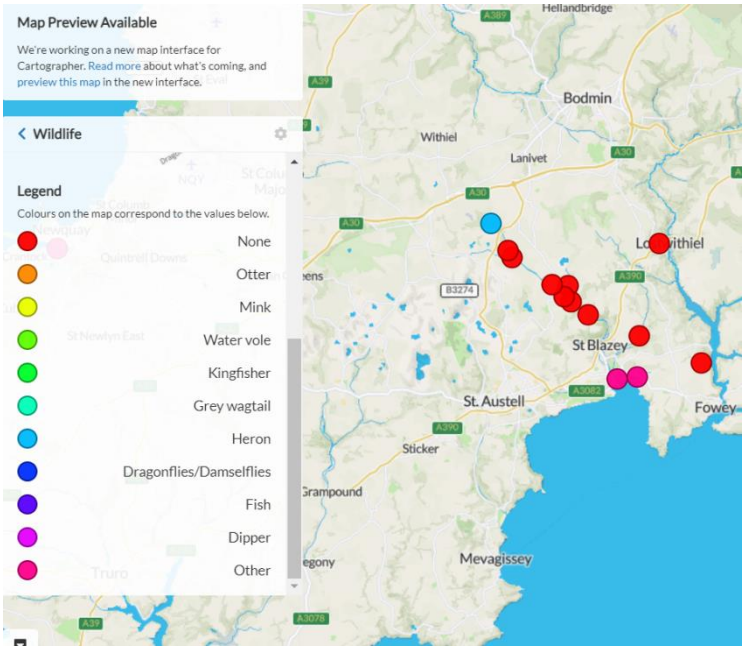
(a) Maps



Source: Cartographer.

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

(**b**)



Source: Cartographer

N.B. Heron sighting is from November and should not have been repeated.

Wildlife sightings at the monitoring points included:

PAR RIVER/TRIBUTARY	LOCATION	WILDLIFE NOTED
Par	Criggan Moors, SX 01882 61133	None. Wrong entry in Cartographer.
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	Cormorant
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	Blackbird, robin

J. OTTER SURVEY

PAR RIVER OTTER SURVEYS

DECEMBER 2022

1. SURVEY CONDITIONS

Date & time	12/12/2022, 14/12/2022, 18/12/2022
Surveyors	Roger Smith
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 Tywardreath Highway
Weather	Very cold on 12th and 14th. Very heavy rain on 18th.
River level	Average (12th & 14th); high (18th).
River flow	Steady (12th & 14th); Surging (18th).
Water quality	Too High phosphate levels from Luxulyan allotments downstream, with a possible maximum reading of 1000 PPB at Cam Bridges. E.coli readings at Lady Rashleigh Mine were *Very High Risk/Unsafe*. Total coliform scores at the same locations were *Very Unsafe*.
Other wildlife	

2. EVIDENCE FOR OTTERS ✓

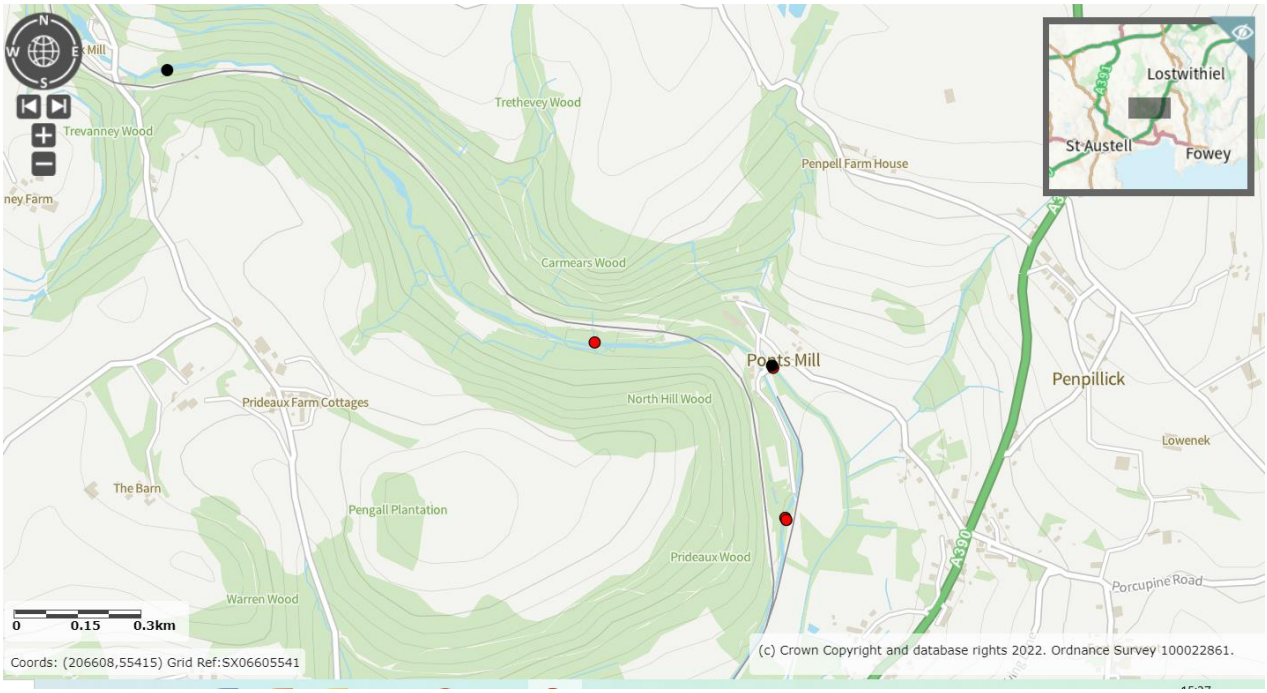
EVIDENCE	SEEN/ ORKS*	LOCATION	NOTES
Spraint - fresh			
Spraint – recent	✓*	SX 0692 2564 Lower Tramway, south of Carmears Wood, upstream of confluence with watercourse	No bones.
	✓*	SX 07312 56164 Under canal bridge at Ponts Mill	Scales and bones
	✓*	SX 07342 55795 On stones immediately downstream of Ponts Mill sluice gate	
Spraint - old	✓*	SX 07342 55795 On stones immediately downstream of Ponts Mill sluice gate	
Anal jelly			
Sign heap			
Staining			
Tracks	?	SX 05802 56860 on sand on island near Rock Mill quarry	Uncertain.
	?	SX 07312 56164 Under canal bridge at Ponts Mill	Ill-defined but spraint was nearby.
Path			
Slide			
Holt			
Hover			
Couch			
Live sighting			
Corpse			

***Report sent to ORKS: https://erccis.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) Islet near Rock Mill Quarry (SX 05802 56860 on sand on island near Rock Mill quarry)

(b) Possible prints on islet but not clear enough to record on ORKS

(c) Spraint near Lower Tramway (SX 0692 2564) jelly-like, no bones or scales visible

(d) Spraint under canal bridge at Ponts Mill (SX 07312 56164)

(e) Possible prints under canal bridge at Ponts Mill (SX 07312 56164)

(f) Recent spraint near sluice gate downstream from Ponts Mill (SX 07342 55795)

(g) Old spraint near sluice gate downstream from Ponts Mill (SX 07342 55795)

5. COMMENTS

No checks were made in November. Evidence was found on 12th December when the weather was dry and very cold. Nothing was found by the Upper Par on 14th. The torrential rain and high water on the 18th washed all evidence away. Sufficient evidence was found in and slightly downstream from Luxulyan Valley to show the continued presence of otters.

K. 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:

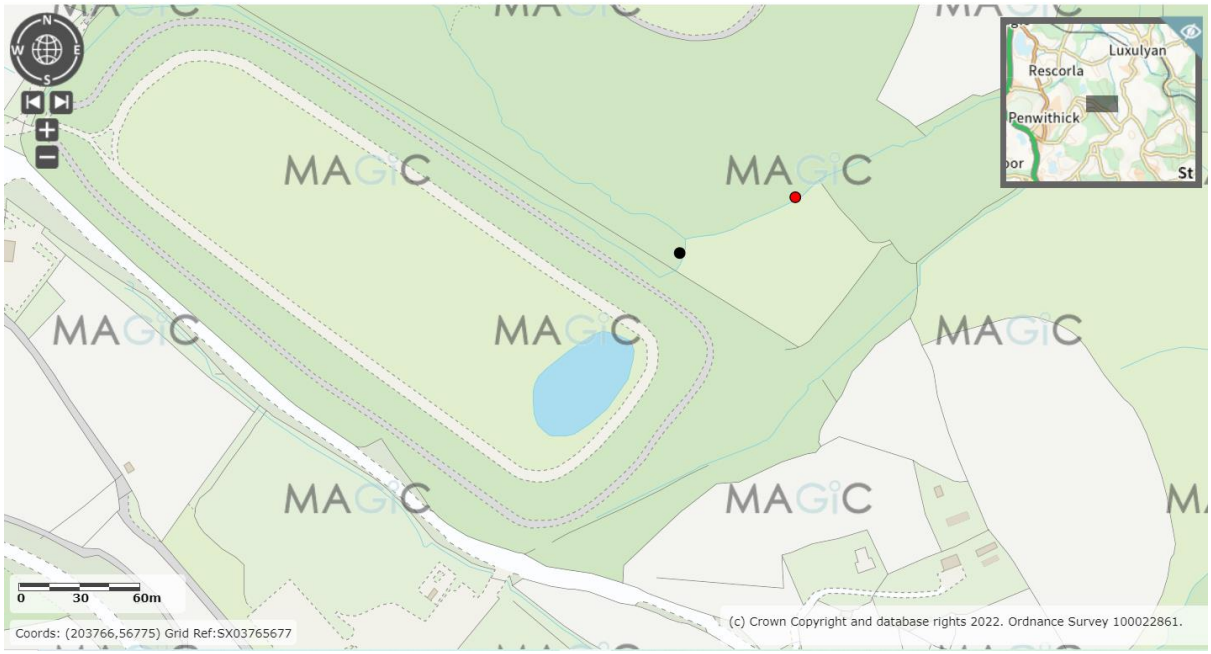
Abundance	Score	Estimated Number
1-9	1	Quick count
10-99	2	Nearest 10
100-999	3	Nearest 100
>1000	4	Nearest 1000

1. Par River at Lady Rashleigh Mine

Riverfly monitoring on the main river has been suspended until Spring 2023 to avoid disturbing fish spawning.

2. WINTER MONITORING SOUTH-EAST OF INNIS FISHERY, NEAR PENWITHICK

Monitoring was conducted on the Treverbyn/Treskilling Stream upstream and downstream of the confluence with the Innis Stream, which is ochre-stained as a result of flowing through former tin-streaming ground.



Site 1 Black dot SX 04058 56650: Treverbyn/Treskilling Stream upstream from confluence with Innis Stream.
Site 2 Red dot SX 04113 56670: Treverbyn/Treskilling Stream downstream from confluence with Innis Stream.

Results

Site 1 Black dot SX 04058 56650 Treverbyn/Treskilling Stream upstream from confluence with Innis Stream

	SPECIES	NUMBER	CATEGORY
Trichoptera			
1	**Cased Caddisfly**	**0**	**0**
2	**Caseless Caddisfly**	**2**	**1**
Ephemeroptera 3 tails			
3	**Mayfly (Ephemeridae)**	**0**	**0**
4	**Blue-winged olive (Ephemerellidae)**	**0**	**0**
5	**Flat-bodied up-wings (Heptageniidae)**	**0**	**0**
6	**Olives (Baetidae)**	**0**	**0**
Plecoptera 2 tails			
7	**Stoneflies**	**0**	**0**
Gammaridae			
8	**Freshwater Shrimp**	**15+**	**2**
			3

CATEGORY TOTAL	**3**
TRIGGER LEVEL	**n/a**

Other creatures were found, including several Golden-Ringed Dragonfly nymphs, a crane-fly larva and a caterpillar like creature. A frog was also seen near the stream.

Golden-Ringed Dragonfly nymphs

Frog

Site 2 Red dot SX 04113 56670 Treverbyn/Treskilling Stream, downstream from confluence with Innis Stream

	SPECIES	NUMBER	CATEGORY
Trichoptera			
1	**Cased Caddisfly**	**2**	**1**
2	**Caseless Caddisfly**	**0**	**0**
Ephemeroptera 3 tails			
3	**Mayfly (Ephemeridae)**	**? (dead)**	**0**
4	**Blue-winged olive (Ephemerellidae)**	**0**	**0**
5	**Flat-bodied up-wings (Heptageniidae)**	**0**	**0**
6	**Olives (Baetidae)**	**2**	**1**
Plecoptera 2 tails			
7	**Stoneflies**	**0**	**0**
Gammaridae			
8	**Freshwater Shrimp**	**10**	**2**
			4

CATEGORY TOTAL	**4**
TRIGGER LEVEL	**n/a**

Site 2 produced creatures that we could not identify. Nick Taylor of Three Bays Wildlife group has identified them: *'The things that look like woodlice are hoglice. The species is almost certainly Asellus aquaticus, although it's hard to say for sure from the photos. The other thing isn't clear, although it could be a True Mayfly larva. Both types of creature generally live in silty/muddy conditions.'*

Hoglice **Photo: Joan Farmer**

Hoglice **Photo: Joan Farmer**

L. DISCUSSION

1. Positive observations

(a) The presence of otters on the Lower Par.

(b) Phosphate readings were not as high as on some occasions but the readings on the Lower Par, where elevated levels are common, were taken when the river was high, so levels would have been diluted.

2. Points of concern

(a) Bacteria levels are of concern if the US Aquagenx judgements are applied (but see **Areas of Doubt**).

(b) Phosphate levels were Too High at 4 sites on the Lower Par according to the WRT categories.

3. Areas of doubt

(a) Bacteria testing by WRT volunteers is still experimental. The Aquagenx chart makes it easy to make judgements; however, expert assessment of the suitability of the method and how to interpret the results will be needed before firm conclusions are drawn. Although we are able to test for E.coli and Total Coliforms, only the EA is in a position to detect the more critical Intestinal Enterococci. At this stage we can go no further than to say that our results for bacteria are interesting but by no means conclusive.

(b) Identifying factors that may have a negative effect on river quality is not easy. It is believed that SWW's St Austell North STW may be linked to higher phosphate levels. Our group has not established any link with agriculture but that doesn't rule it out. The Carbis Stream does seem to be polluted with china clay. Similarly, it is important to identify anything that might cause high levels of bacteria. The EA conducted extra tests at 3 of our sites last month, including tests for bacteria. Of the 3 sites, the Par River near Minorca Lane showed the highest levels. A resident expressed concern about sewerage near his caravan, alleging that the septic tank and soakaway were inadequate and that conditions were unsatisfactory in other locations nearby. These are unverified allegations but the information has been passed to the Environment Agency. The River's Trust sewage map (https://theriverstrust.org/sewage-map) shows that the caravan site (or sites as there are multiple landlords) at Minorca Lane is served by 8 treated sewage discharges, all with permits. It may be that there is nothing wrong and that there is no impact on the river but it remains an area of doubt.

Report compiled by Dave Burrell, Joan Farmer & Roger Smith for the Par River Monitoring Group, 6th January 2023.