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.

DECEMBER 2024

Young Mute Swan on the Polmear Stream **Photo: Simon Tagney**

CONTENT	PAGES

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

1. Data

We sampled at 16 locations between 16th and 19th December 2024. The **red** highlighting shows results 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, MOLINNIS STREAM, TRESKILLING STREAM, BOKIDDICK STREAM) 6 TESTING LOCATIONS	TRIBUTARY OF LOWER PAR (POLMEAR STREAM) 2 TESTING LOCATION
TEMPERATURE ˚ CELSIUS (SHOULD NOT EXCEED 18˚ CELSIUS)	Mean 11.98 Median 12.1 Min 11.3 Max 12.4	Mean 10.96 Median 12 Min 8.6 Max 12.3	Mean 11.31 Median 11.75 Min 8.8 Max 12.6	Mean 13.05 Median 13.05 Min 12.5 Max 13.6
TOTAL DISSOLVED SOLIDS PPM (SHOULD NOT EXCEED 300 PPM)	Mean 83 Median 83 Min 70 Max 93	Mean 145.66 Median 86 Min 86 Max 265	Mean 91 Median 76.5 Min 53 Max 165	Mean 145.5 Median 145.5 Min 116 Max 175
TURBIDITY (SHOULD BE <12 ON SECCHI TUBE. FOR AVERAGING ANY READING <12 IS COUNTED AS 0)	Mean 0 Median 0 Min 0 Max 0	Mean 0 Median 0 Min 0 Max 0	Mean 2.66 Median 0 Min 0 Max 16	Mean 0 Median 0 Min 0 Max 0
PHOSPHATES PPB (SHOULD NOT EXCEED 100 PPB)	Mean **120** Median 0 Min 0 Max **300**	Mean **166.66** Median **200** Min 0 Max **300**	Mean 0 Median 0 Min 0 Max 0	Mean 0 Median 0 Min 0 Max 0
RIVERFLY SCORE (TRIGGER LEVEL AT LRM SHOULD BE ≥ 6)	RIVERFLY SURVEYS WILL RESUME IN SPRING 2025			
WILDLIFE EVIDENCE	Blue Tit, Bullfinch, Long-tailed Tit, Jackdaw, Meadow Pipit, Robin	Dipper Otter spraint	Beaver lake, Geese, Chaffinch	Robin, Long-tailed Tit, frog, young Mute Swan
INVASIVE PLANTS	None	None	None	None
EVIDENCE OF POLLUTION	Foam, smell	Foam	Slight grey tinge (china clay)	Large piece of black plastic blocking bridge arch

2. Key points

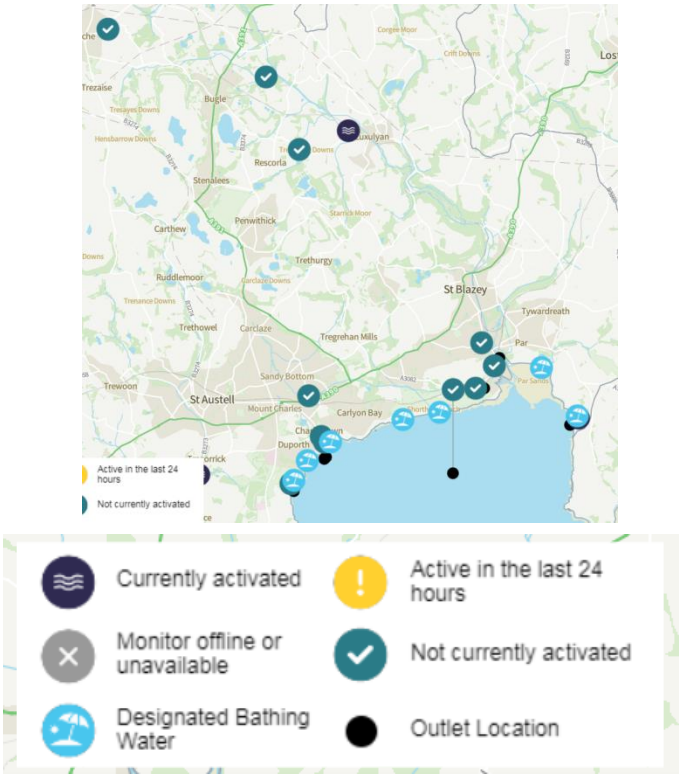
(a) Positive signs

Wildlife sightings may have been boosted by the use of the Merlin birdsong app but the spotting of a dipper, plus otter spraint, in Luxulyan Valley, and the unavoidable evidence of the work of beavers near Helman Tor, are pleasing.

(b) Points of concern

(i) High phosphate levels. One significant identified source is the SWW St Austell North STW at Luxulyan.

(ii) Discharges from the SWW storm overflows can be monitored on the WaterFit Live maps: https://www.southwestwater.co.uk/environment/rivers-and-bathing-waters/waterfitlive .



It is disappointing that sewage is allowed to spill into our rivers, as seems to be the case quite often. So far, a record of spillages from storm overflows has not been included in this report but it is hoped to report on them in future.

The main overflows are (from source to sea along the catchment):

- Victoria pumping station overflow, Roche (SWW1266)
- Roche storm overflow (SWW1001)
- Molinnis storm overflow, Bugle (SWW0765)
- Rescorla storm overflow, Luxulyan (SWW0987)
- Luxulyan sewage treatment works settled storm overflow, St Austell (SWW0694)
- Tredenham Close storm overflow, Par (SWW1230)
- Par No2 pumping station overflow, Par (SWW0519)

(Other outfalls which may affect Par Beach are not included.)

(iii) High TDS figures at Par Beach Slipway (monitoring occurs at low tide) are concerning and still unexplained.

(c) Areas for further research

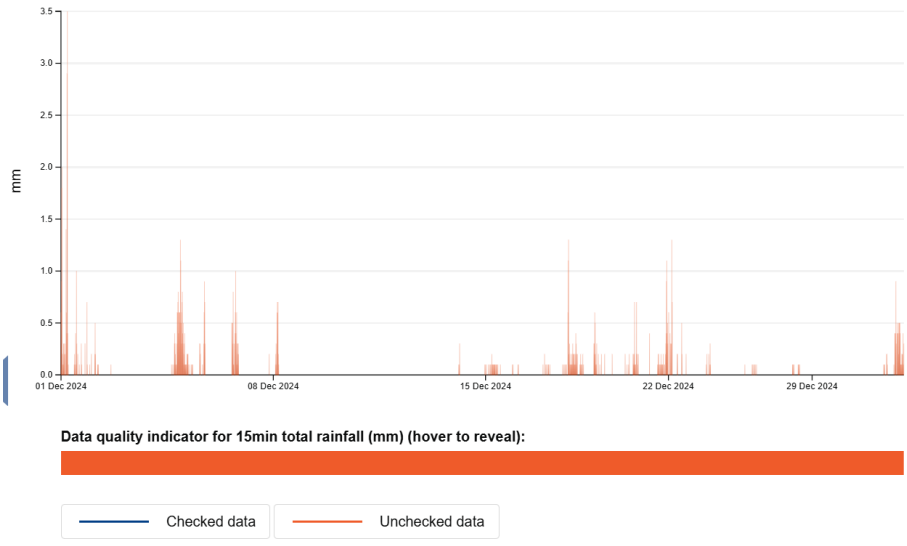
(i) On 17th October 2023, in response to an enquiry by our group, SWW stated that certain improvements at the St Austell North STW were either underway or planned. Are the Ammonia reduction actions on schedule and are the phosphorus reduction measures planned for 2025 underway? What is SWW doing to assess the efficacy of these improvements and by whom are such measurements being independently verified? And, of course, where can the public obtain this information? This is an excerpt from the letter (reference EIR23195):

> The Water Framework Directive classification of the Lower Par River indicates that the waste water treatment works (WWTW) is one of many sectors contributing to Reasons for Not Achieving Good (RNAG). Ammonia reduction works at Luxulyan WWTW are already in progress and due for completion by March 2025.
>
> The works is currently included in the planned 2025-2030 Water Industry National Environment Programme (WINEP) for phosphorus reduction improvements. If that WINEP is not changed during the Price Review, a Phosphorus limit of 0.5mg/l will be imposed at Luxulyan WWTW in the period 2025-30.
>
> The current works are indeed associated with ammonia reduction obligations under the current WINEP programme, and due for completion by March 2025.
>
> The works has already benefited from storm overflow reduction works with the construction of 300m^3 of additional storm storage completed in March 2021.

(ii) There is a contrast between TDS on the Upper Par (median 83 ppm) and on the tributaries of the Lower Par (median TDS 145.5 ppm).

B. RAINFALL, RIVER LEVELS AND FLOW

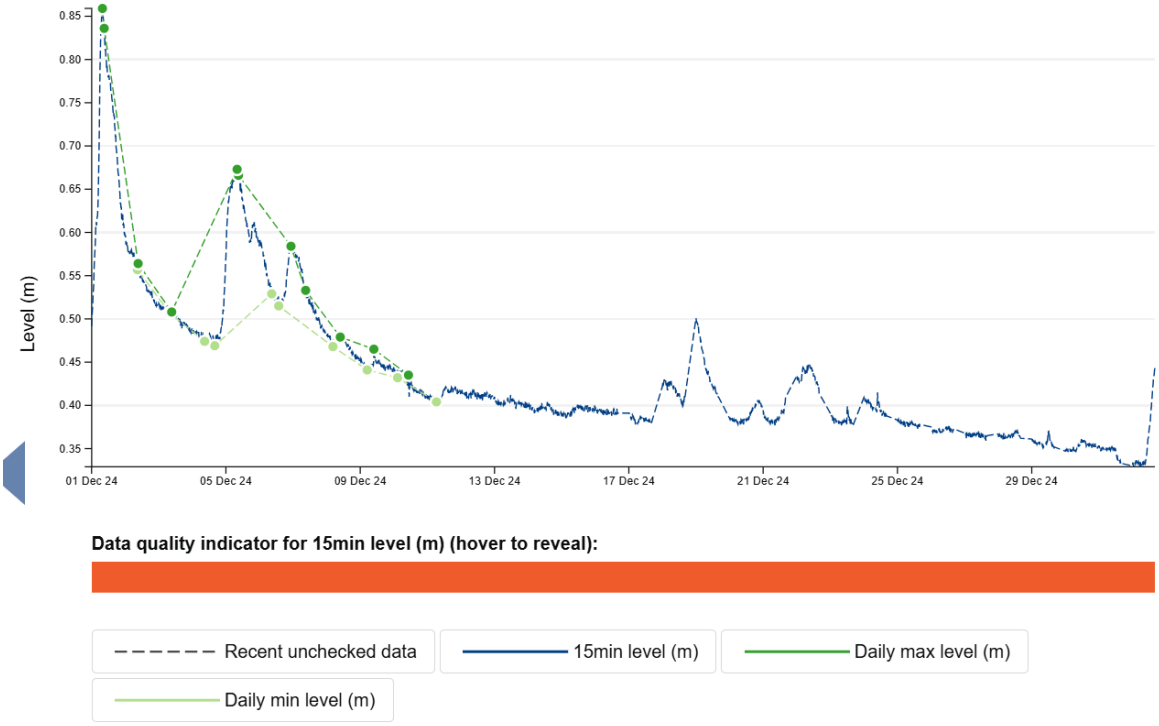
1. Rainfall at Luxulyan (https://environment.data.gov.uk/hydrology/station/14aadf3c-3d4d-44b3-b26b-cf705827d00e_377323)



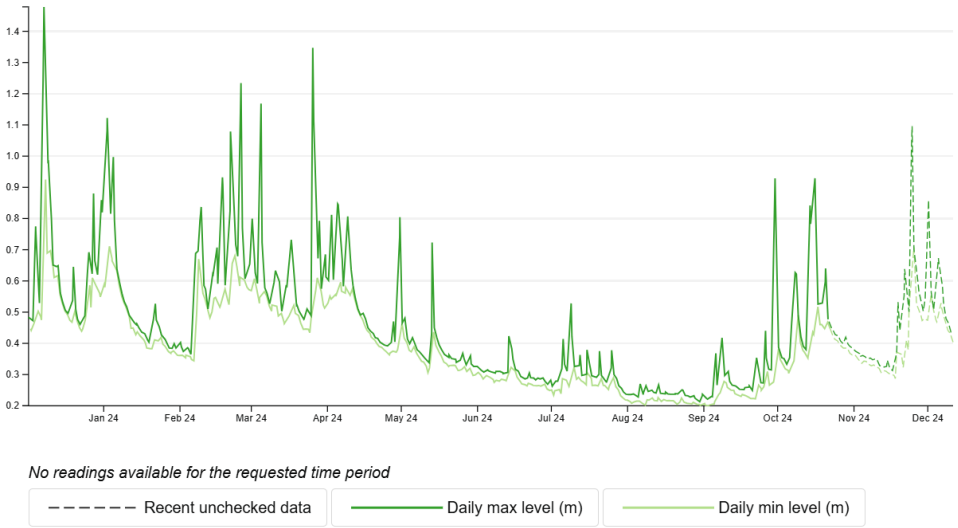
2. Par River levels at Luxulyan preceding and during surveys.

Source: https://environment.data.gov.uk/hydrology/station/14aadf3c-3d4d-44b3-b26b-cf705827d00e

(a) Levels



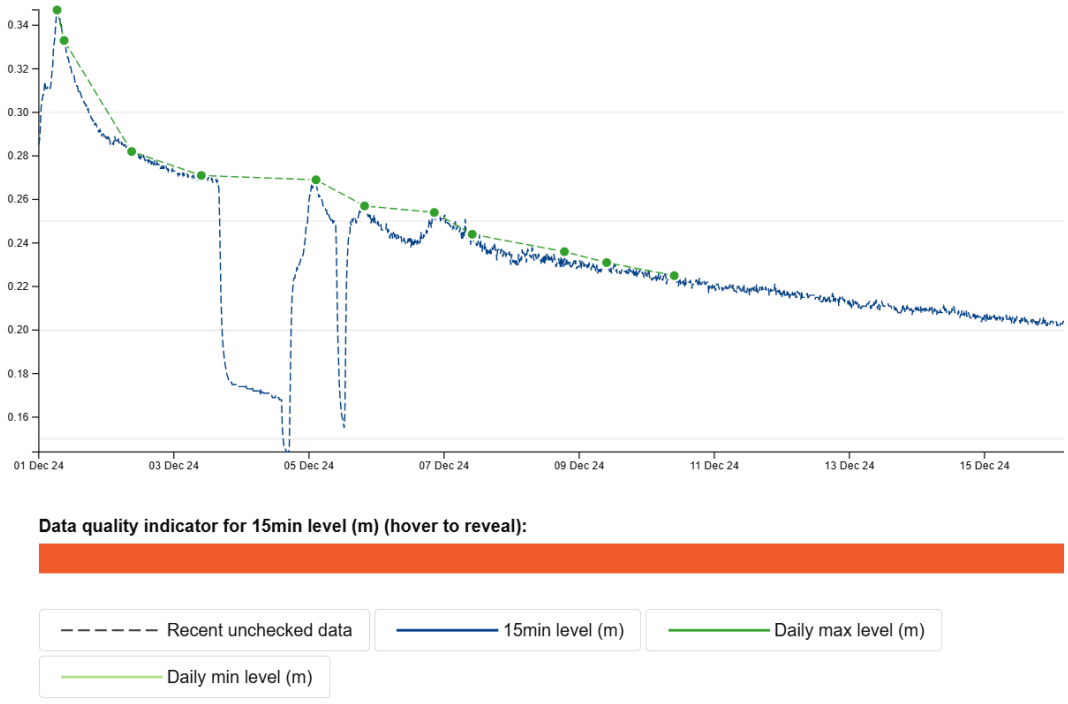
(b) Maximum and minimum levels at Luxulyan for the last year:



(c) How levels at Luxulyan could affect nearby areas:

1.80m	Property flooding is possible above this level. One or more flood warnings may be issued
1.68m	Water reaches the highest level recorded at this measuring station (recorded on 19 December 1999)
1.40m	Low lying land flooding is possible above this level. One or more flood alerts may be issued
	This is the top of the normal range

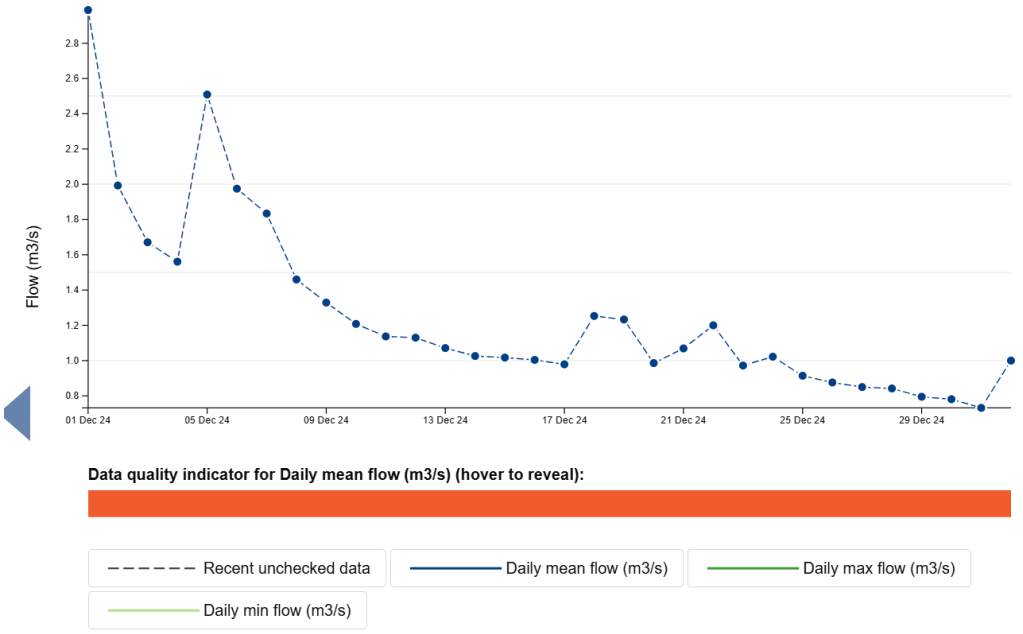
3. Par River at St Andrews



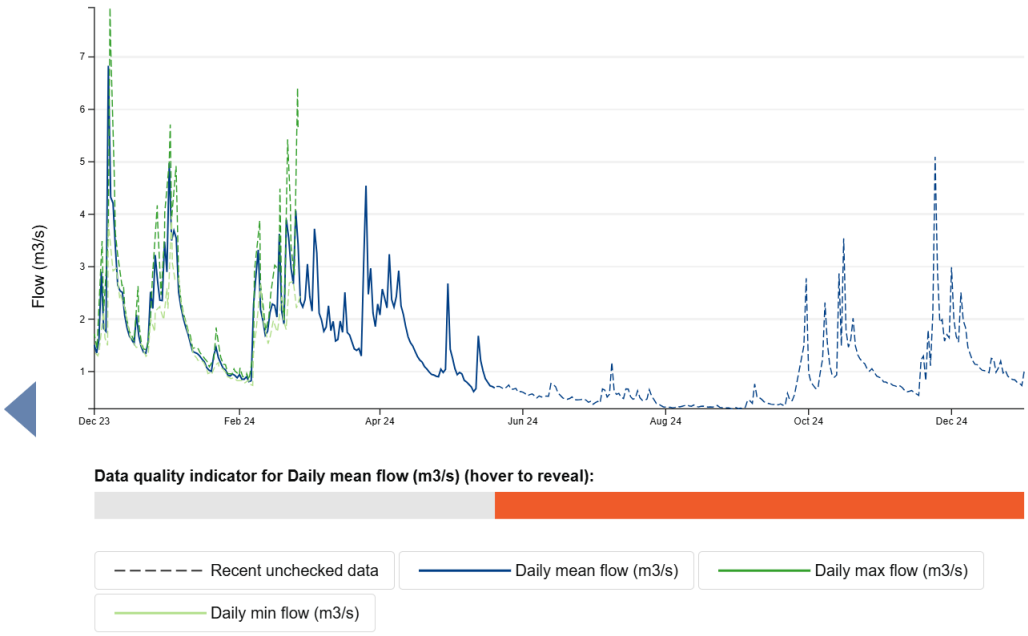
5. The graphs in sections 1 to 4 are taken from Hydrology Data Explorer (https://environment.data.gov.uk/hydrology/explore). Data for Luxulyan and Par St Andrews are used here. Other stations in the Par catchment include: Ponts Vale, Par Highways, Treesmill Dam Public Footpath, Treesmill Dam Marsh Villa Gardens, and St Blazey (rainfall only). It is possible to check daily Par River levels for Luxulyan, Ponts Vale and St Blazey Station Stream at St Blazey Station Road at: https://check-for-flooding.service.gov.uk/river-and-sea-levels/rloi/3159 .

4. RIVER FLOW AT LUXULYAN (Daily Mean Flow in M3/s – cubic metres per second):

(a) The last month (N.B. Some data unchecked):

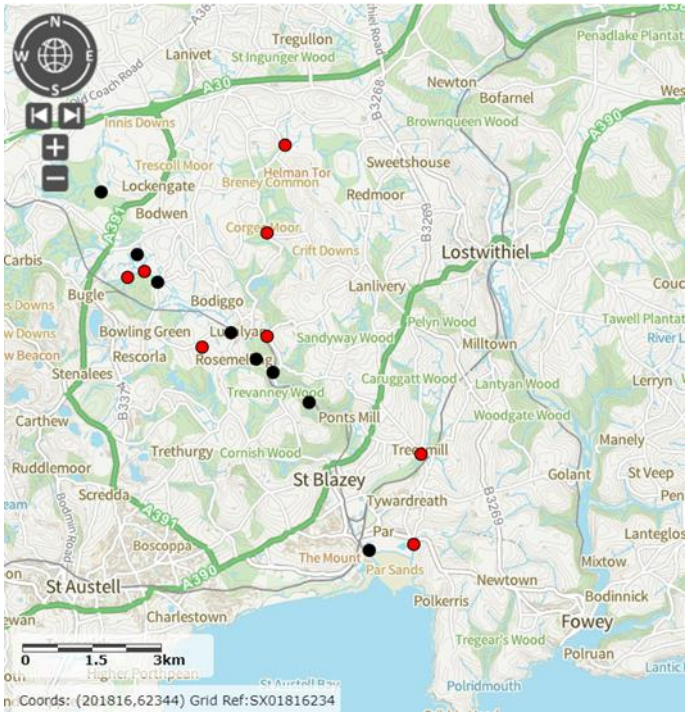


(b) The last year N.B. More recent data is unchecked):



C. DECEMBER 2024 MONITORING POINTS

This month monitoring occurred at 16 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	PAR/TRIBUTARY	DATE/TIME	TYPE OF CHECK	MONITORED BY
Criggan Moors, Par River, SX 01882 61133	**PAR**	18/12/2024 9.50	CSI sample & Cartographer record.	Roger Smith
South of Minorca Lane, Par River, SX02668 59747	**PAR**	18/12/2024 9.08	CSI sampling. Cartographer record.	Roger Smith
Near Forkandles farm, Molinnis Stream, SX 02460 59271	**SECONDARY TRIBUTARY (OF CARBIS STREAM)**	18/12/2024 10.55	CSI sample & Cartographer record.	Roger Smith
Carbis Stream SX 02834 59401	**TRIBUTARY**	18/12/2024 10.40	CSI sampling. Cartographer record.	Roger Smith
Lavrean, Par River SX 03134 59164	**PAR**	18/12/2024 11.15	CSI sampling. Cartographer record.	Roger Smith
Treskilling, Treskilling Stream, SX 04107 57726	**TRIBUTARY**	19/12/2024 9.55	CSI sampling. Cartographer record.	Roger Smith
Luxulyan allotments, Par River, SX 04732 58045	**PAR**	18/12/2024 12.10	CSI sampling. Cartographer record.	Roger Smith
Cam Bridges, Par River, SX 05292 57454	**PAR**	18/12/2024 13.30	CSI sampling. Cartographer record.	Roger Smith
Trebell Green, Bokiddick Stream SX 0551960226	**TRIBUTARY**	16/12/2024 14.35	CSI sampling. Cartographer record.	Roger Smith
Corgee Moor, Bokiddick Stream SX 0593462167	**TRIBUTARY**	16/12/2024 15.15	CSI sampling. Cartographer record.	Roger Smith
Gatty's Bridge, Bokiddick Stream SX 05531 57953	**TRIBUTARY**	18/12/2024 15.15	CSI sampling. Cartographer record.	Joan Farmer
Treffry Viaduct, Par River, SX 05650 57179	**PAR**	18/12/2024 14.40	CSI sampling. Cartographer record.	Roger Smith
Lady Rashleigh Mine, Par River, SX 06451 56509	**PAR**	18/12/2024 14.10	CSI sampling. Cartographer record.	Roger Smith
Treesmill, Tywardreath Stream, SX 08873 55385	**TRIBUTARY**	18/12/2024 10.43	CSI sampling. Cartographer record.	Maggie Tagney
Par Beach slipway, SX 0776 53261	**PAR**	19/12/2024 15.30	CSI sampling. Cartographer record.	Simon Tagney
Polmear Stream, Ship Inn SX 08749 53417	**TRIBUTARY**	18/12/2024 10.15	CSI sampling. Cartographer record.	Brian Harrisson

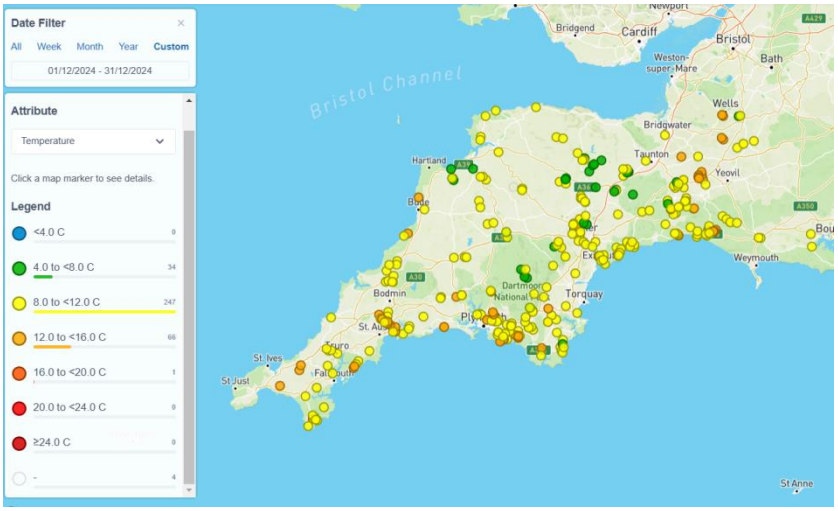
The times have been included in case that explains some of the variations in water temperature.

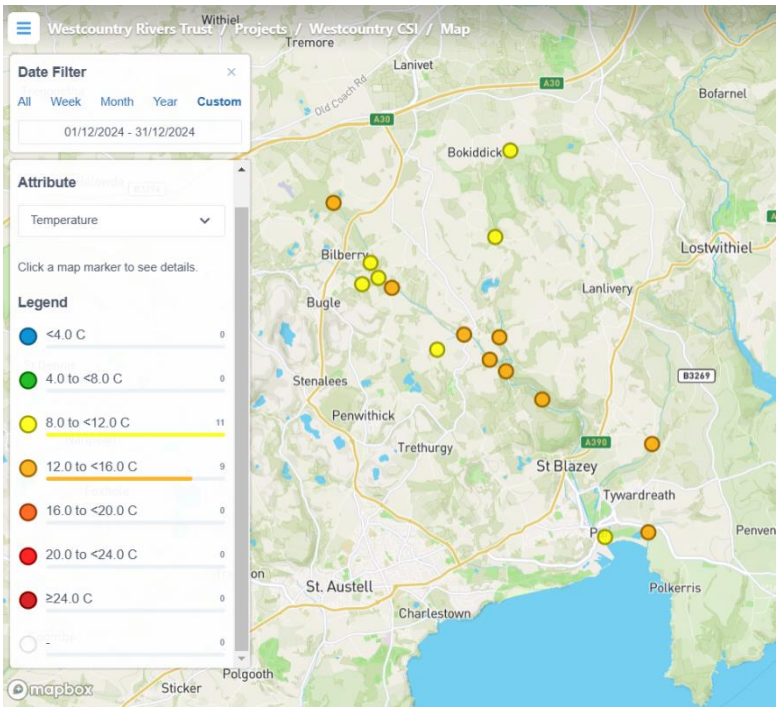
D. TEMPERATURE

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.

Geographical comparison. Source: Cartographer.





2. Results December 2024

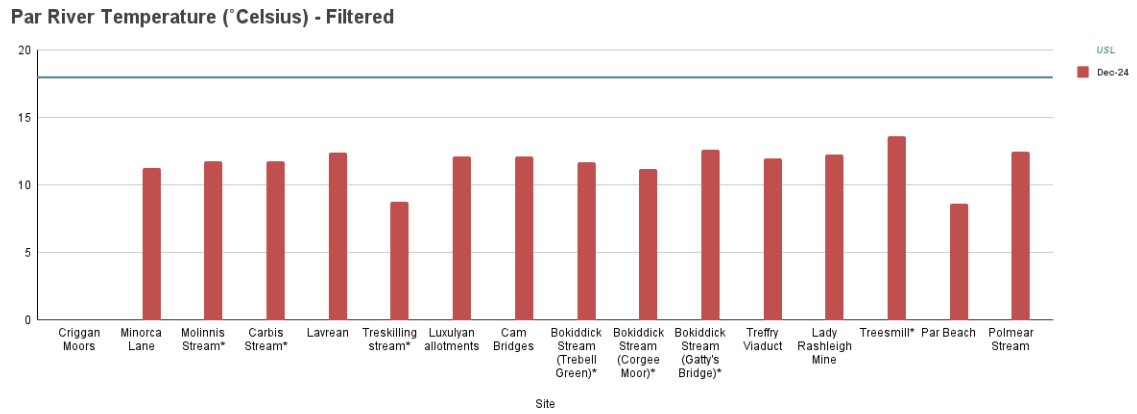
Results above the temperature at which fish and other organisms can function healthily will be shown in red. At present, 18 ˚Celsius is being used as the upper safe limit for fish and other creatures, although 20˚ Celsius has been suggested by WRT instead. The Yealm Estuary to Moor Project (YEM) in Devon considers that the upper safe level (USL) for temperature is 19.5 °C.

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.

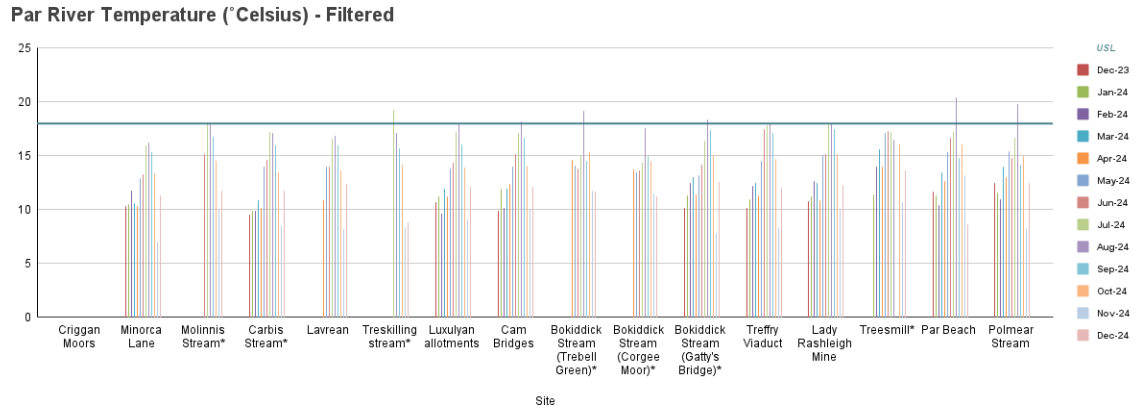
PAR RIVER/TRIBUTARY	LOCATION	Temperature ˚Celsius
Par	Criggan Moors, Par River, SX 01882 61133	12
Par	South of Minorca Lane, Par River, SX 02657 59788	11.3
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	11.8
Tributary	Carbis Stream SX 02834 59401	11.8
Par	Lavrean, Par River SX 03134 59164	12.4
Tributary	Treskilling, Treskilling Stream, SX 04107 57726	8.8
Par	Luxulyan allotments, Par River, SX 04732 58045	12.1
Par	Cam Bridges, Par River, SX 05292 57454	12.1
Tributary	Trebell Green, Bokiddick Stream SX 0551960226	11.7
Tributary	Corgee Moor, Bokiddick Stream SX 0593462167	11.2
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	12.6
Par	Treffry Viaduct, Par River, SX 05650 57179	12
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	12.3
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	13.6
Par	Par Beach slipway, SX 0776 53261	8.6
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	12.5

3. Graphs

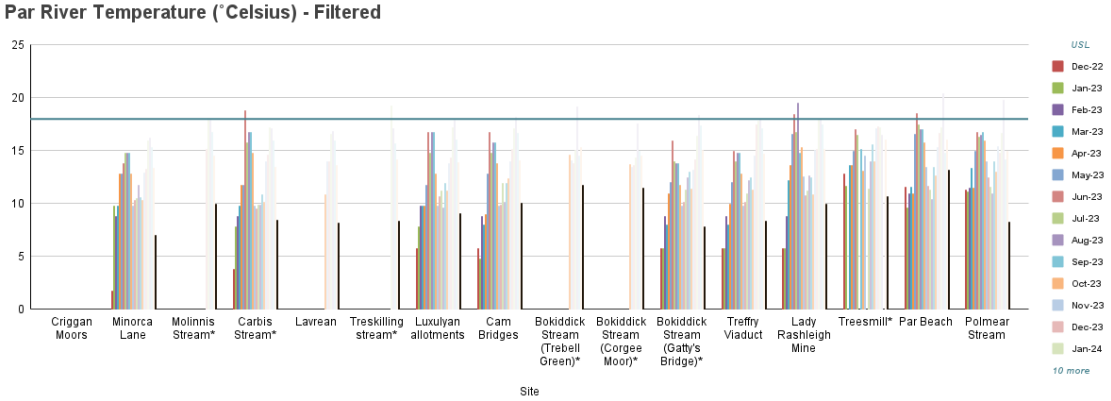
(a) This month:



(b) From 1st December 2023 until now:



(c) From 1st December 2022 until now:

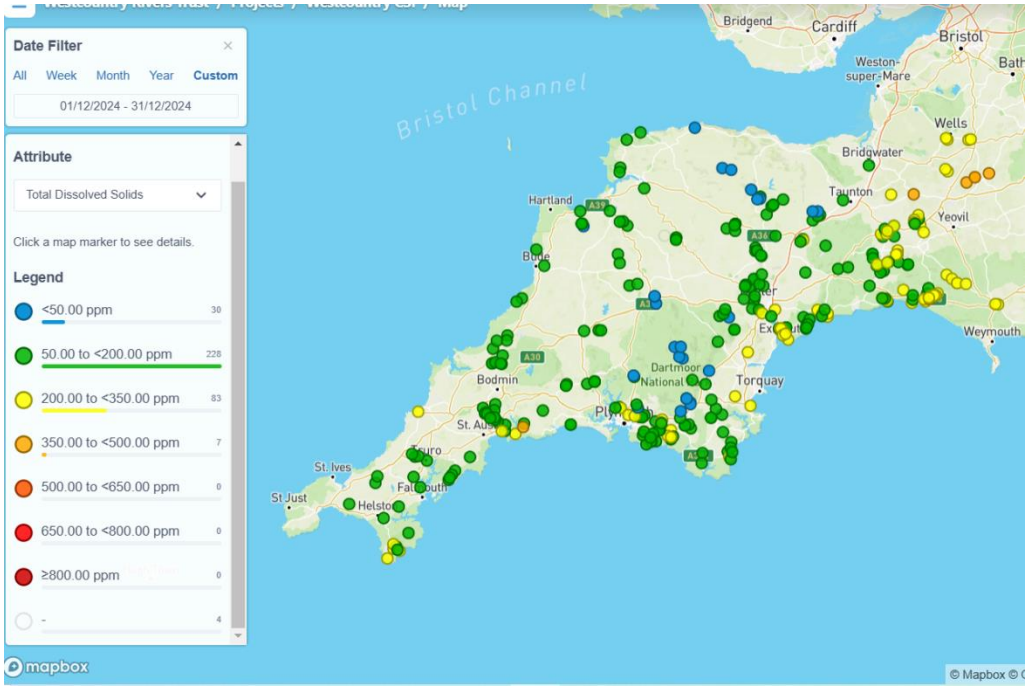


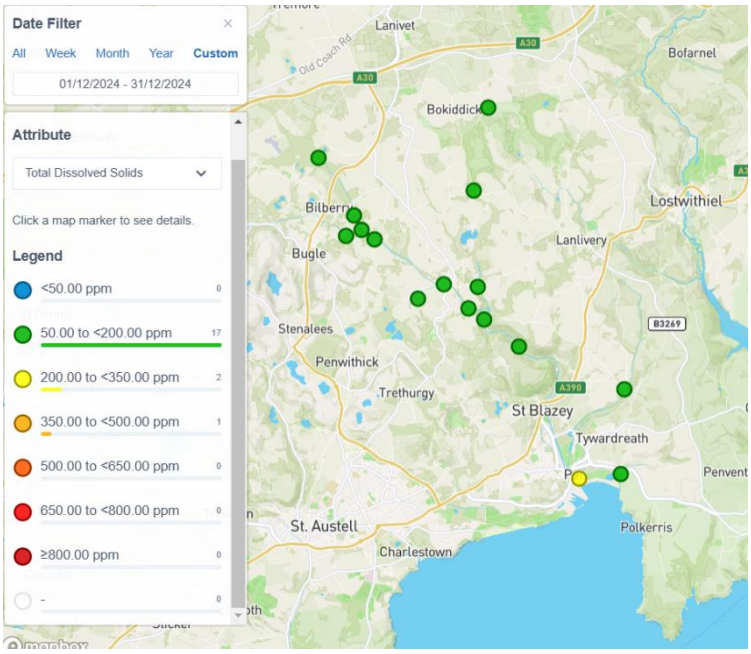
D. TOTAL DISSOLVED SOLIDS

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.



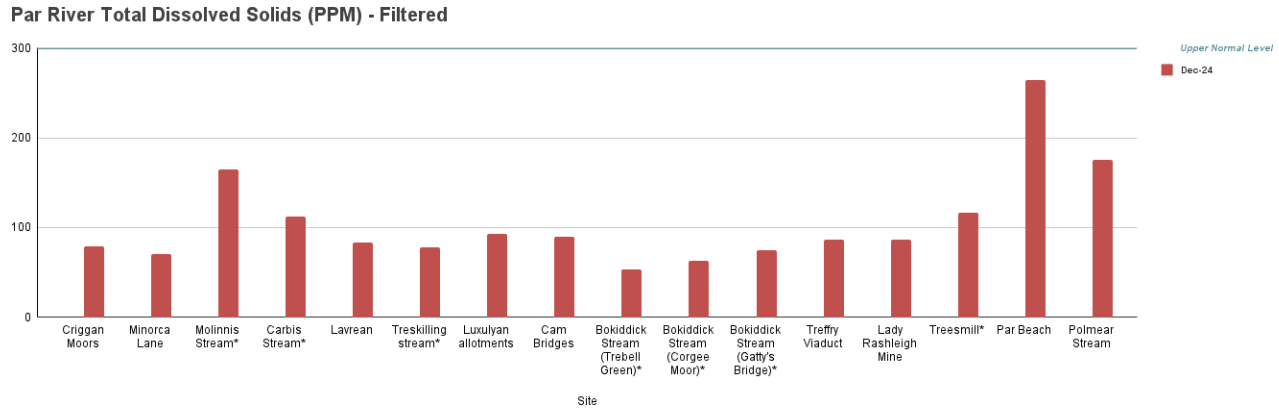


2. Results December 2024

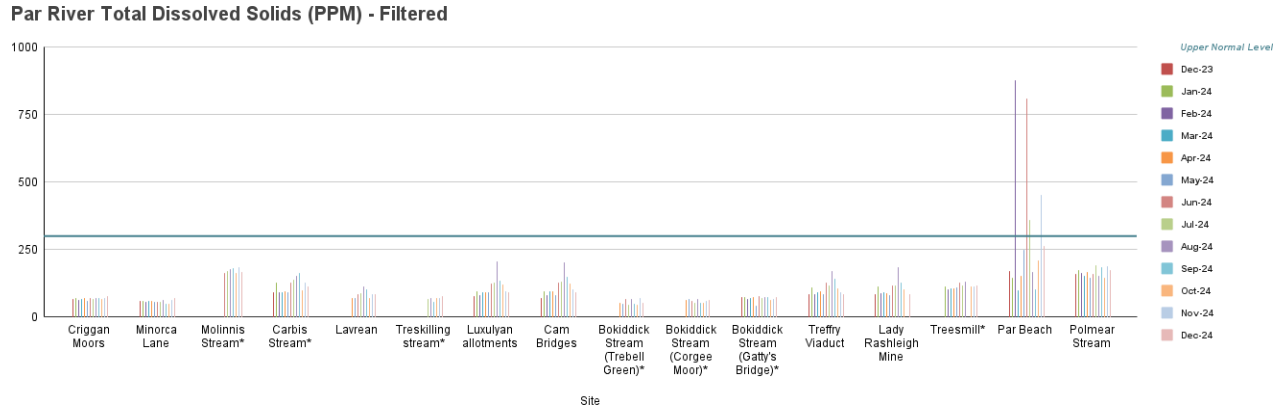
PAR RIVER/TRIBUTARY	LOCATION	Total Dissolved Solids PPM
Par	Criggan Moors, Par River, SX 01882 61133	79
Par	South of Minorca Lane, Par River, SX 02657 59788	70
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	165
Tributary	Carbis Stream SX 02834 59401	112
Par	Lavrean, Par River SX 03134 59164	83
Tributary	Treskilling, Treskilling Stream, SX 04107 57726	78
Par	Luxulyan allotments, Par River, SX 04732 58045	93
Par	Cam Bridges, Par River, SX 05292 57454	90
Tributary	Trebell Green, Bokiddick Stream SX 0551960226	53
Tributary	Corgee Moor, Bokiddick Stream SX 0593462167	63
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	75
Par	Treffry Viaduct, Par River, SX 05650 57179	86
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	86
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	116
Par	Par Beach slipway, SX 0776 53261	265
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	175

3. Graphs

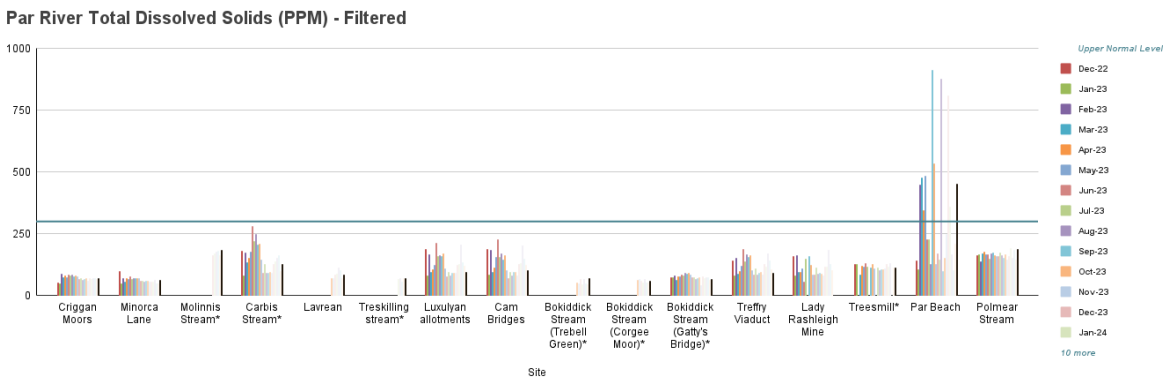
(a) This month:



(b) From 1st December 2023 until now:



(c) From 1st December 2022 until now:



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.

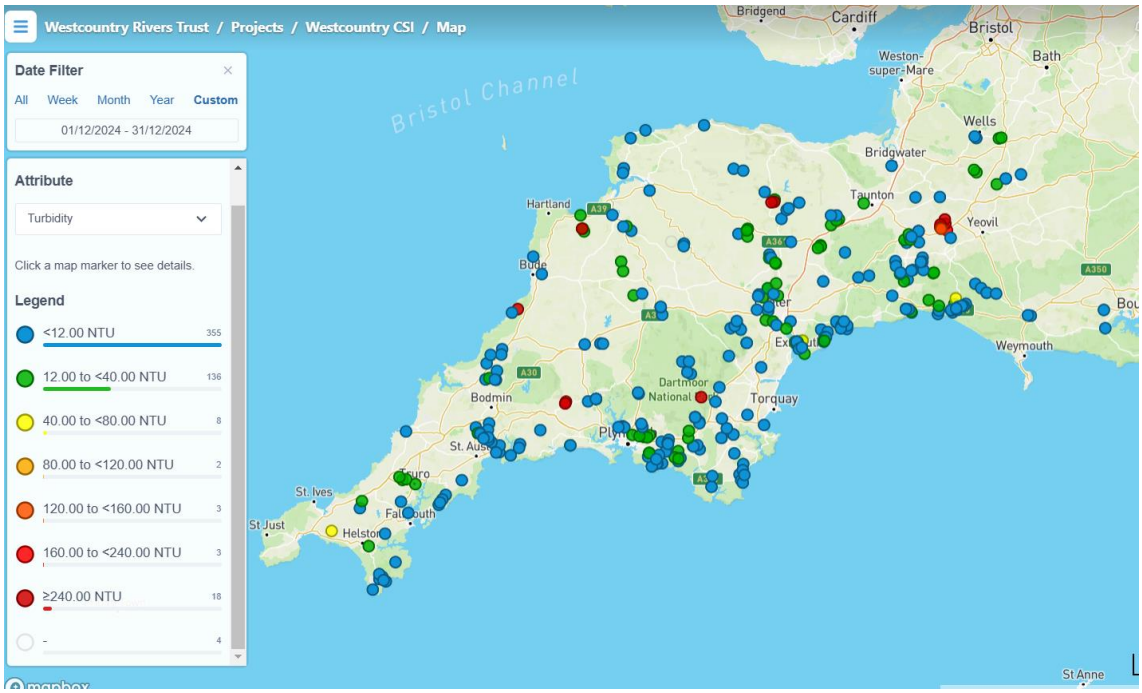
The Yealm Estuary to Moor Project (YEM) in Devon considers that the upper safe level (USL) for turbidity is 75 NTU = 25 mg/l.

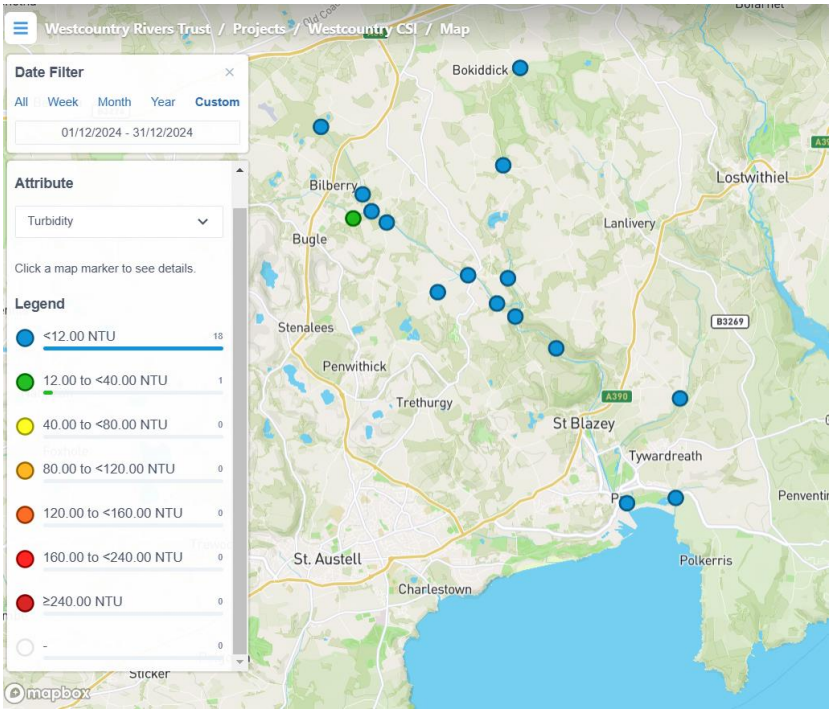
2. Results December 2024:

PAR RIVER/TRIBUTARY	LOCATION	Turbidity (NTU)
Par	Criggan Moors, Par River, SX 01882 61133	<12
Par	South of Minorca Lane, Par River, SX 02657 59788	<12
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	16
Tributary	Carbis Stream SX 02834 59401	<12
Par	Lavrean, Par River SX 03134 59164	<12
Tributary	Treskilling, Treskilling Stream, SX 04107 57726	<12
Par	Luxulyan allotments, Par River, SX 04732 58045	<12
Par	Cam Bridges, Par River, SX 05292 57454	<12
Tributary	Trebell Green, Bokiddick Stream SX 0551960226	<12
Tributary	Corgee Moor, Bokiddick Stream SX 0593462167	<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	<12
Par	Par Beach slipway, SX 0776 53261	<12
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	<12

3. Graphs

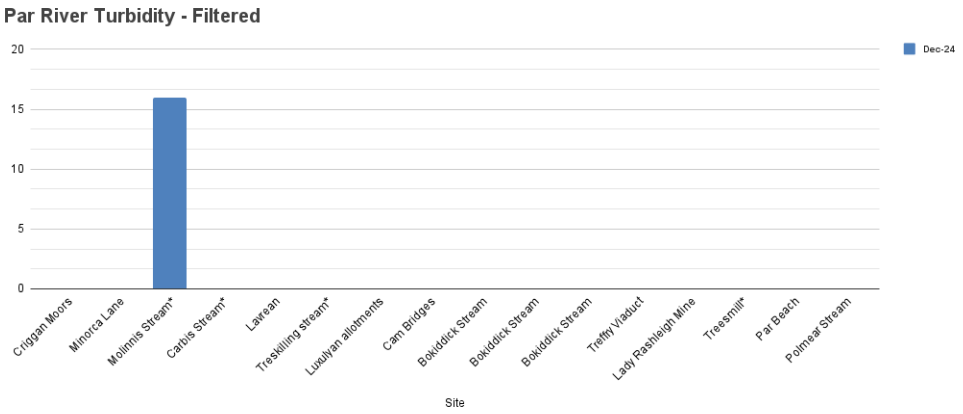
(a) This month



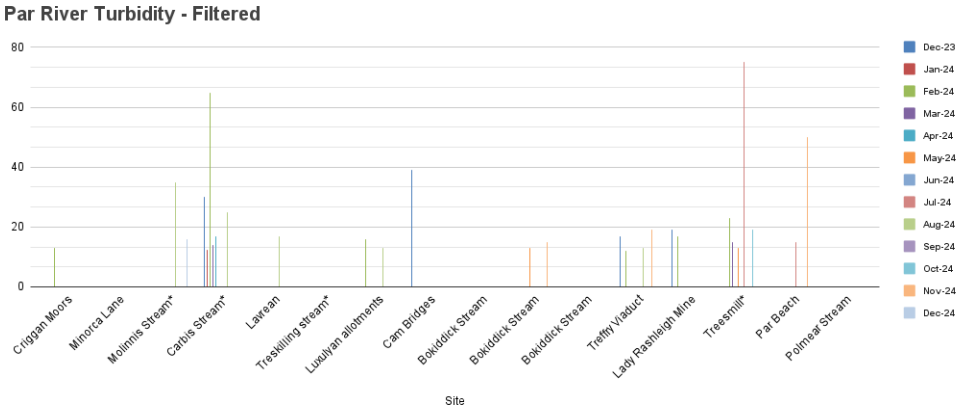


3. Graphs

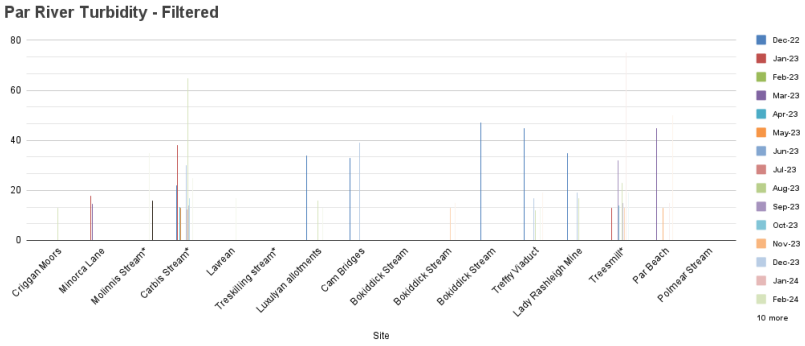
(a) This month



(b) From 1st December 2023 until now:



(c) From 1st December 2022 until now:



E. 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

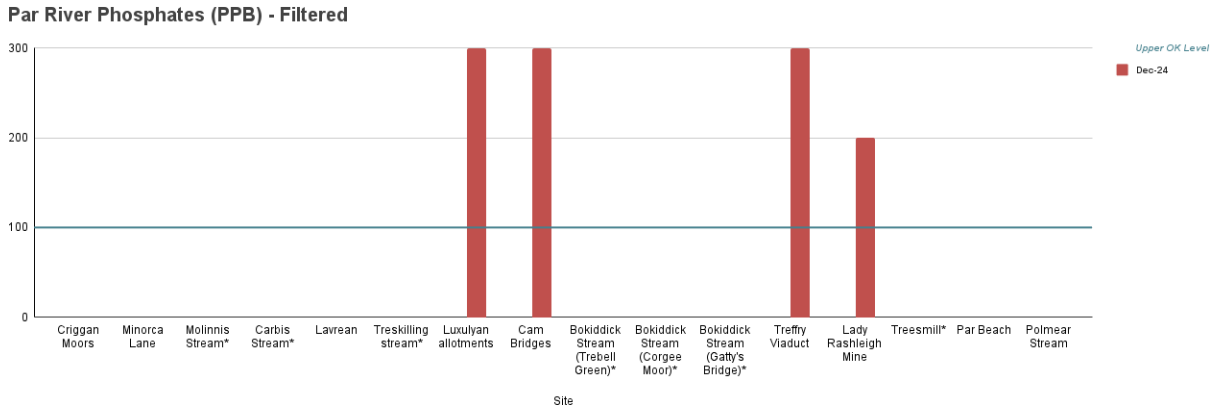
2. Results November 2024

Results in red show phosphate levels that are classified as 'High' (above the upper safe level). WRT advice is that this is 100 Parts per Billion (0.1 mg/l).

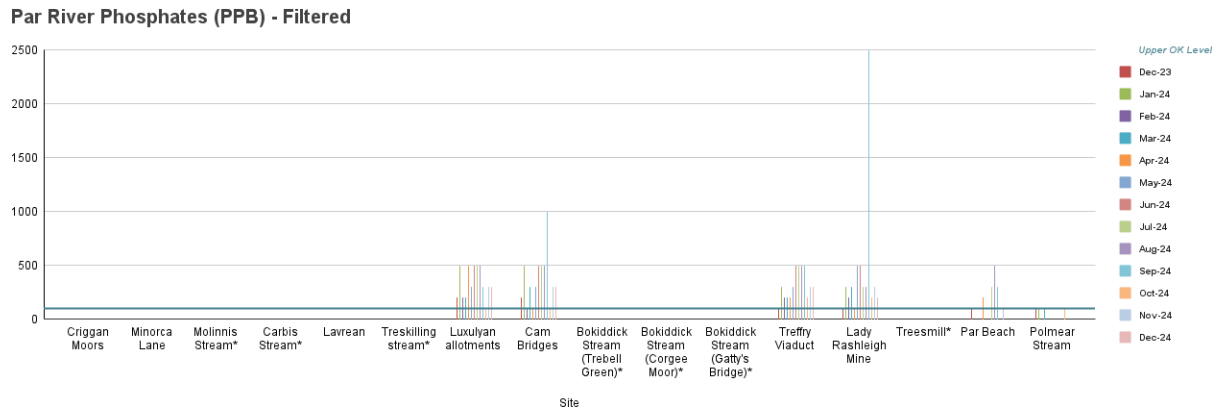
PAR RIVER/TRIBUTARY	LOCATION	Phosphates PPB
Par	Criggan Moors, Par River, SX 01882 61133	**0**
Par	South of Minorca Lane, Par River, SX 02657 59788	**0**
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	**0**
Tributary	Carbis Stream SX 02834 59401	**0**
Par	Lavrean, Par River SX 03134 59164	**0**
Tributary	Treskilling, Treskilling Stream, SX 04107 57726	**0**
Par	Luxulyan allotments, Par River, SX 04732 58045	**300**
Par	Cam Bridges, Par River, SX 05292 57454	**300**
Tributary	Trebell Green, Bokiddick Stream SX 0551960226	**0**
Tributary	Corgee Moor, Bokiddick Stream SX 0593462167	**0**
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	**200**
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	**0**
Par	Par Beach slipway, SX 0776 53261	**0**
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	**0**

4. Graphs

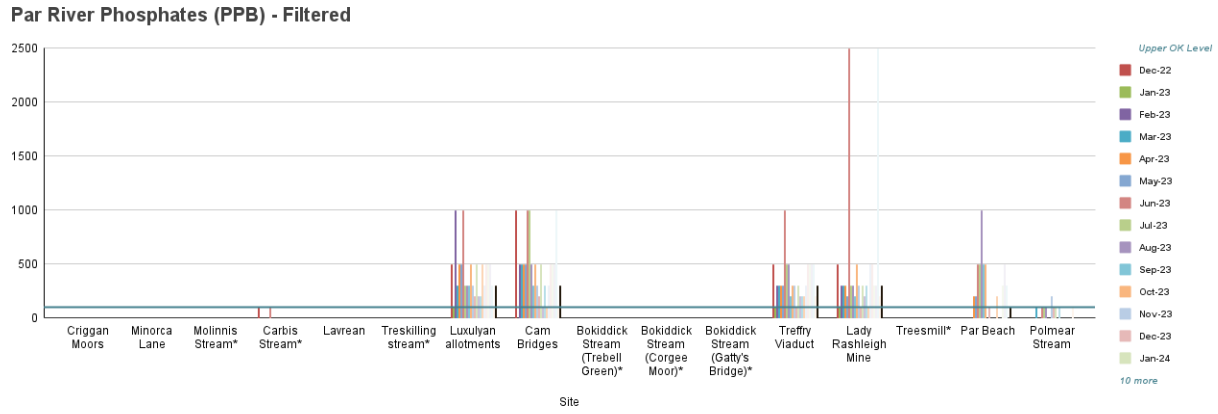
(a) This month:



(b) From 1st December 2023 until now:



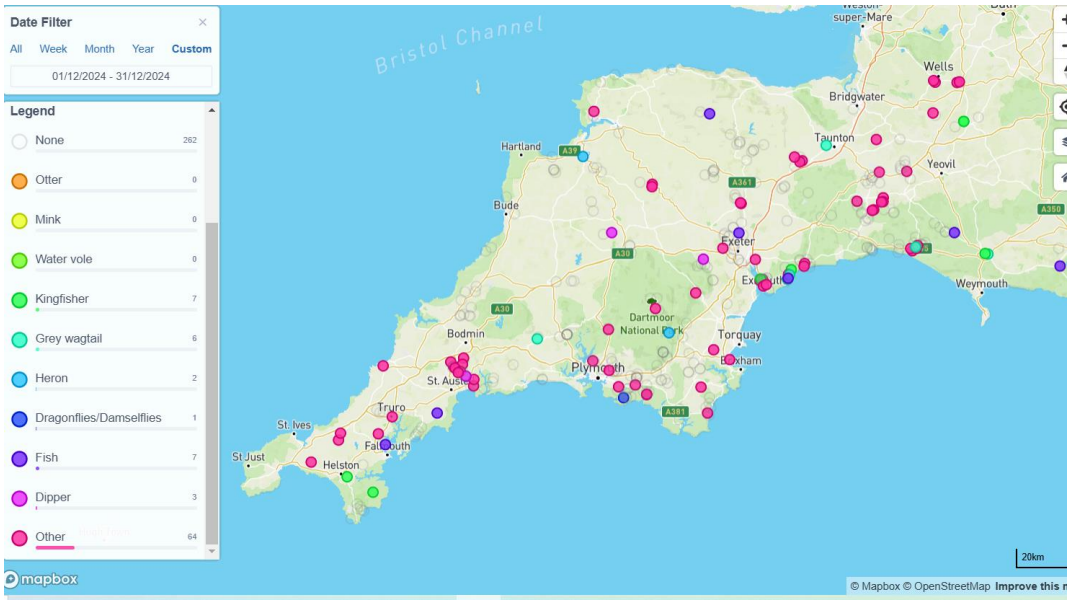
(c) From 1st December 2022 until now:

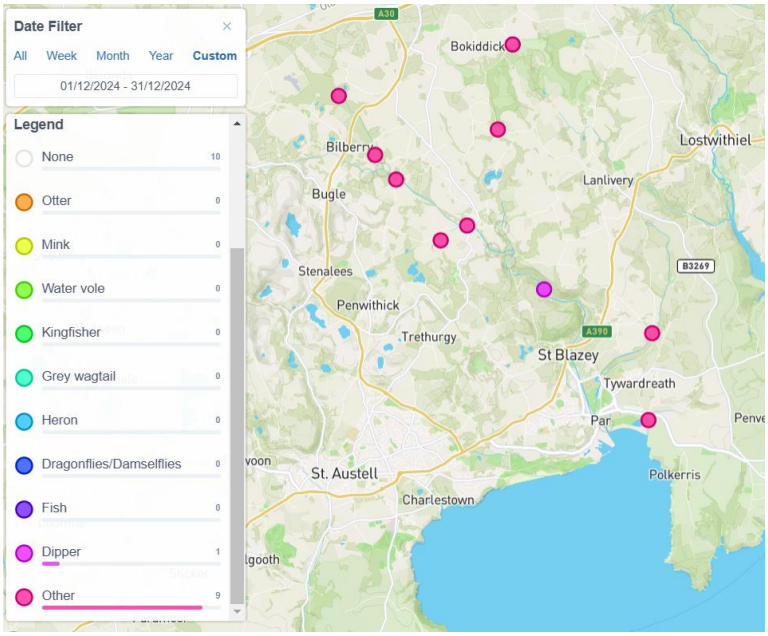


G. WILDLIFE & INVASIVE PLANTS

Evidence of otters is found nearly every month, but frequently it is not found at our monitoring points and when it is it will be entered under 'Other' because live sightings are extremely rare. However, in October, a combination of high river levels and a lack of time meant that no evidence was found. This does not mean that otters were not present.

Wildlife & Invasive Plants sightings at the monitoring points included:



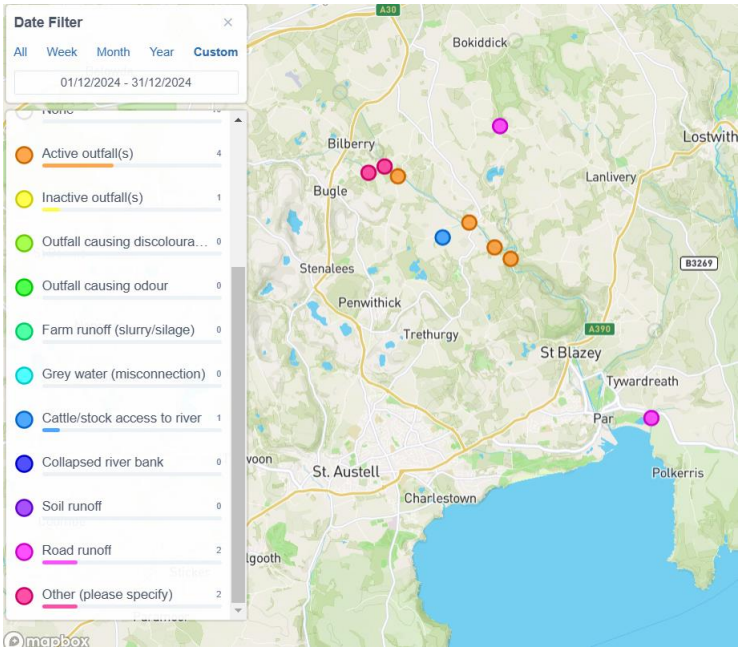


LOCATION	WILDLIFE NOTED	INVASIVE PLANTS NOTED
Criggan Moors, SX 01882 61133	Blue Tit, Bullfinch	None
South of Minorca Lane, Par River, SX 02657 59788	Long-tailed Tit	None
Forkandles Farm, Molinnis Stream, SX 02460 59271	None	Japanese Knotweed (dead)
Carbis Stream SX 02834 59401	None	None
Lavrean, Par River SX 03134 59164	Jackdaw, Meadow Pipit	None
Treskilling, Treskilling Stream, SX 04107 57726	Geese	None
Luxulyan allotments, Par River, SX 04732 58045	Blue Tit, Robin	None
Cam Bridges, Par River, SX 05292 57454	None	None
Trebell Green, Bokiddick Stream SX 0551960226	Lake created by beaver dam	None
Corgee Moor, Bokiddick Stream SX 0593462167	None	None
Gatty's Bridge, Bokiddick Stream SX 05531 57953	None	None
Treffry Viaduct, Par River, SX 05650 57179	None	None
Lady Rashleigh Mine, Par River, SX 06451 56509	Dipper, otter spraint	None
Treesmill, Tywardreath Stream, SX 08873 55385	Robin, Long-tailed Tit, frog.	None
Par Beach slipway, SX 0776 53261	None	None
Polmear Stream, Ship Inn, SX 08749 53417	Young Mute swan	None

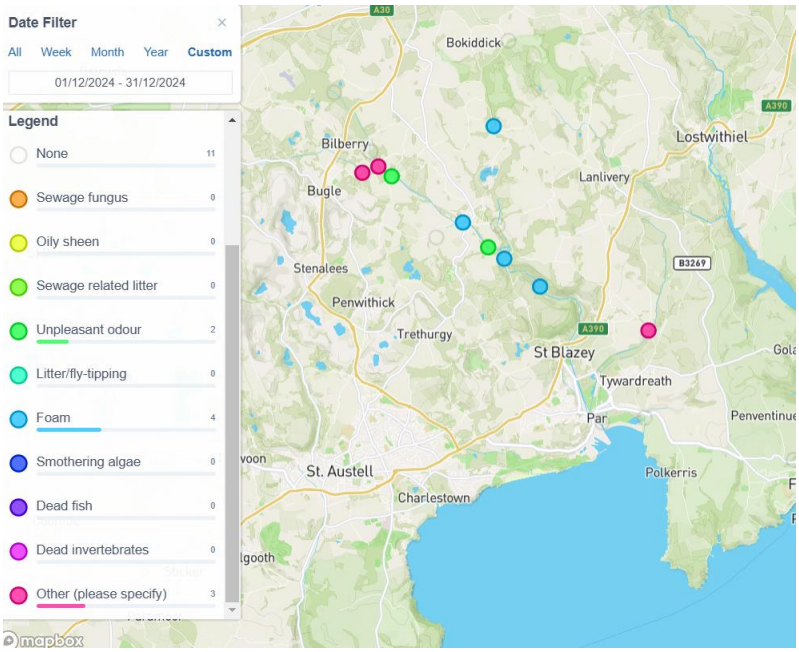
H. POLLUTION SOURCES AND EVIDENCE

LOCATION	POLLUTION
Criggan Moors, SX 01882 61133	None observed.
South of Minorca Lane, Par River, SX 02657 59788	None observed.
Forkandles Farm, Molinnis Stream, SX 02460 59271	Grey-tinge to the water (china clay)
Carbis Stream SX 02834 59401	Slight grey-tinge to the water (china clay)
Lavrean, Par River SX 03134 59164	Foam, smell?
Treskilling, Treskilling Stream, SX 04107 57726	Foam.
Luxulyan allotments, Par River, SX 04732 58045	Foam.
Cam Bridges, Par River, SX 05292 57454	Foam, smell.
Trebell Green, Bokiddick Stream SX 0551960226	None observed.
Corgee Moor, Bokiddick Stream SX 0593462167	None observed.
Gatty's Bridge, Bokiddick Stream SX 05531 57953	None observed.
Treffry Viaduct, Par River, SX 05650 57179	Foam.
Lady Rashleigh Mine, Par River, SX 06451 56509	Foam.
Treesmill, Tywardreath Stream, SX 08873 55385	Large piece of black plastic partially blocking bridge arch.
Par Beach slipway, SX 0776 53261	None observed.
Polmear Stream, Ship Inn, SX 08749 53417	None observed.

Visible sources of pollution



Evidence of recent pollution:



Molinnis Stream near Bugle – a grey tinge to the water.

J. 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 Joan Farmer; Veronica Jones; 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, Jenny Heskett, Nick Taylor, Jeremy Roberts, Mat Bateman, Colin Pringle, Matt Healey, Simon Browning, Lydia Deacon, Jack Middleton, Anna Seal, Anna Crane, Zoe Connelly, Jade Neville, Lauren Jasper, Gwen Maggs, Simon Browning and Callum Lewis is greatly appreciated. The work carried out by the late Dave Burrell both in the field and in checking reports will not be forgotten. The interest and encouragement offered by Environment Agency officers, especially Lisa Best, Lisa Goodall, Layla Ousley, Jenny Davies, Leah Steward, Nicola Rogers and Peter Scobie, have been invaluable.

Roger Smith, 14th January 2025