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 2024

Looking upriver from Par Beach slipway **Photo: Brian Harrisson**

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

1. Data

We sampled at 16 locations between 18th and 20th November 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 8.14 Median 8.2 Min 6.3 Max 10.1	Mean 10.53 Median 10 Min 8.4 Max 13.2	Mean 9.66 Median 9.25 Min 7.8 Max 11.8	Mean 9.5 Median 9.5 Min 8.3 Max 10.7
TOTAL DISSOLVED SOLIDS PPM (SHOULD NOT EXCEED 300 PPM)	Mean 83 Median 84 Min 62 Max 102	Mean 272 Median 272 Min 90 Max **454** Score at LRM not included.	Mean 97.16 Median 71 Min 60 Max 184	Mean 150 Median 150 Min 112 Max 188
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 23 Median 19 Min 0 Max 50	Mean 3 Median 0 Min 0 Max 15	Mean 0 Median 0 Min 0 Max 0
PHOSPHATES PPB (SHOULD NOT EXCEED 100 PPB)	Mean **120** Median 0 Min 0 Max **300**	Mean **233.33** Median **300** Min 100 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	Long-tailed Tit, Chaffinches	Dipper Otter spraint	Great Tit, Long-tailed Tit, Chaffinch	None
INVASIVE PLANTS	None	None	Japanese Knotweed	None
EVIDENCE OF POLLUTION	Foam	Foam	Foam, very slight grey tinge (china clay)	None

2. Key points

(a) Positive signs

(i) Phosphate levels, though high from Luxulyan allotments downstream, were not as high as we have known them to be. This was probably due to dilution resulting from high river levels.

(ii) Even though it was only possible to make a cursory search for otter spraint, a tiny fragment was found on a boulder downstream from Lady Rashleigh Mine.

(iii) Anecdotal evidence from Cornwall Wildlife Trust suggests that the beavers on the Upper Bokiddick Stream are established.

(iv) Dr Gwen Maggs and two of her colleagues from the CWT *Tor to Shore* project accompanied some of us on our surveys in Luxulyan and Luxulyan Valley. This exciting project will undertake major habitat improvements in the Bokiddick and Lower Par catchments. More can be found at: https://www.cornwallwildlifetrust.org.uk/tor-to-shore .

(b) Points of concern

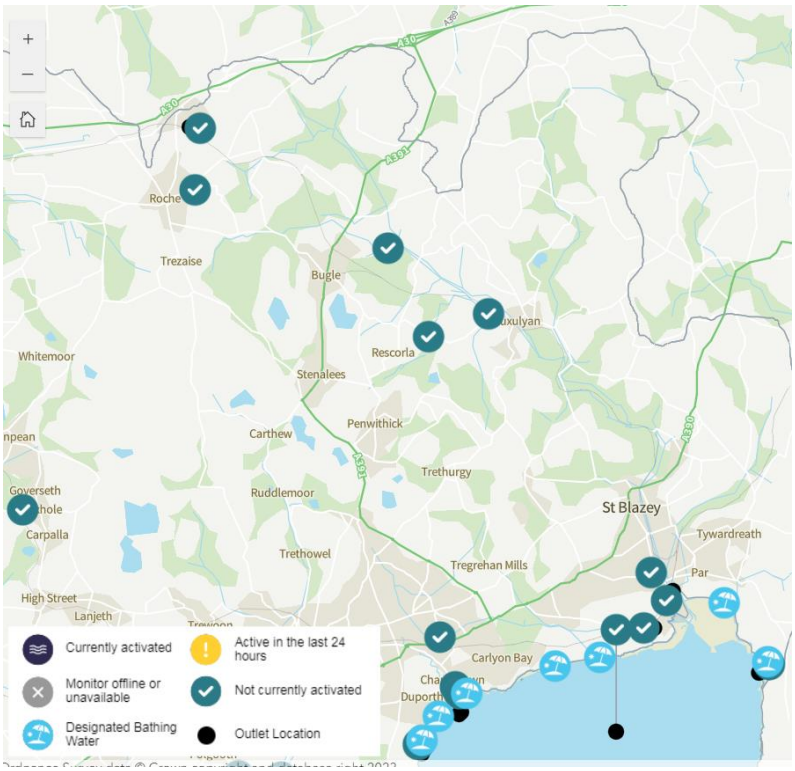
(i) High phosphate levels. We have been told that South West Water will have to initiate a programme of phosphate reduction at the St Austell North STW at Luxulyan in 2025. Hopefully this will happen.

(ii) A Total Dissolved Solids reading of 454 PPM at Par Beach Slipway is, on the face of it, something that requires investigation, although, without understanding the issue, it would be premature to be too concerned. Readings are taken at low tide at this location.

(c) Areas for further research

While discharges from sewage treatment works are not the only causes of pollution, we know they occur too often, so it may be necessary to monitor the live information now made on this website:

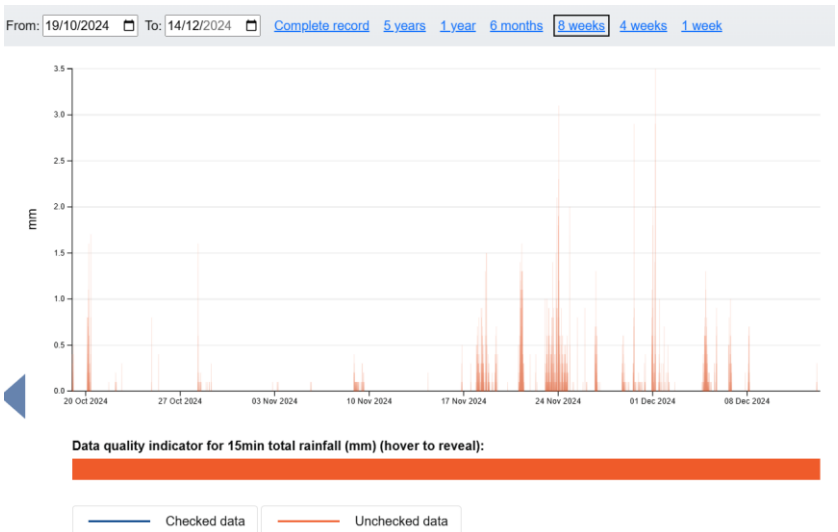
https://www.southwestwater.co.uk/environment/rivers-and-bathing-waters/waterfitlive/storm-overflow-map/full-map



We need to look at all the outlets. Local information has suggested that smaller outlets, such as that from Rescorla ought to be considered.

B. RAINFALL, RIVER LEVELS AND FLOW

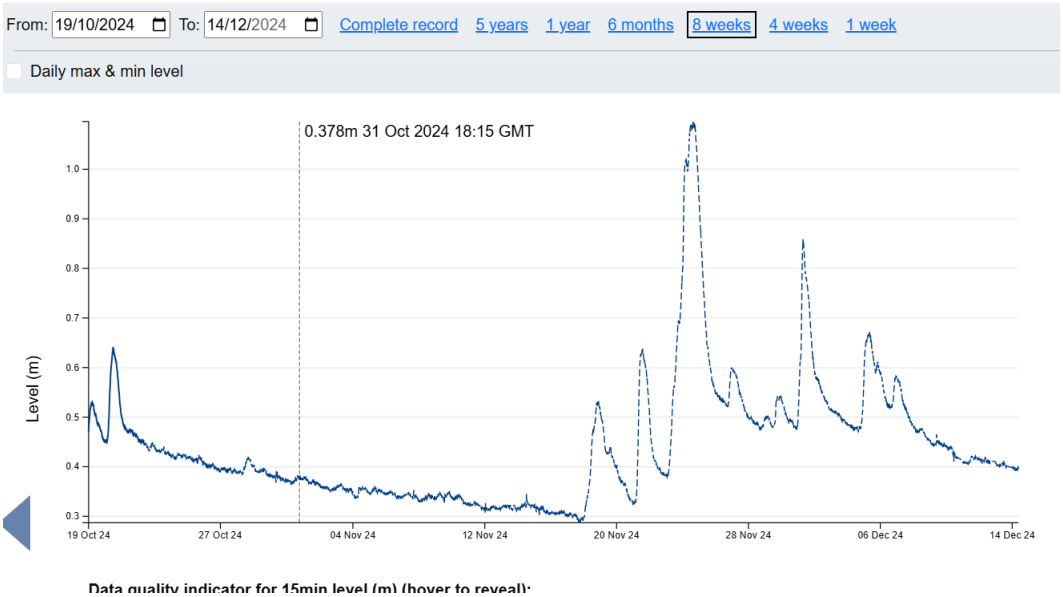
1. Rainfall at Luxulyan (https://environment.data.gov.uk/hydrology/station/14aadf3c-3d4d-44b3-b26b-cf705827d00e_377323)



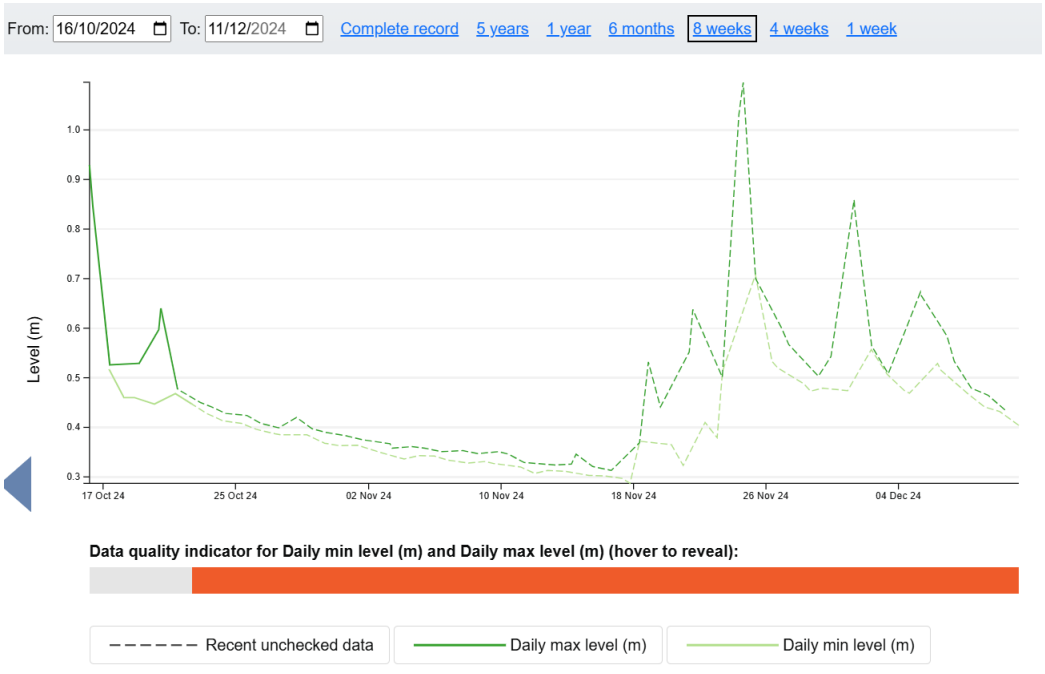
2. Par River levels at Luxulyan preceding and during surveys.

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

(a) Levels



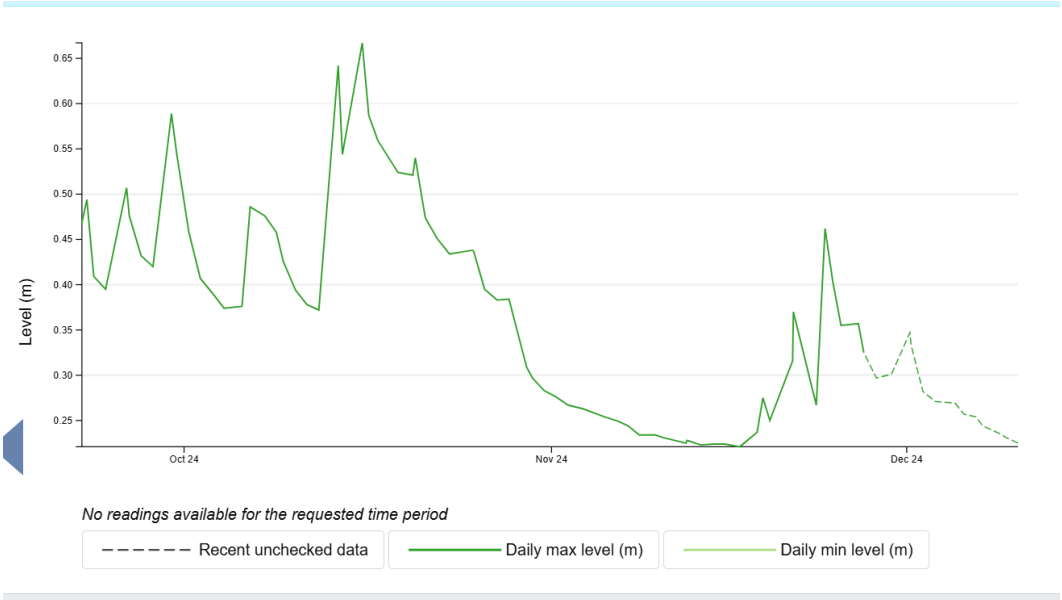
(b) Maximum and minimum levels at Luxulyan for the last year:



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

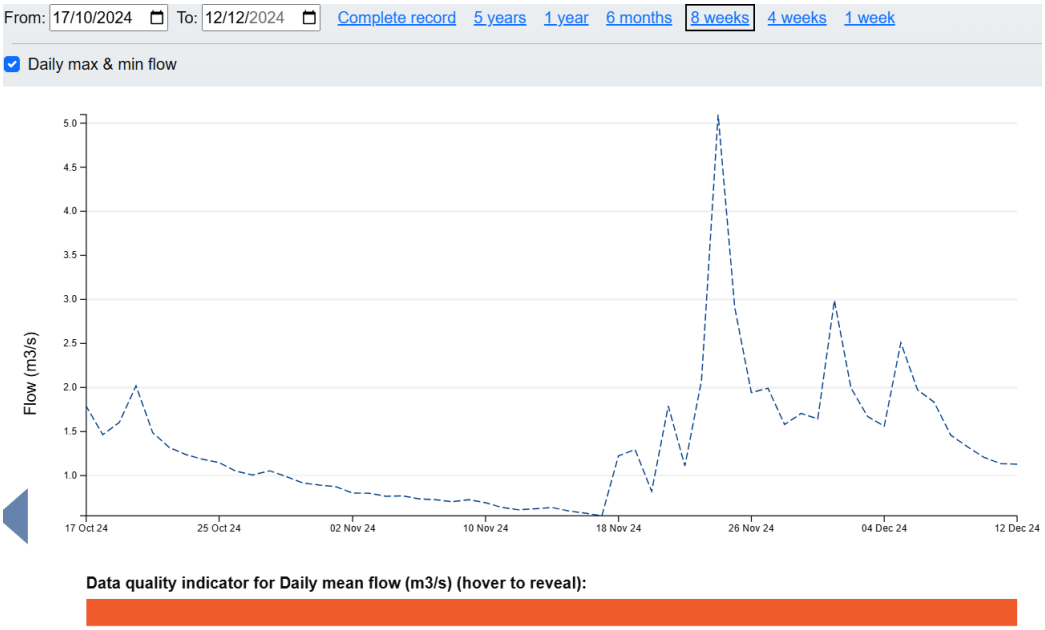
1.80m	Property flooding is possible above this level. One or more flood warnings may be issued
1.68m	Water reaches the highest level recorded at this measuring station (recorded on 19 December 1999)
1.40m	Low lying land flooding is possible above this level. One or more flood alerts may be issued
	This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

3. Par River at St Andrews

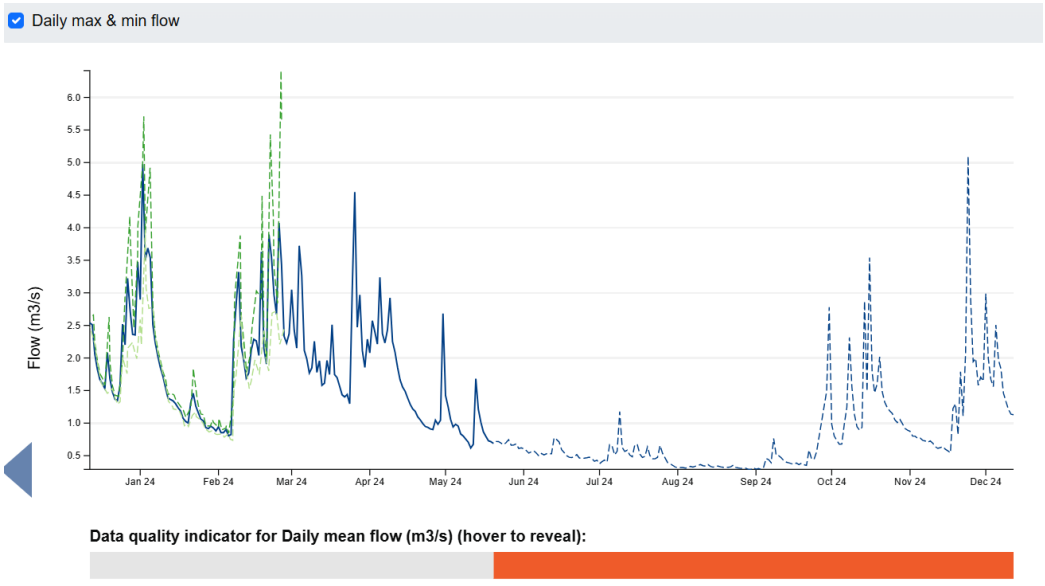


4. RIVER FLOW AT LUXULYAN (Daily Mean Flow in M3/s – cubic metres per second):

(a) The last month (N.B. Data unchecked):



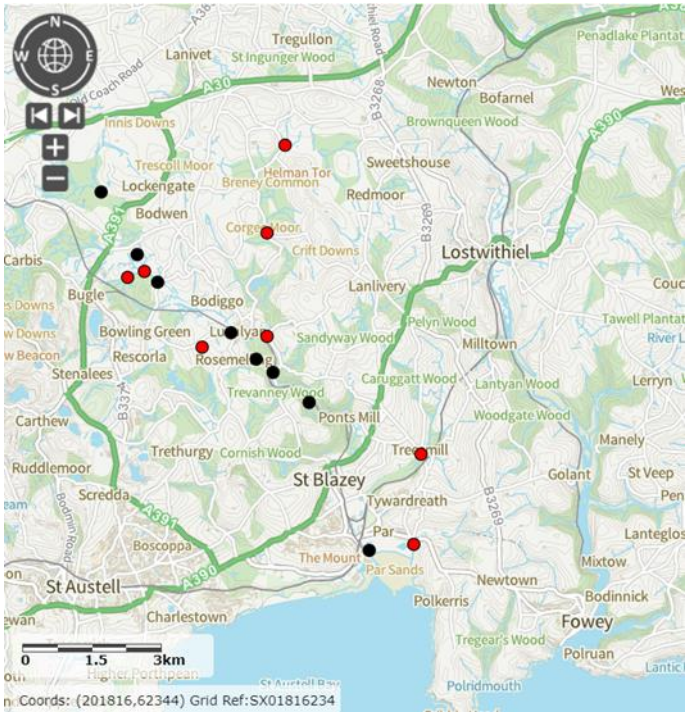
(b) The last year N.B. More recent data is unchecked):



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 .

C. NOVEMBER 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**	20/11/2024 9:00	CSI sample & Cartographer record.	Roger Smith
South of Minorca Lane, Par River, SX02668 59747	**PAR**	20/11/2024 8:10	CSI sampling. Cartographer record.	Roger Smith
Near Forkandles farm, Molinnis Stream, SX 02460 59271	**SECONDARY TRIBUTARY (OF CARBIS STREAM)**	20/11/2024 10:05	CSI sample & Cartographer record.	Roger Smith
Carbis Stream SX 02834 59401	**TRIBUTARY**	20/11/2024 9:50	CSI sampling. Cartographer record.	Roger Smith
Lavrean, Par River SX 03134 59164	**PAR**	20/11/2024 10:25	CSI sampling. Cartographer record.	Roger Smith
Treskilling, Treskilling Stream, SX 04107 57726	**TRIBUTARY**	20/11/2024 11:05	CSI sampling. Cartographer record.	Roger Smith
Luxulyan allotments, Par River, SX 04732 58045	**PAR**	20/11/2024 11:25	CSI sampling. Cartographer record.	Roger Smith
Cam Bridges, Par River, SX 05292 57454	**PAR**	20/11/2024 14:05	CSI sampling. Cartographer record.	Roger Smith
Trebell Green, Bokiddick Stream SX 0551960226	**TRIBUTARY**	18/11/2024 11:10	CSI sampling. Cartographer record.	Roger Smith
Corgee Moor, Bokiddick Stream SX 0593462167	**TRIBUTARY**	18/11/2024 11:55	CSI sampling. Cartographer record.	Roger Smith
Gatty's Bridge, Bokiddick Stream SX 05531 57953	**TRIBUTARY**	20/11/2024 16:00	CSI sampling. Cartographer record.	Joan Farmer
Treffry Viaduct, Par River, SX 05650 57179	**PAR**	20/11/2024 15:25	CSI sampling. Cartographer record.	Joan Farmer
Lady Rashleigh Mine, Par River, SX 06451 56509	**PAR**	20/11/2024 14:15	CSI sampling. Cartographer record.	Veronica Jones, Joan Farmer, Roger Smith
Treesmill, Tywardreath Stream, SX 08873 55385	**TRIBUTARY**	20/11/2024 11:21	CSI sampling. Cartographer record.	Maggie Tagney
Par Beach slipway, SX 0776 53261	**PAR**	19/11/2024 13:30	CSI sampling. Cartographer record.	Simon Tagney
Polmear Stream, Ship Inn SX 08749 53417	**TRIBUTARY**	20/11/2024 10:30	CSI sampling. Cartographer record.	Brian Harrisson

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

There are problems getting access to the map data on Cartographer so there are no maps giving geographical context in sections D to I.

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 November 2024

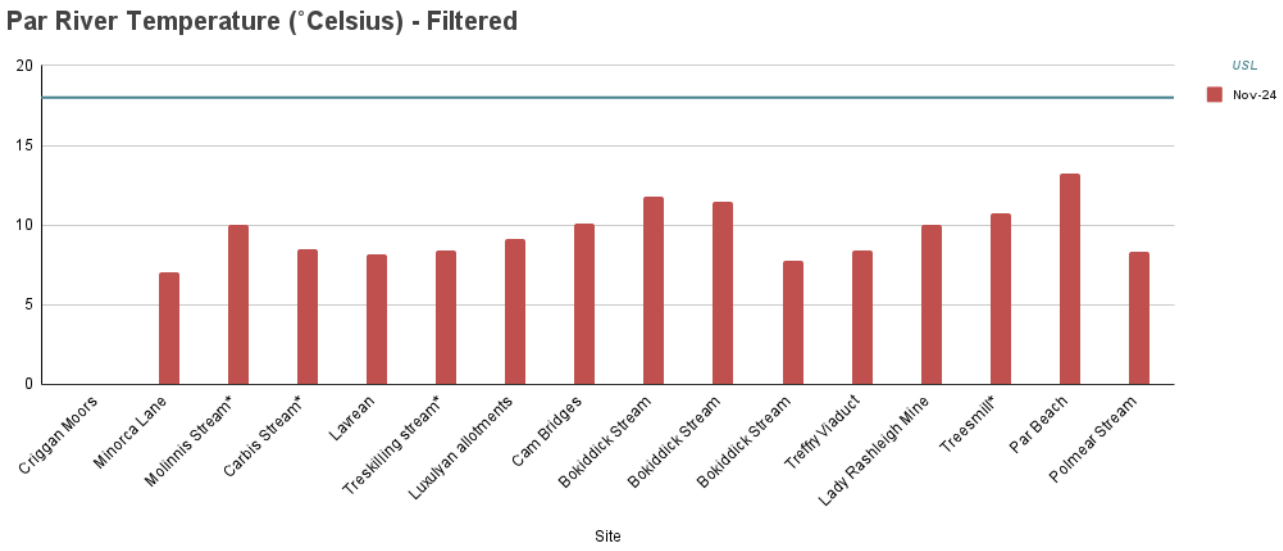
Results above the temperature at which fish and other organisms can function healthily will be shown in red. At present, 18 ˚Celsius is being used as the upper safe limit for fish and other creatures, although 20˚ Celsius has been suggested by WRT instead. The Yealm Estuary to Moor Project (YEM) in Devon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

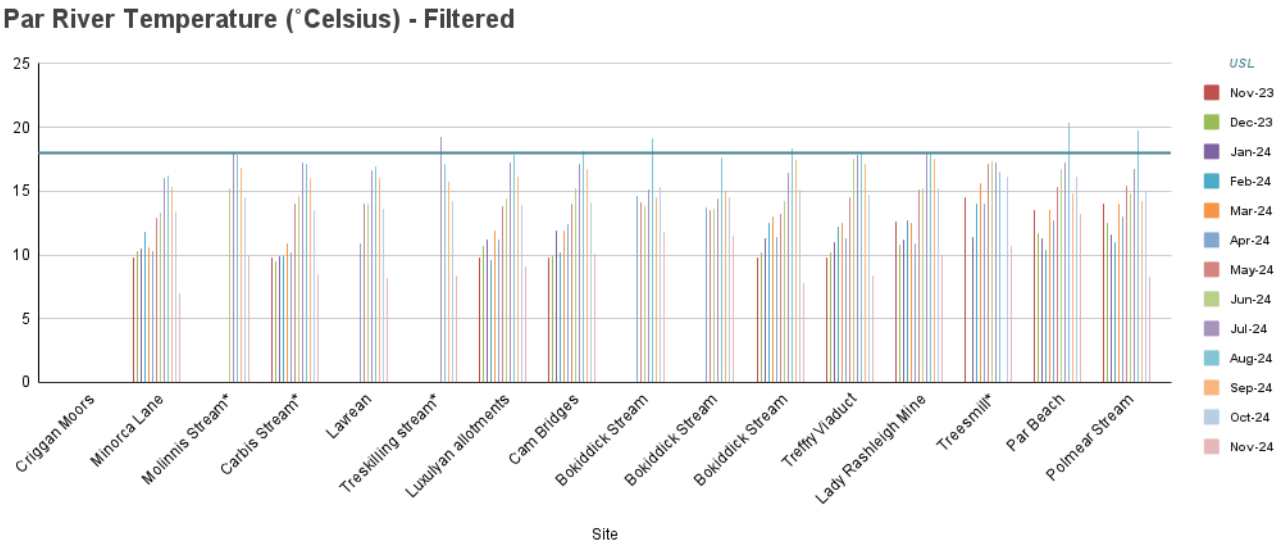
PAR RIVER/TRIBUTARY	LOCATION	Temperature ˚Celsius
Par	Criggan Moors, Par River, SX 01882 61133	6.3
Par	South of Minorca Lane, Par River, SX 02657 59788	7
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	10
Tributary	Carbis Stream SX 02834 59401	8.5
Par	Lavrean, Par River SX 03134 59164	8.2
Tributary	Treskilling, Treskilling Stream, SX 04107 57726	8.4
Par	Luxulyan allotments, Par River, SX 04732 58045	9.1
Par	Cam Bridges, Par River, SX 05292 57454	10.1
Tributary	Trebell Green, Bokiddick Stream SX 0551960226	11.8
Tributary	Corgee Moor, Bokiddick Stream SX 0593462167	11.5
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	7.8
Par	Treffry Viaduct, Par River, SX 05650 57179	8.4
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	10
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	10.7
Par	Par Beach slipway, SX 0776 53261	13.2
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	8.3

3. Graphs

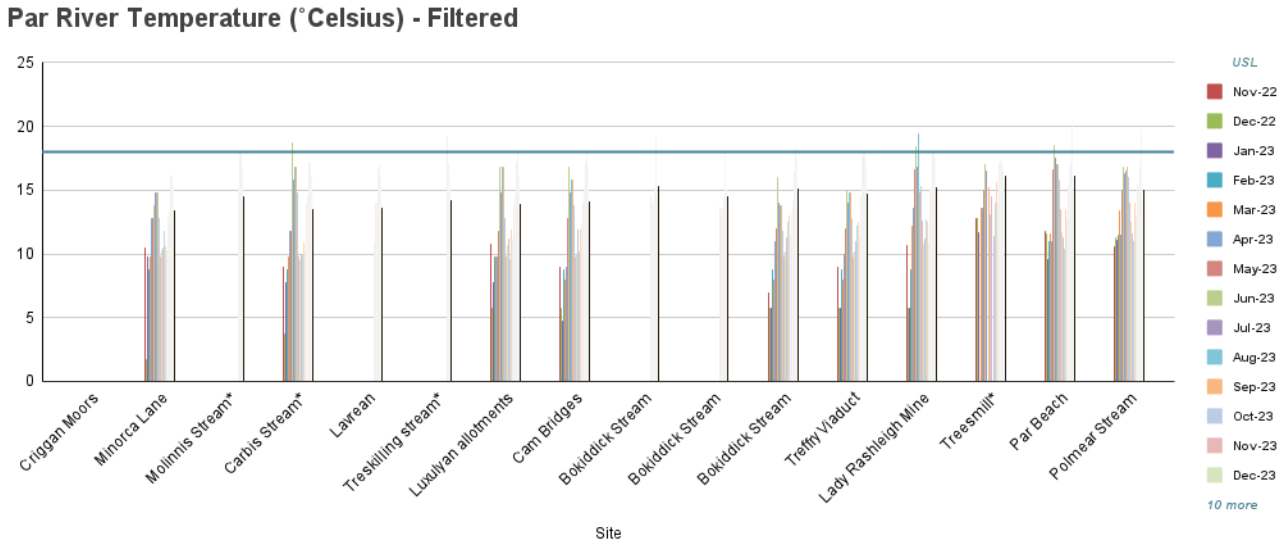
(a) This month:



(b) From 1st November 2023 until now:



(c) From 1st November 2022 until now:



D. TOTAL DISSOLVED SOLIDS

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

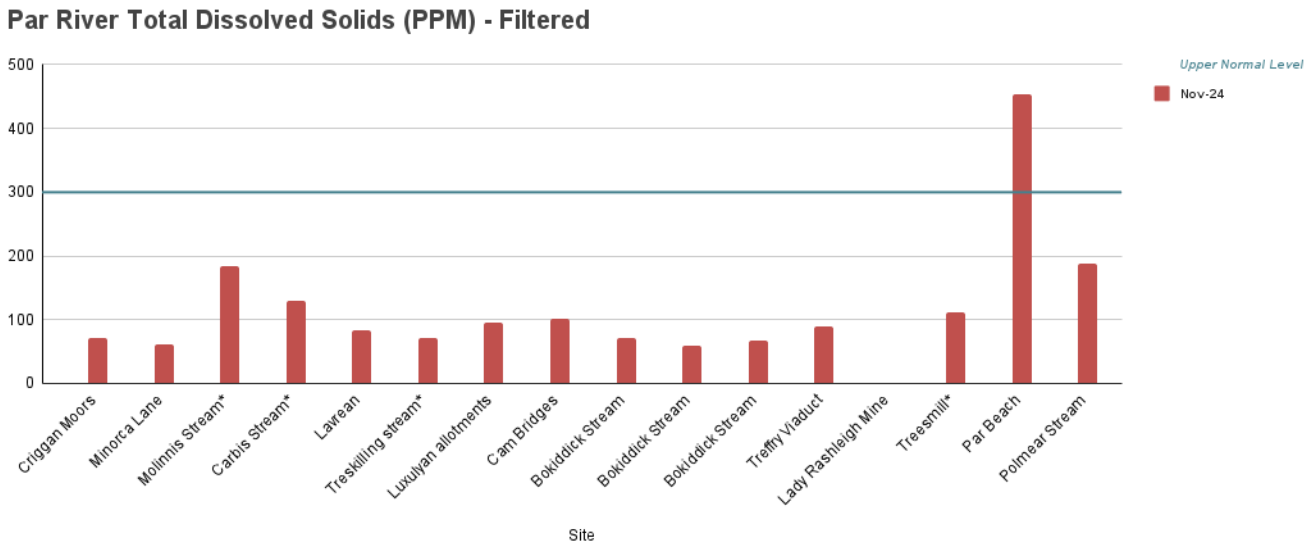
Total Dissolved Solids (TDS) is directly related to the conductivity of the water. The more minerals, salts and metals that are dissolved in the water the more conductive it gets. Low levels of dissolved solids in waters such as those on Dartmoor near to the source of the river are a result of very low 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. Results November 2024

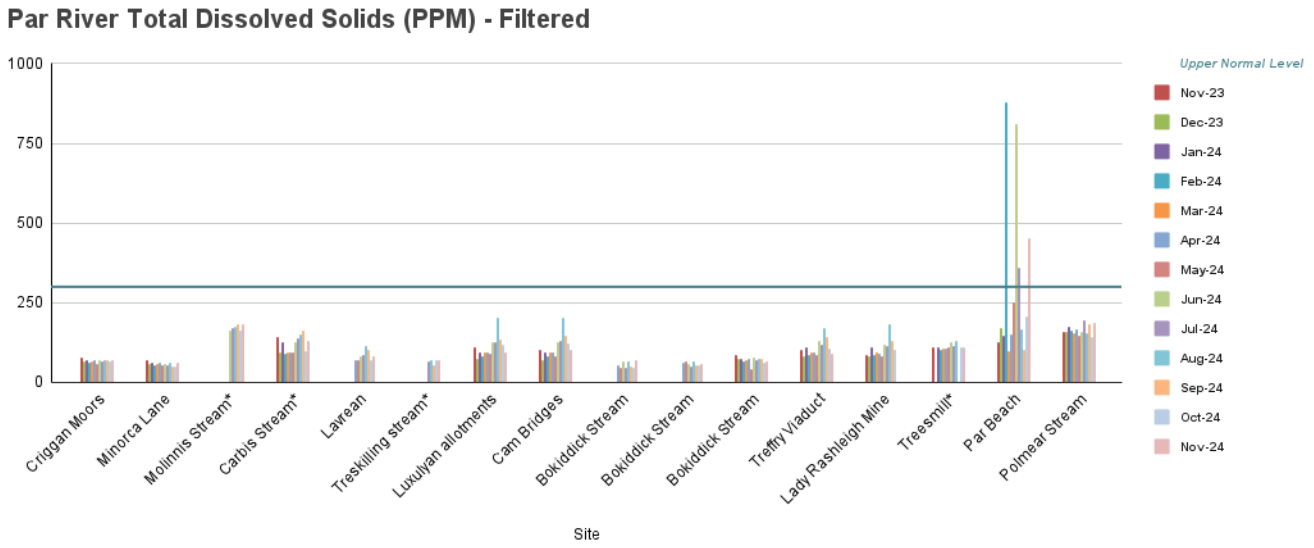
PAR RIVER/TRIBUTARY	LOCATION	Total Dissolved Solids PPM
Par	Criggan Moors, Par River, SX 01882 61133	71
Par	South of Minorca Lane, Par River, SX 02657 59788	62
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	184
Tributary	Carbis Stream SX 02834 59401	129
Par	Lavrean, Par River SX 03134 59164	84
Tributary	Treskilling, Treskilling Stream, SX 04107 57726	71
Par	Luxulyan allotments, Par River, SX 04732 58045	96
Par	Cam Bridges, Par River, SX 05292 57454	102
Tributary	Trebell Green, Bokiddick Stream SX 0551960226	71
Tributary	Corgee Moor, Bokiddick Stream SX 0593462167	60
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	68
Par	Treffry Viaduct, Par River, SX 05650 57179	90
Par	Lady Rashleigh Mine, Par River, SX 06451 56509	Invalid result
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	112
Par	Par Beach slipway, SX 0776 53261	454
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	188

3. Graphs

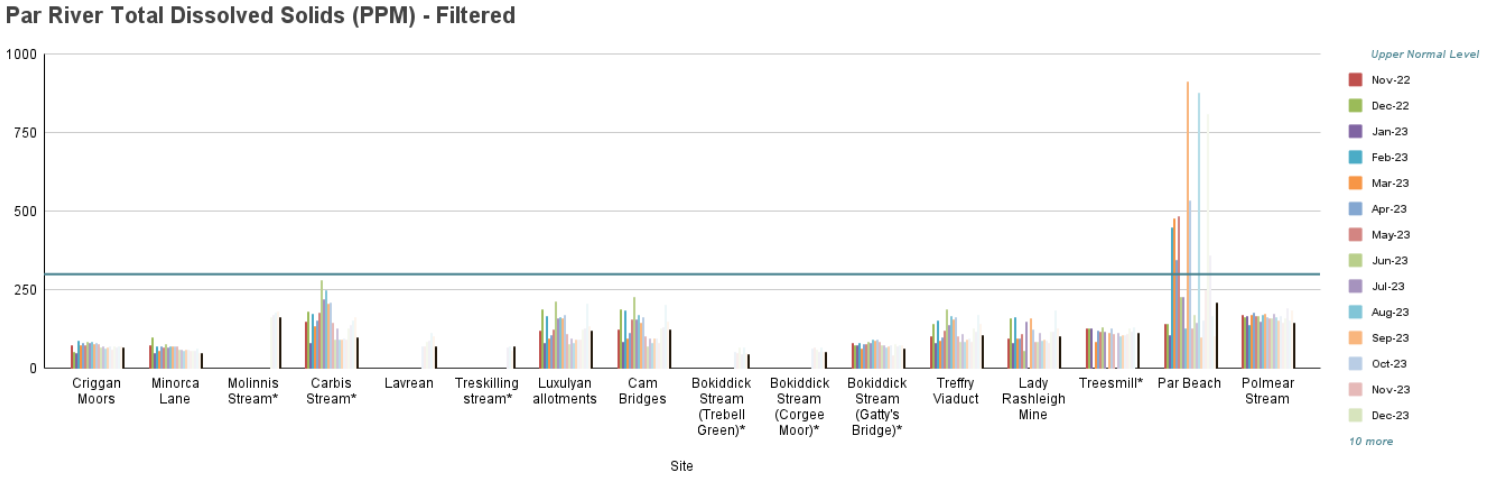
(a) This month:



(b) From November 2023 until now:



(c) From November 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.

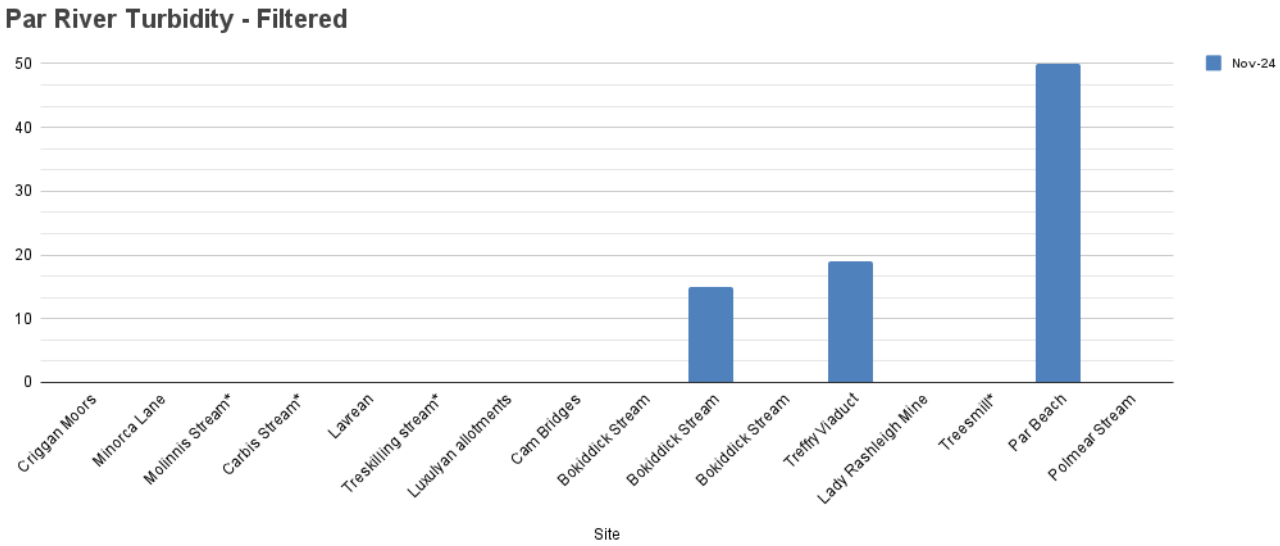
The Yealm Estuary to Moor Project (YEM) in Devon considers that the upper safe level (USL) for turbidity is 75 NTU = 25 mg/l.

2. Results November 2024:

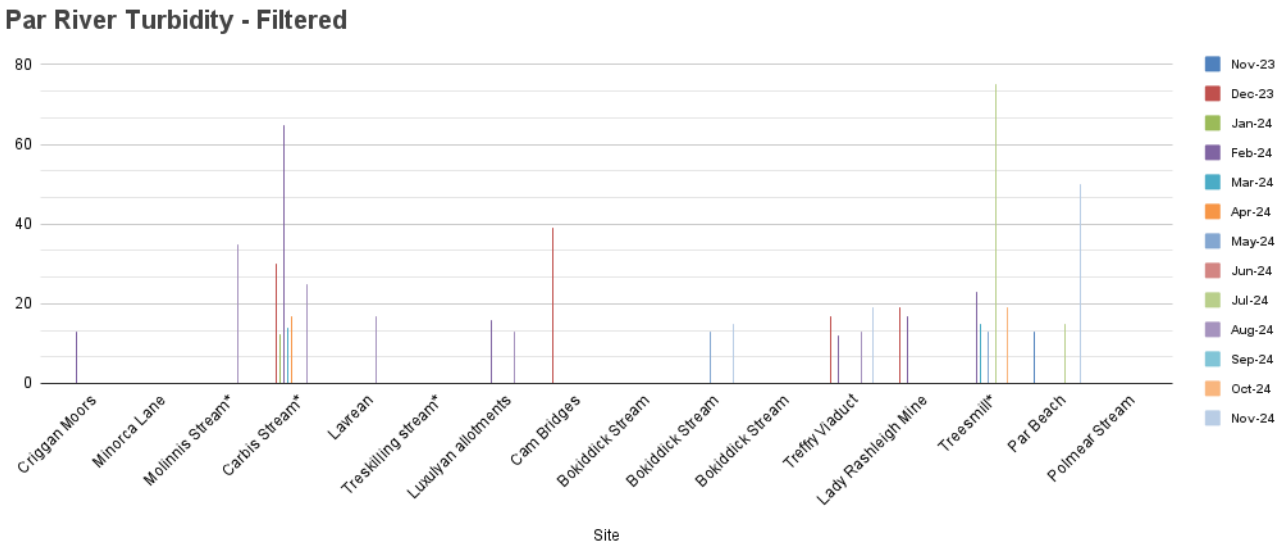
PAR RIVER/TRIBUTARY	LOCATION	Turbidity (NTU)
Par	Criggan Moors, Par River, SX 01882 61133	<12
Par	South of Minorca Lane, Par River, SX 02657 59788	<12
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	<12
Tributary	Carbis Stream SX 02834 59401	<12
Par	Lavrean, Par River SX 03134 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	15
Tributary	Gatty's Bridge, Bokiddick Stream SX 05531 57953	<12
Par	Treffry Viaduct, Par River, SX 05650 57179	19
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	50
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	<12

3. Graphs

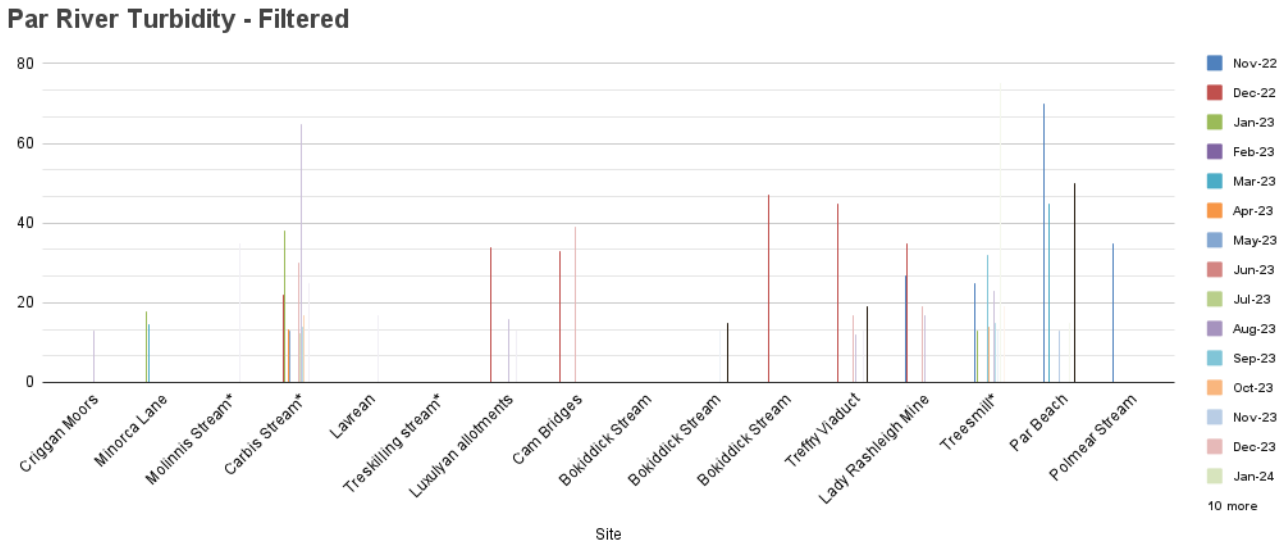
(a) This month



(b) From November 2023 until now:



(c) From November 2022 until now:



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

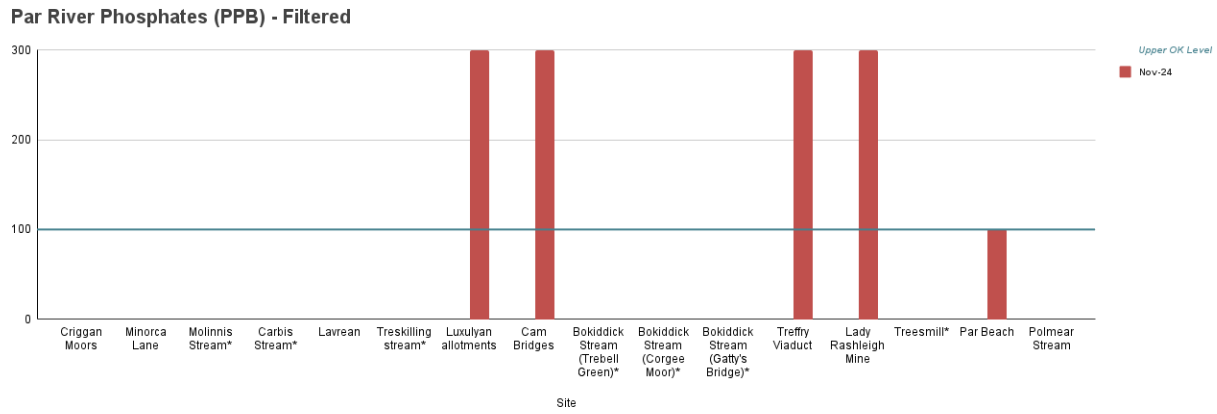
2. Results November 2024

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).

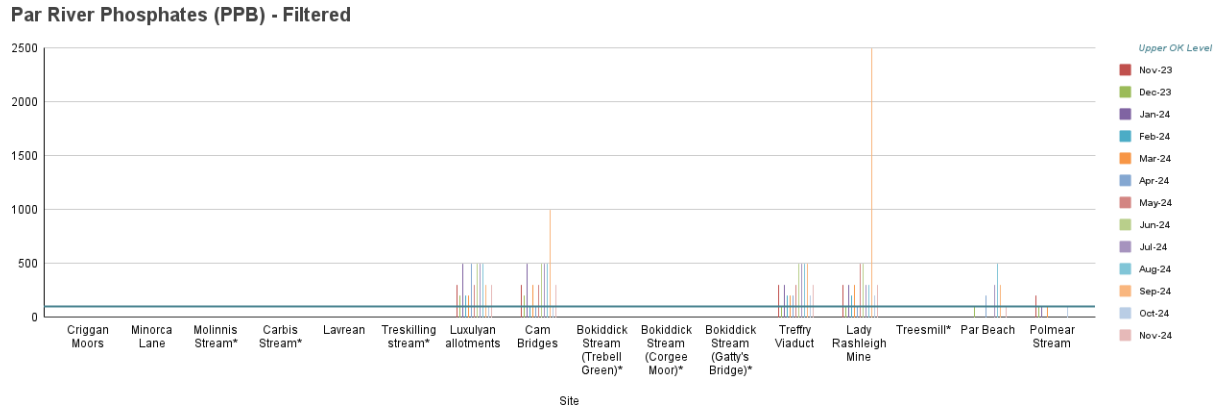
PAR RIVER/TRIBUTARY	LOCATION	Phosphates PPB
Par	Criggan Moors, Par River, SX 01882 61133	**0**
Par	South of Minorca Lane, Par River, SX 02657 59788	**0**
Secondary tributary	Near Forkandles Farm, Molinnis Stream, SX 02460 59271	**0**
Tributary	Carbis Stream SX 02834 59401	**0**
Par	Lavrean, Par River 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	**300**
Tributary	Treesmill, Tywardreath Stream, SX 08873 55385	**0**
Par	Par Beach slipway, SX 0776 53261	**100**
Tributary	Polmear Stream, Ship Inn, SX 08749 53417	**0**

4. Graphs

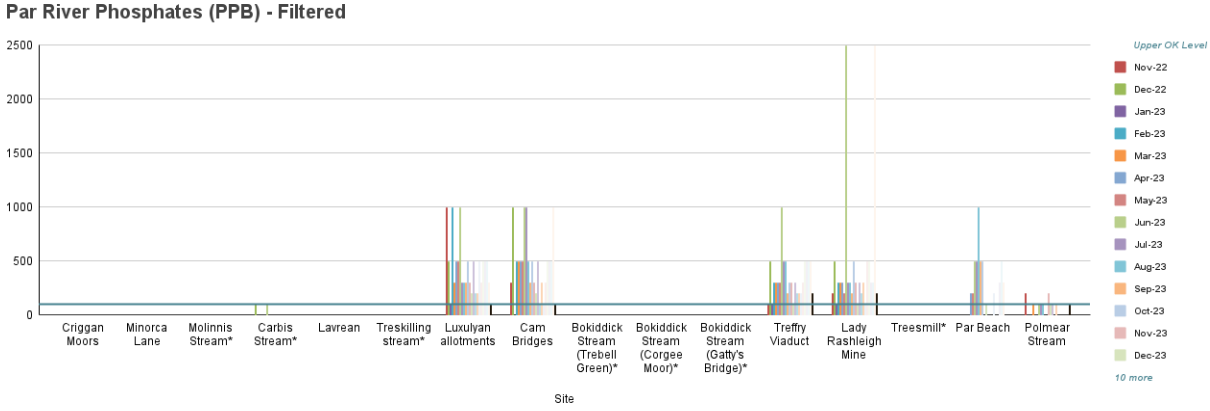
(a) This month:



(b) From November 2023 until now:



(c) From November 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	None	None
South of Minorca Lane, Par River, SX 02657 59788	Long-tailed Tit, Chaffinch	None
Forkandles Farm, Molinnis Stream, SX 02460 59271	None	Japanese Knotweed
Carbis Stream SX 02834 59401	Great Tit, Long-tailed Tit, Chaffinch	None
Lavrean, Par River SX 03134 59164	Chaffinch	None
Treskilling, Treskilling Stream, SX 04107 57726	Meadow Pipit	None
Luxulyan allotments, Par River, SX 04732 58045	None	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	Dipper	None
Lady Rashleigh Mine, Par River, SX 06451 56509	None	None
Treesmill, Tywardreath Stream, SX 08873 55385	None	None
Par Beach slipway, SX 0776 53261	None	None
Polmear Stream, Ship Inn, SX 08749 53417	None	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	Very slight grey-tinge to the water (china clay)
Carbis Stream SX 02834 59401	None observed.
Lavrean, Par River SX 03134 59164	Foam.
Treskilling, Treskilling Stream, SX 04107 57726	Foam.
Luxulyan allotments, Par River, SX 04732 58045	Foam.
Cam Bridges, Par River, SX 05292 57454	Foam.
Trebell Green, Bokiddick Stream SX 0551960226	None observed.
Corgee Moor, Bokiddick Stream SX 0593462167	Foam.
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	None observed.
Par Beach slipway, SX 0776 53261	None observed.
Polmear Stream, Ship Inn, SX 08749 53417	None observed.

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 and Callum Lewis is greatly appreciated. The

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Roger Smith, 15th December 2024