

ECP monthly water quality data report April 2024



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1. Overview

This report provides a synopsis of water quality in the Evenlode catchment for April 2024. The data sources and recording periods used for this report are summarised in **Table 1**.

Data sources and monitoring period

Table 1: Data types, sources, and monitoring periods

Data type	Data source	Start	End
Rainfall	Environment Agency	01/04/2024	30/04/2024
Combined Sewage Overflows	Thames Water	01/04/2024	30/04/2024
Nutrients	ECP FWW Spring WaterBlitz (citizen science)	19/04/2024	23/04/2024
Nutrients	Environment Agency	15/04/2024	26/04/2024
Turbidity	ECP Proteus sondes	17/04/2024	22/04/2024
Chromophoric dissolved organic matter			
Tryptophan			
Riverfly	ECP citizen science	April 2024	

Rainfall data and combined sewage overflows (CSOs) from sewage treatment works (STWs) are presented for the month. These can be considered the “inputs” or drivers of water quality in terms of contamination and available dilution. No data are available for specific pollution sources other than from STWs, but diffuse pollution for agriculture, as well as outflows from septic tanks and other small sewage treatment facilities at household level also impact water quality in the Evenlode catchment.

Sonde data is presented for 17 – 22 April, i.e., covering the weekend when citizen science (CS) Freshwater Watch (FWW) surveying was carried out (19 – 22 April. All Environment Agency (EA) data available for April is presented. Riverfly results reported during April are also included.

Rainfall data

Rainfall for April at Worsham Mill is shown in **Figure 1**.

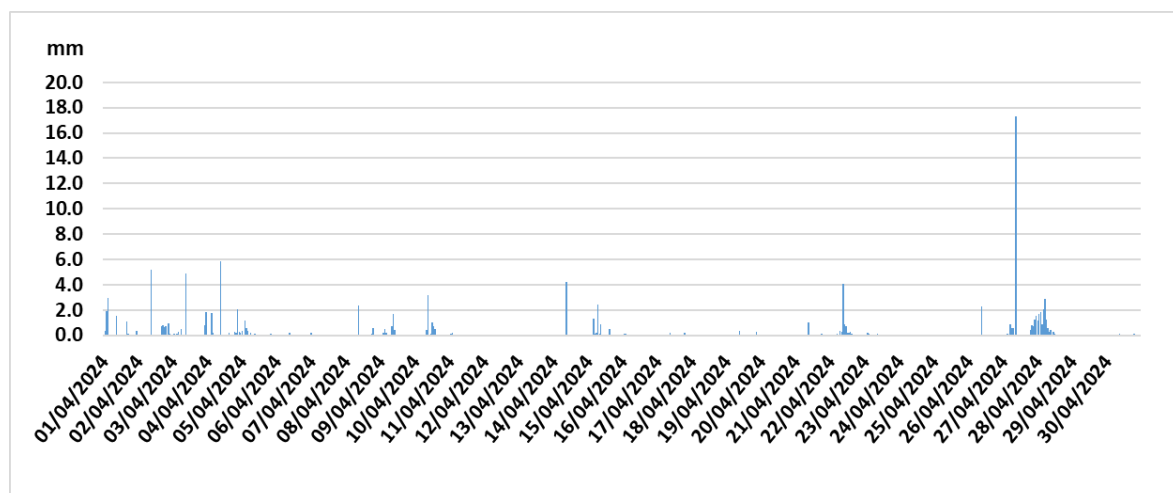


Figure 1: Rainfall at Worsham Mill 01/04/2024 – 30/04/2024

Combined sewage overflow data

The hours that CSOs were discharge from STWs into the River Evenlode and its tributaries are shown in **Figure 2**.

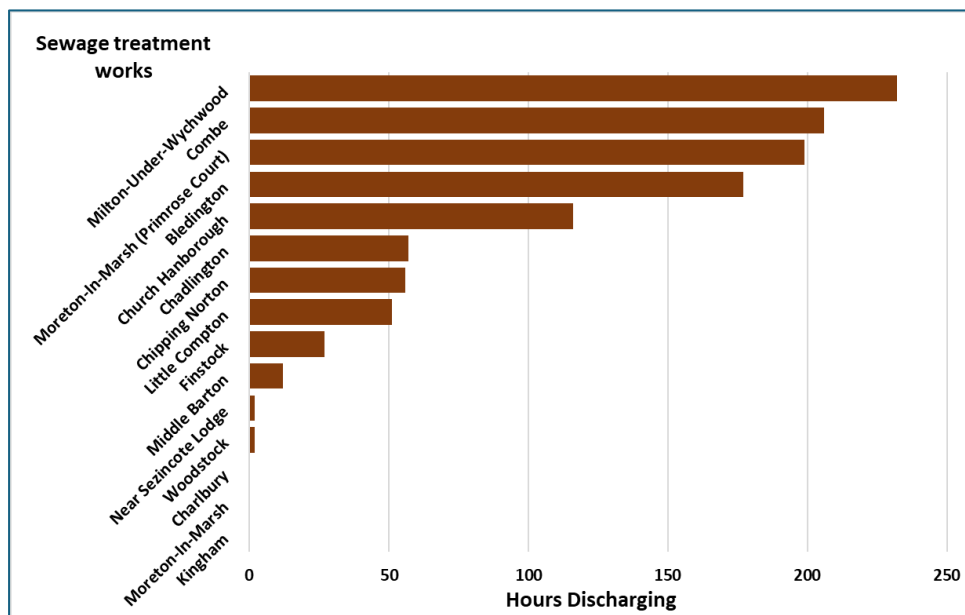


Figure 2: Combined sewage overflows 01/04/2024 – 30/04/2024

FWW monitoring: Spring WaterBlitz data

180 Citizen Scientists participated in the Spring 2024 Evenlode Catchment Partnership WaterBlitz from 19 – 22nd April. Weather conditions over the WaterBlitz weekend were mainly dry. 60% of people reported no rain, while 40% experienced light showers. River levels reflected the drier weather this month with almost 90% of observers noting average flows. Nitrate (**Figure 3**) and phosphate (**Figure 4**) concentrations recorded for the Evenlode and its tributaries between 19 – 22nd April 2024 are shown below.

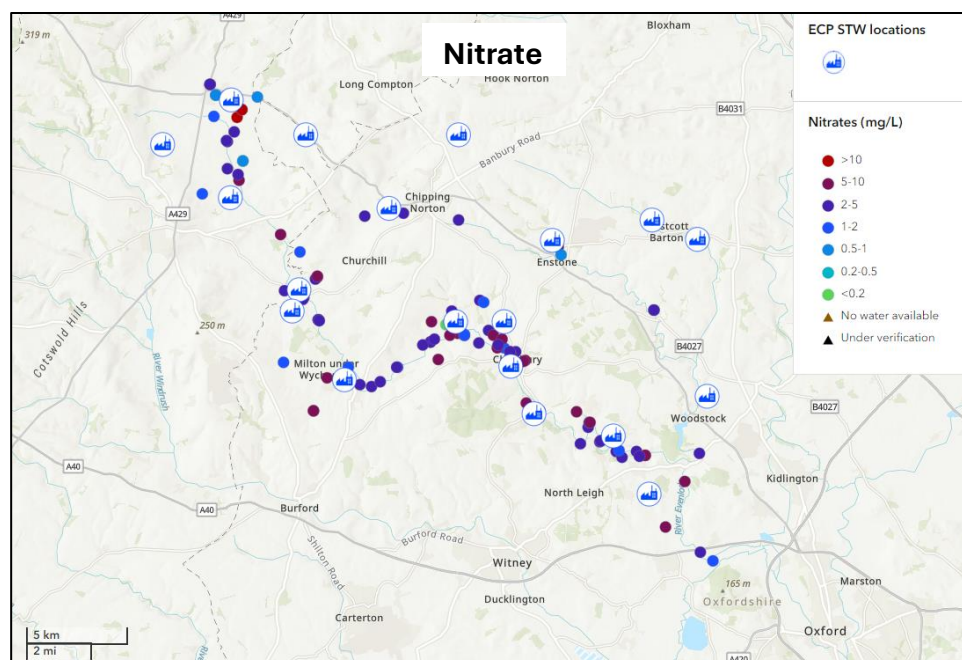


Figure 3: FWW nitrate concentrations 19/04/2024 – 22/04/2024

The highest nitrate concentrations (>10 mg/litre) were recorded on the Four Shires Brook near Moreton in Marsh. High (>2.0 mg/litre) and moderate (1.0 mg/litre – 2.0 mg/litre) nitrate concentrations were evident throughout the length of the Evenlode, with low concentrations (<1.0 mg/litre) mainly restricted to tributary headwaters. One very low reading (< 0.2 mg/litre) was recorded, at Lower Court Farm fishpond near Chadlington.

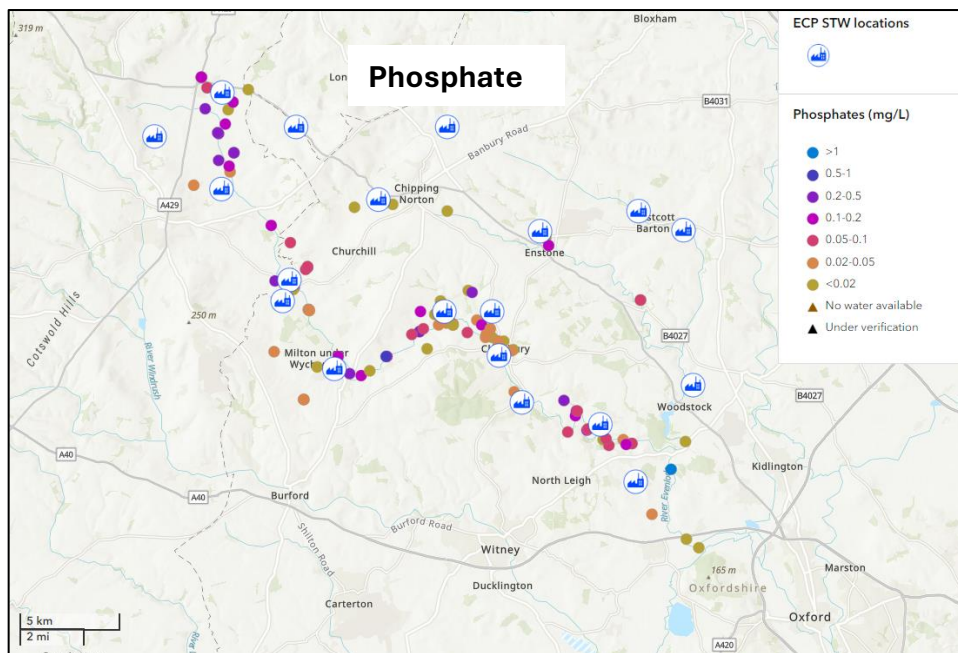


Figure 4: FWW phosphate concentrations 19/04/2024 – 22/04/2024

A very high phosphate concentration of > 1.0 mg/litre was recorded for the Evenlode below the A4095, i.e., downstream of the Combe STW. Unfortunately, the EA sampling site here (TH-PEVR0080, Evenlode downstream of Glyme tributary [sic]) has not been active since 2019, so there is no comparable data. The second highest concentration (0.5 – 1 mg/litre) was recorded downstream of the Milton under Wychwood STW. High (> 0.2 mg/litre) and moderate (0.1 - 0.2 mg/litre) phosphate concentrations were restricted to the main channel of the Evenlode, particularly in the headwaters around Moreton in Marsh. Low (<0.1 mg/litre,) concentrations were also evident down the Evenlode, in the tributaries around Moreton in Marsh, Chipping Norton, and Chadlington, and on the Glyme. However, these low concentrations were typically not found immediately downstream of STWS).

Figure 5 and **Figure 6** show that high nitrate and phosphate concentrations were more frequent in April with respect to the past 4 months of 2024.

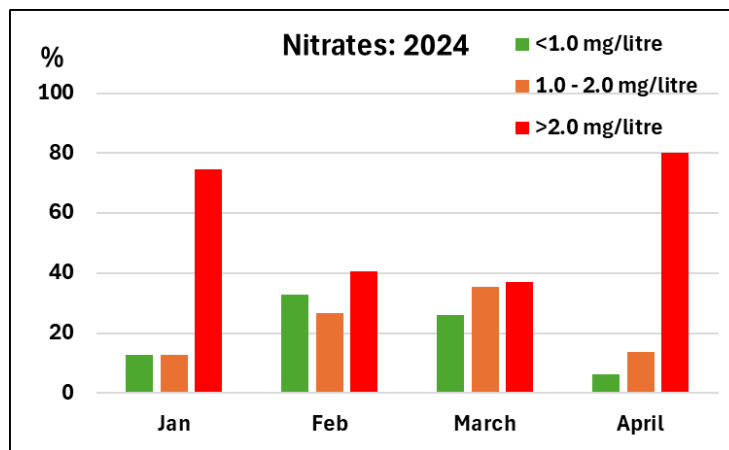


Figure 5: Nitrate concentrations January – April 2024

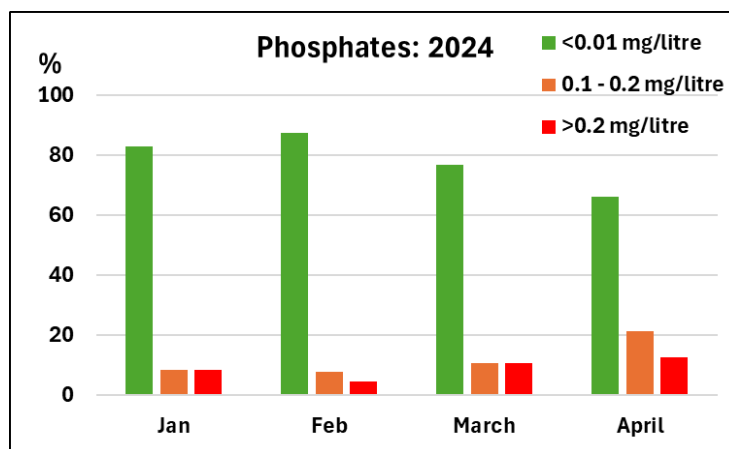


Figure 6: Phosphate concentrations January – April 2024

Environment Agency data

The Environment Agency (EA) monitored 8 sites in the Evenlode catchment in April. Nitrate as N, and orthophosphate reactive as P measured by the EA data are comparable with the N and P concentrations measured by citizen scientists using the FWW test kits. The EA site details and nutrient concentrations are summarised in **Table 2**. The results summarised in Table 2 reflect the trends shown by the CS FWW surveying: High nitrate concentrations and low phosphate concentrations.

Table 2: Environment Agency Evenlode sampling site details for April 2024

ID	Site	Latitude	Longitude	Date	Nitrate as N (mg/l)	FWW range (mg/l)	Ortho-phosphate reactive as P (mg/l)	FWW range (mg/l)
TH-PEVR0052	Fire College Stream 150 M Below A44	51.987946	-1.679156	17-Apr	1.66	1 - 2	0.066	0.05 – 0.1
TH-PEVR0006	Evenlode at T B4449, Cassington	51.788664	-1.351885	26-Apr	6.89	5 - 10	0.053	0.05 – 0.1
TH-PEVR0013	Evenlode below Ashford Bridge	51.836954	-1.441177	15-Apr	7.09	5 - 10	0.095	0.05– 0.1
TH-PEVR0081	Evenlode d/s of Westcote Brook tributary	51.897387	-1.626247	22-Apr	6.09	5 - 10	0.12	0.1 – 0.2
TH-RSN0626	Heythrop Park	51.927167	-1.458003	15-Apr	11	>10	< 0.01	<0.02
TH-RSN1250	D/S Heath End Bridge	51.972343	-1.677753	17-Apr	5.19	5 - 10	0.05	0.02 – 0.05
TH-SSN0207	D/S Station Road - Kingham Stream	51.905748	-1.625945	18-Apr	3.2	2 - 5	0.041	0.02 – 0.05

2. Selected analyses

Moreton in Marsh

FWW and EA data

Both FWW and EA nitrate and phosphate data are available for some waterbodies near Moreton in Marsh (Figure 7)

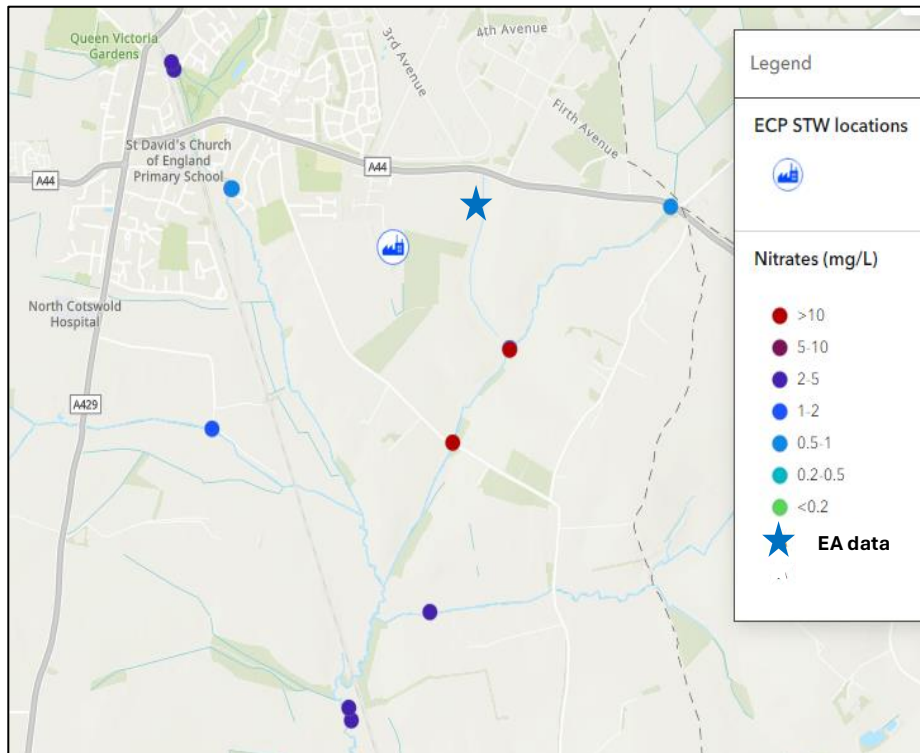


Figure 7: FWW and EA nitrate concentrations near Moreton in Marsh

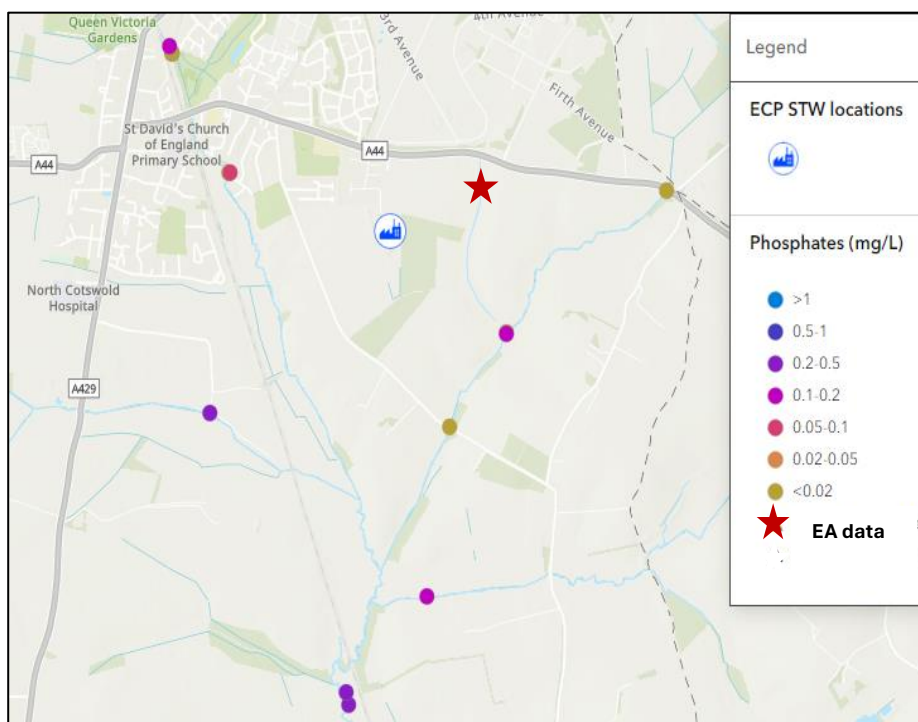


Figure 8: FWW and EA phosphate concentrations near Moreton in Marsh

The EA data fell within the same range as the FWW data for headwaters in this area. All nitrate values were high, showing evidence of pollution sources. Both nitrate and phosphate concentrations increase downstream towards the main channel of the Evenlode

Riverfly data

Despite the very high nitrate and moderate phosphate concentrations associated with the Riverfly sampling site near Moreton in Marsh, the trigger level was not breached (**Figure 9**).

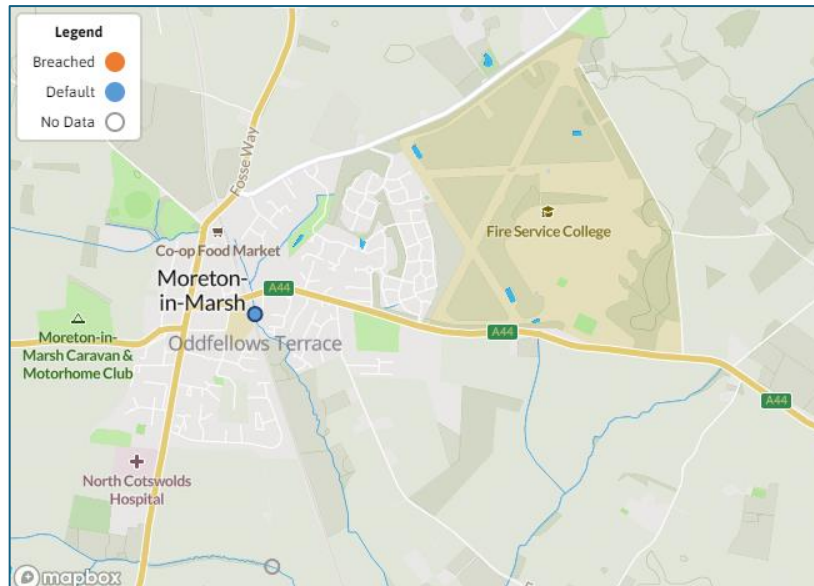


Figure 9: Riverfly data near Moreton in Marsh

The Chipping Norton Brook (also known as the Blue Brook)

Combined sewage outflows

Chipping Norton STW released raw sewage into the Chipping Norton Brook for ~52 hours during April.

FWW data

No EA data are available for the Chipping Norton Brook. FWW data are shown in **Figure 10** and **Figure 11**.

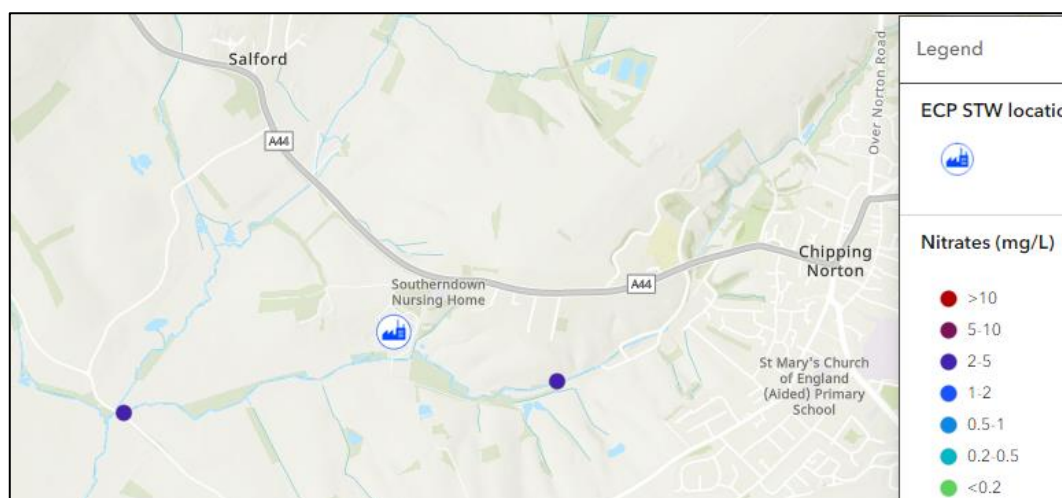


Figure 10: Nitrate concentrations up and downstream of Chipping Norton STW

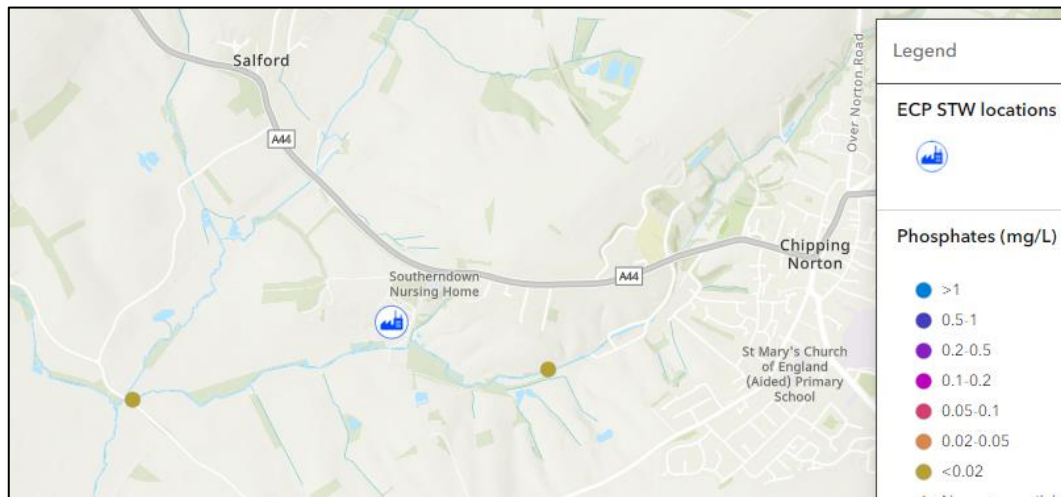


Figure 11: Phosphate concentrations up and downstream of Chipping Norton STW

Surprisingly, there was no difference in the FWW nutrient levels recorded up and downstream of the STW. Nitrate concentrations were high (2 – 5 mg/litre) whilst phosphate concentrations were very low (<0.02 mg/litre).

Sonde data

Two Proteus sondes are installed on the Chipping Norton Brook, one downstream of the Chipping Norton STW, and one further downstream below a constructed natural flood management intervention.

The impact from the sewage works was visible in the sonde data, as rainfall decreased and river levels fell, reducing dilution in the river. There was a buildup of sediment with a strong activated sludge smell observed in the first holding area of the wetlands below Chipping Norton STW. Also, the presence of filamentous algae noted in the field above the road was indicative of nitrification. NB: the graphs below have differing vertical scales, and that although units appear to change, ppb = µg/l

Turbidity indicates the total suspended solids present. There was no significant difference between turbidity readings for the two sites.

Chromophoric dissolved organic matter (CDOM) is the light-absorbing part of organic matter. It does not specifically measure sewage, but at the sonde locations, there is a strong correlation between CDOM and the sewage discharges. (Caution - different colours between graphs). There are clearly defined twice daily peaks due to sewage effluent downstream of the STW (**Figure 12**), which rise gradually from peaks of ~63 µg/l to peaks of ~75 µg/l over the monitoring period. Below the wetland (**Figure 13**) these peaks are lower (between 55 µg/l and 65 µg/l but still visible).

Tryptophan: is an amino acid, indicative of organic contamination and microbial activity. Sewage discharge is the dominant source at these locations. The pattern is the similar to CDOM, with peak values ranging from 26 ppb to 32 ppb downstream of the STW (**Figure 12**), but remaining steadier at 25 ppb downstream of the wetland (**Figure 13**).

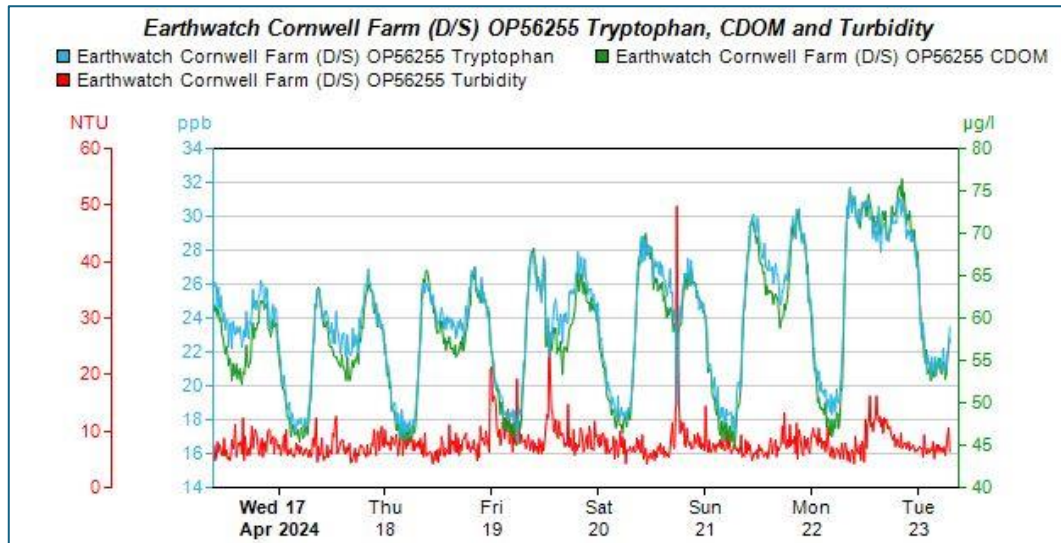


Figure 12: Turbidity, tryptophan and CDOM for the Chipping Norton Brook downstream of Chipping Norton STW

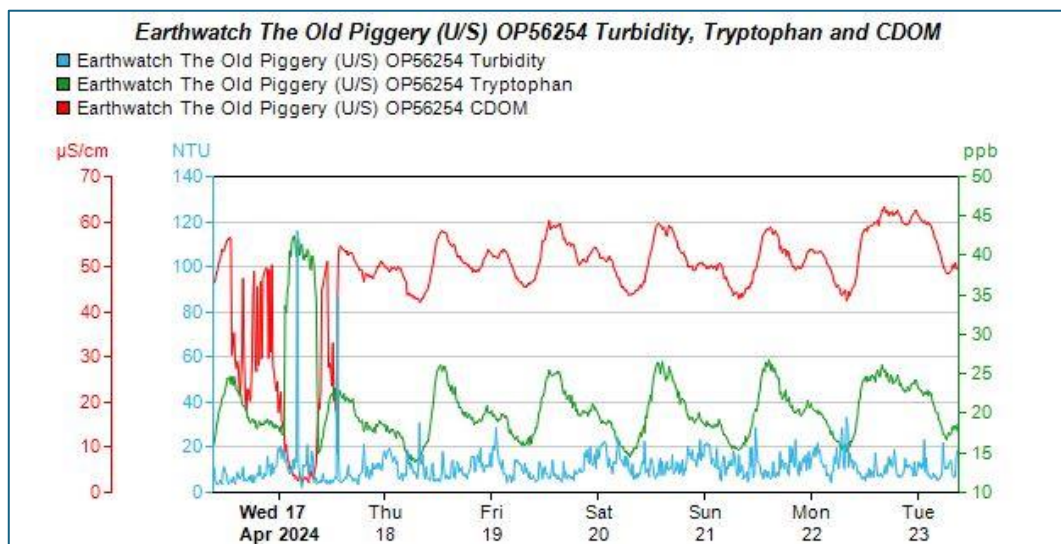


Figure 13: Turbidity, tryptophan and CDOM for the Chipping Norton Brook downstream of the natural flood management intervention

Milton under Wychwood sewage treatment works

Combined sewage overflows

Milton under Wychwood STW released raw sewage into the Littlestock Brook for ~230 hours during April (**Figure 1**).

FWW data: nitrate

The EA have never sampled near Milton under Wychwood STW. **Figure 14** shows the effect on the River Evenlode of the nitrate outflow from the Littlestock Brook.

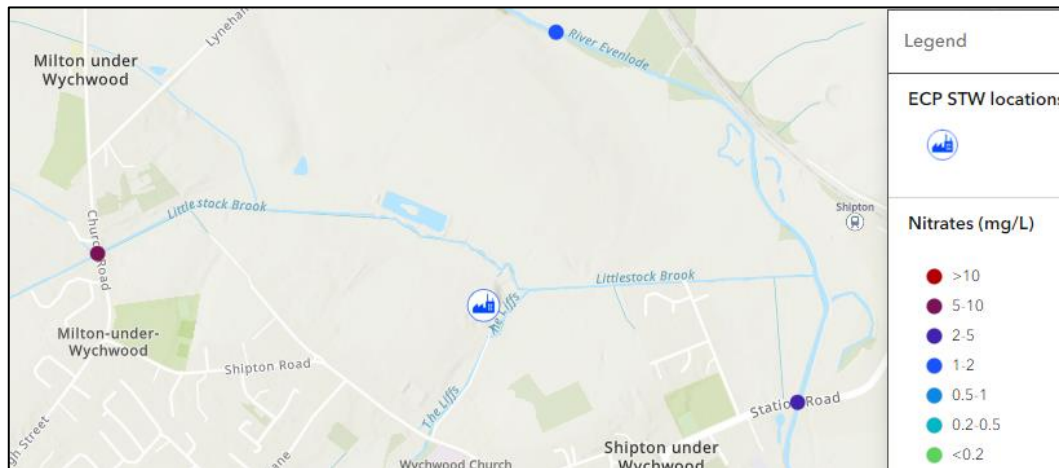


Figure 14: Nitrate concentrations up and downstream of Milton under Wychwood STW

Nitrate concentration measured above the STW was high, at 5 – 10 mg/litre. Unfortunately, there was no FWW survey data in April immediately downstream of the STW for comparison and to indicate whether upstream agriculture, the STW, or a mixture of both was the likely source. The Evenlode above the confluence with the Littlestock Brook, measured a nitrate concentration 1 – 2 mg/litre, but below the confluence this rose to 2 – 5 mg/litre.

FWW data: phosphate

Figure 15 underlines the negative impact of the STW on phosphate concentrations. Above the STW on the Littlestock Brook, phosphate concentrations were low, measuring < 0.02 mg/litre. Above the confluence, the Evenlode had moderate (0.1 – 0.2 mg/litre) concentrations. Downstream of the confluence, phosphate concentrations in the Evenlode increased to 0.2 – 0.5 mg/liter, with the STW the obvious source.

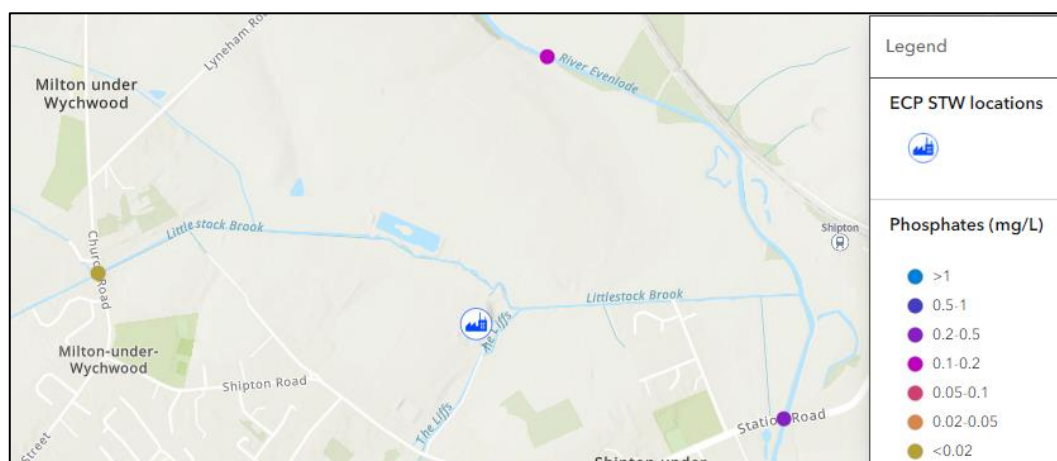


Figure 15: Phosphate concentrations up and downstream of Milton under Wychwood STW

Sonde data

Two Proteus sondes are installed on the Littlestock Brook, up- and downstream of the Milton under Wychwood STW.

Turbidity: There was no significant difference between upstream (Heath Farm, **Figure 16**) and downstream (Littlestock House, **Figure 17**).

CDOM: Upstream of the STW at Heath Farm (**Figure 16**), CDOM declined steadily from April 17th to 22nd, before rising steadily again. In contrast, twice-daily peaks are clearly seen downstream at Littlestock House (**Figure 17**), due to the impact of Milton under Wychwood Sewage works on the watercourse.

Tryptophan: This indicator of organic contamination and microbial activity ranged from ~7 ppb to 7.5 ppb upstream (**Figure 16**), but was approximately twice this (~13 ppb downstream (**Figure 17**), again with clearly-defined twice-daily peaks reflecting the morning flush and the evening domestic activity.

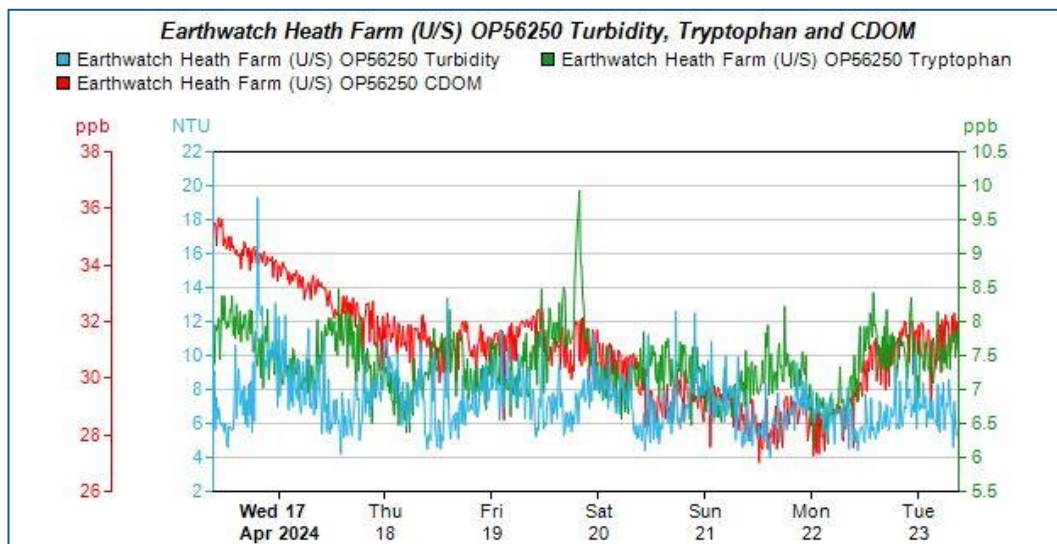


Figure 16: Turbidity, tryptophan and CDOM for the Littlestock Brook at Heath Farm

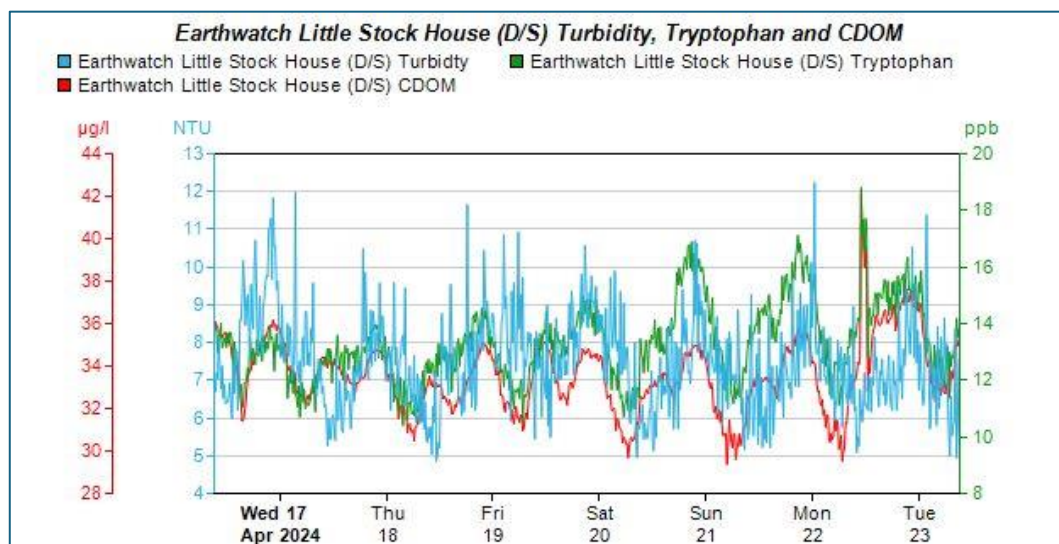


Figure 17: Turbidity, tryptophan and CDOM for the Littlestock Brook at Littlestock House

Riverfly data

The Riverfly results (**Figure 18**) do not reflect these nuances, showing only that no trigger levels were breached at any of the sites around the STW.

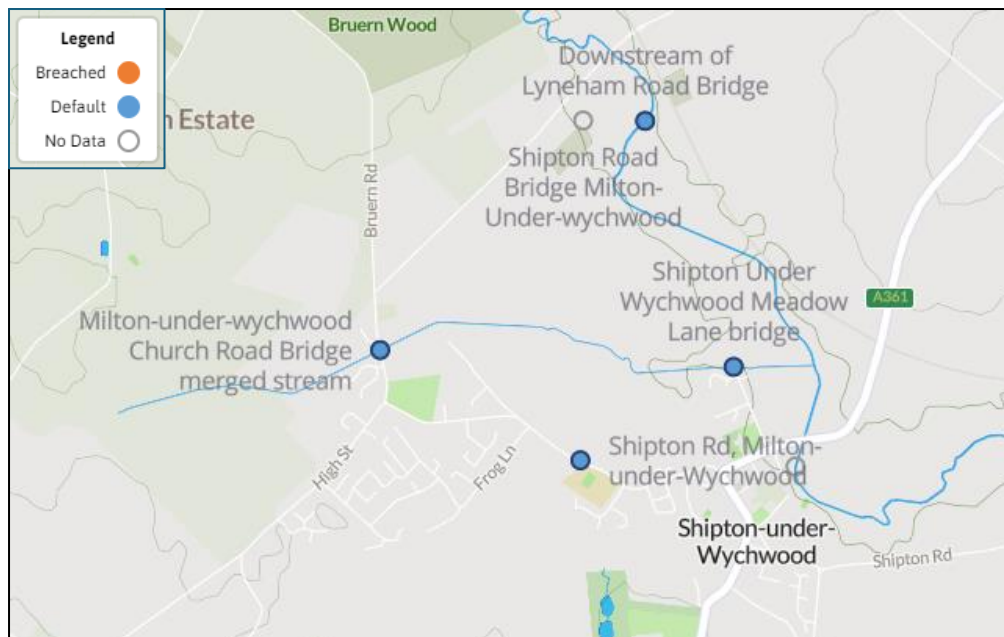


Figure 18: Riverfly results up and downstream of Milton under Wychwood STW ([Riverfly Data](#))

3. Summary

Riverfly data did not raise any “red flags” with regard to water quality, while the CS FWW nitrate and phosphate concentrations were the highest recorded in 2024. This was supported by the EA measurements. Chipping Norton STW appeared to have less downstream impact on water quality in the Chipping Norton Brook than Milton under Wychwood STW had on the Littlestock Brook, in terms of nitrates and phosphates. However, turbidity, tryptophan and CDOM measured by in situ probes clearly showed the twice-daily peaks due to releases from these works, highlighting the value of multi-parameter monitoring of these areas of concern.