

Analysis of stream water, Christmas Farm Llay – Oct 2022

Sampled and analysed by: M Williams

Date: 13/10/2022

Test parameter	Method	Unit	Composite sample	Alt result/comment
Temp	Hach Hq40d	°C	15.8	As expected at this time of year
Diss O2	Hach Hq40d	mg/l O2	8.46	Aerobic conditions
Turbidity	Hach 2100P Turbidimeter	NTU	14.7	Relatively light turbidity
Conductivity	Hanna HI9835 Meter	µs/cm	3390	The conductivity is unusually high (normal 50 to 1500 µs/cm)
pH	Palintest Micro 600 pH meter	pH units	8.09	Within the optimum range for fresh water systems in this area
Ammonia	Lovibond MD600 photometer	mg/l NH3	1.75mg/l	Relatively high level of ammonia
Unionised ammonia	Calculation based on temp & pH	mg/l UaA	0.06	At the threshold level where a toxic effect may be seen in fish
Nitrite	Lovibond MD600 photometer	mg/l NO2	0.08	Relatively high but not yet at a level to cause toxicity to fish
Nitrate	iDip photometer	mg/l NO3	6.63	Sufficiently high to drive a moderate algal bloom
Alkalinity	Lovibond MD600 photometer	mg/l CaCO3	320	Very high level of alkalinity
Iron	Lovibond MD600 photometer	mg/l Fe	0.03	Low
Aluminium	Lovibond MD600 photometer	mg/l Al	BDL	Below detectable limit
Phosphate	Lovibond MD600 photometer	mg/l PO4	2.68	Sufficiently high to drive a significant algal bloom
Aerobic bac count	TTC dipslide	CFU/100ml	<10 ²	indicating low levels of nitrifying bacteria
Chlorophyll a	YSI 6820 V2	µg/l	3	Low
Hepatotoxins	BlueGreenTest®	Presence/absence	Absent	Absent
Total dissolved solids	Hanna HI9835 Meter	parts per million	1690	Unusually high
Pseudomonas	PDM/Mac dipslide	CFU/100ml	<10 ²	Acceptable
Pseudomonas aureus	PDM/Mac dipslide	CFU/100ml	<10 ²	Acceptable
E.coli	E. coli dipslide	CFU/100ml	<10 ²	Acceptable
Coliforms	E. coli dipslide	CFU/100ml	<10 ²	Acceptable

The above analysis was not performed in a UKAS registered laboratory

Interpretation

The water entering the Christmas Farm site comes via the culvert running under Llay Road. The catchment includes residential dwellings, of which some at least have septic tanks, agricultural fields, quarry workings, industrial sites as well as the site of a previous coal mine.

The main concerns about the water quality entering site include:

- Potential ill effects to livestock, visitors and staff from contact with the water.
- Negative effects on aquatic organisms in the streams and lakes currently on site, #or planned to be on site in the future.
- Negative effects on the water quality of the proposed aquatic recreation lake, including toxic algal blooms,
- Odour.

The analysis carried out included parameters normally used to assess the basic water chemistry of a freshwater system. The results indicated that none of the parameters were at levels to cause illness in livestock or humans. The conductivity and TDS however were at levels considered unusually high for freshwater systems and as such I would recommend further investigation.