

## The River Wharfe: its wonders and woes

St Peter's Church Hall

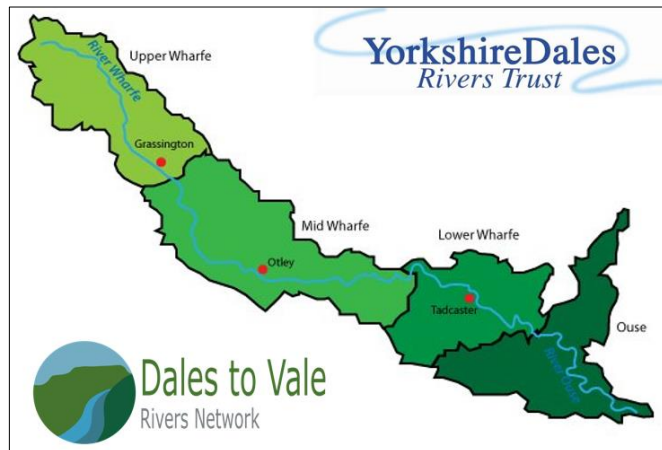
Saturday, July 20<sup>th</sup> from 1.30 pm



Climate Action Addingham (CAA) held its Water Week, the third or four themed environment weeks, from July 13<sup>th</sup> to 20<sup>th</sup>, 2024. The stand-out event was a meeting on Saturday July 20<sup>th</sup> on “The River Wharfe: its Wonders and Woes”.

The meeting was concerned with the River Wharfe, especially the section of the river running from Bolton Abbey, through the village of Addingham towards and beyond Ilkley. It was a meeting designed to address the questions: How well do we understand the river and its wildlife? How healthy is the river? How safe is it to swim in? And how can we restore and protect it for future generations?

**Charlotte Simons** of the Yorkshire Dales Rivers Trust (YDRT) set the scene introducing the Wharfe as a Dales river rising in the Pennine Hills and flowing down to the Vale of York, a distance of 65 miles. She described the pressures on the river from habitat loss, from the impact of invasive species and from water pollution and she outlined the projects being carried out by YDRT working with volunteers, farmers and local communities raising awareness, restoring habitats, controlling invasive species and slowing the flow of floodwater in the catchment.



**Steve Westerman** of the Wharfedale Naturalists Society spoke about the rich variety of wildlife species to be found along the river Wharfe between Addingham and Burley. His talk was



illustrated by exceptionally detailed photographs, all taken locally, of otters, kingfishers and other riparian wildlife. They expertly captured aspects of behaviour, especially the selection of prey items. Despite these “wonders”, he expressed serious concerns about the effects of disturbance and habitat loss along this section of the river, through human activity and the increasing number of dogs that are allowed to run free along the banks.

The presentation by **Jon Grey** (Wild Trout Trust and Lancaster University) was concerned with native wild brown trout, and the role of trout as indicators of freshwater health. His focus was on habitat management and the need to provide suitable habitat conditions for all life-cycle stages. Good conditions are found when there is a mosaic of micro-habitats in the main river,



when the river is connected to its flood plain and when there is good connectivity both along the river and between the river and its tributary becks. He explained that the Wharfe has been heavily modified over the centuries, channels have been straightened, riverbanks have been reinforced to prevent lateral movement of the channel, weirs and other barriers have been built on the main river, especially during the nineteenth century, and culverts and barriers have been constructed on tributaries impeding the movement of fish to headwater spawning sites. However, there is good evidence from sites in Upper Wharfedale and other Dales' rivers that where habitats have been improved trout numbers increase quite rapidly.



Trout were also the subject of **Richard Maxted's** talk. He spoke about the Environment Agency's plans to install a fish pass on the weir at Addingham Low Mill as part of a programme of measures to improve fish passage along the river. He used the occasion to say that previous plans to instal a fish pass at the site are being reviewed in light of improved knowledge. He also gave a reassurance that every effort would be made to consult with the landowner and local residents once a new design was agreed. He stressed that the structure would need to be

carefully crafted not just to attract upstream-swimming fish to it but also to protect the function of the weir as the most important flow gauging station on the river capable of accurately measuring flows from near zero to 300 cubic metres per second. These measurements are used to monitor and regulate the pumping of water by Yorkshire Water from the river at Lob Wood and the release of compensation flows from Grimwith Reservoir, and they help to forecast flood risk downstream.

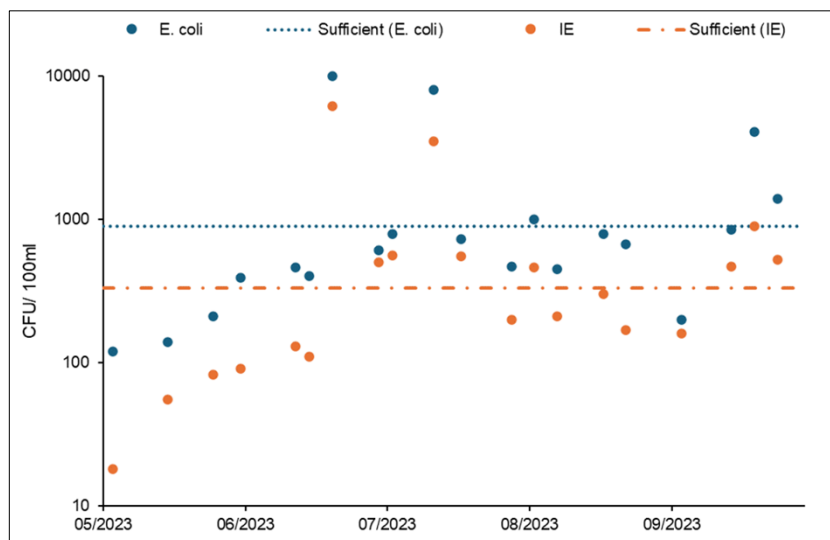
**Rick Battarbee** (Addingham Environment Group and UCL) gave a very brief introduction to pollution problems in the Wharfe. He differentiated between nutrient pollution as the main threat to the ecological health of the river and faecal bacteria as the main health threat to people using the river for recreation, especially swimming. He said that the single most severe point source of nutrient pollution on the river is the treated effluent outfall from Ilkley Sewage Works.



Ilkley sewage works is also a major source of faecal bacteria discharged from both untreated storm overflows and treated outfalls. It was sightings of untreated effluent being discharged into the river close to the Cromwheel Corner in Ilkley that gave rise to the formation of the Ilkley Clean River Group and their campaign to clean up the river, ultimately leading to the designation of that stretch of the river as the first designated running water bathing site in the UK. Upstream of the Cromwheel high concentrations of *E. coli* and other faecal indicator bacteria are discharged after prolonged rainfall events from the Addingham Pumping Station storm overflow. Faecal bacteria are also washed in from agricultural land.

**Jane Dacombe** and **Tom Wait** (Environment Agency) followed directly on to explain the work undertaken by the EA at the Cromwheel site since its bathing water designation in 2020. Their role was not only to monitor the site during the bathing water season (May to September) for *E. coli* and intestinal enterococci (IE) as required to classify the status of the site for safe bathing but also to investigate reasons for its failure to meet the minimum standard. In each of the three seasons (2021, 2022 and 2023) monitored to date the Cromwheel site has been classified as “poor”. A “poor” classification is also expected for 2024 once all the samples have been taken and analysed. “Poor” in this context means a fail and swimming is not advised.

The investigation showed that “poor” conditions at the Cromwheel were best predicted by moderate to heavy rainfall occurring in the catchment upstream in the preceding 72 hours. All samples taken with no antecedent catchment rainfall over that period of time passed the safety test.



Rain events increase the faecal bacteria inwash from agricultural land, from combined sewer overflows and from surface runoff in urban areas. The contributions from the different sources varies depending especially on the spatial distribution of rainfall in the catchment and proximity to the bathing water site.

Additional, non-statutory monitoring at sites upstream, including Kettlewell, Grassington, Burnsall and Bolton Bridge also showed high concentrations of faecal bacteria present after rainfall. If these sites had been designated for bathing they would also have failed.



Standard techniques of measuring faecal bacteria in water do not differentiate between sources. Genetic methods, however, using a technique called microbial source tracking (MST) can be used to discriminate between bacteria derived from farm animals and from humans. Using this technique the EA were able to show that faecal bacteria come from both human and agricultural sources in both wet and dry weather conditions but that the increase in concentrations observed in wet conditions can largely be attributed to agriculture, principally from cows and sheep.

The EA study concluded:

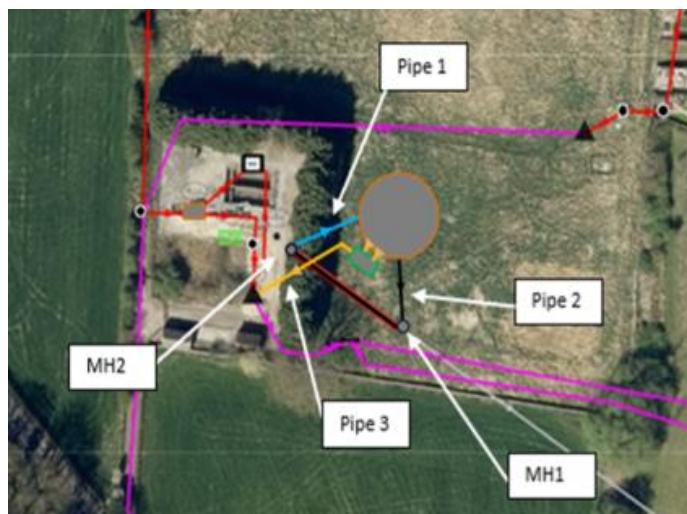
- Don't swim in the River Wharfe for a minimum of 72 hours after moderate or heavy rainfall anywhere within the catchment
- FIO contamination at the Cromwheel and throughout the catchment originates from multiple sources including agriculture and sewage
- The whole of the catchment can be affected by faecal organism contamination, including the upper reaches

**Emma Brown** (Yorkshire Water), was unable to attend the meeting in person but submitted a presentation in writing on Wastewater Solutions for the Wharfe with special reference to Addingham. She explained that Addingham was included in plans to [improve water quality in the Wharfe in Ilkley](#). Under the Environment Act, all overflows 5km upstream of an inland bathing water should aim to achieve one spill during a bathing season (May to Sept) and no more than ten spills per year on average. The overflow in Addingham is within 5km of the bathing water and so is part of YW's investment plans to improve bathing water quality.

A new large circular storage tank will be installed at Addingham Sewage Pumping Station CSO on the land beside the existing pumping station to store flows during heavy rain and reduce spill frequency. It is proposed that there will also be two new manholes and associated pipework to connect the storage to the existing asset and replace the existing overflow with a new chamber.

The current plans are to maintain the current storm overflow discharge location, although following local feedback there is an option of moving the outfall directly into the River Wharfe. A feasibility investigation is currently being scoped with a decision subject to cost, feasibility and permitting.

The question of how to deal with the legacy sludge in the Mill Stream remains open. A public consultation event will be arranged to discuss the issue in the context of the wider plan, bearing in mind that all plans will need permitting by the Environment Agency.



**Isobel Douterelo Soler** (Sheffield University) spoke about using DNA to identify sources of faecal pollution and its potential role in managing designated bathing waters. She was critical of the standard method of using *E. coli* as a faecal indicator organism as *E. coli* concentration does not always reliably predict the presence of pathogens and does not indicate contamination sources.

She described a study on the Wharfe conducted with volunteers from Addingham Environment Group that demonstrated the use of DNA in addressing these issues. Using qPCR to quantify specific bacterial markers she showed that faecal contamination by humans could be differentiated from contamination by ruminant livestock (cows and sheep). The samples collected in dry weather conditions in June and July 2021 were dominated by human-derived bacteria, those collected in August after a heavy rainfall event were dominated by faecal bacteria from agricultural livestock.

To identify the diversity of bacterial pathogens in the water bacterial DNA in the samples was sequenced. This fingerprinting approach showed that sites affected by faecal pollution had relatively high concentrations of the pathogenic bacteria *Mycobacterium* spp, and *Aeromonas* spp. The study concluded that genetic techniques for monitoring faecal contamination of bathing waters and assessing health risks from exposure to pathogens should be used more widely in future.



The final presentation was by **Alistair Boxall** (York University) on the topic of emerging pollutants “Solving the problem of chemical pollution of Yorkshire’s rivers”. He explained that whilst only 16% of English surface waters have good ecological status, none has good chemical status. Over 4000 chemical and chemical mixtures are used in typical UK households and many more substances enter drains and water courses from agriculture, industry and road transport.



A major project to study the distribution and impact of chemicals on Yorkshire rivers including the Wharfe, called EcoMix, has begun but results are not yet available. Data for the River Foss in York, however, show many pharmaceutical products present in the water, including metformin (a diabetes treatment), gabapentin (an epilepsy treatment), fexofenadine (an antihistamine) and paracetamol. Most of these substances were also found in a study of rivers in National Parks throughout England, showing the ubiquity of such pollution and giving rise to concern about their potential impact on wildlife. The results highlighted the importance of minimising disposal of

drugs and other chemical into drains and designing sewage treatment systems, including wetlands, capable of removing them.

**Rick Battarbee**

**21<sup>st</sup> August 2024**