How Citizen Science Can Raise Awareness and Change the World

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Henley local Dave Wallace wanted to do something about pollution in his local river. With the help of River Action, he’s made the move from concerned citizen to citizen scientist – and now he’s hooked. Here’s his story:

This article is written against a backdrop of increasing anger about the dire state of the UK’s water industry and how lack of investment has polluted our rivers and seas. Just 14% of the UK’s rivers are in good health. The abuse of our waterways

can only damage us all in the long run. Water is a precious resource. It is a story of action and the positive contribution of Citizen Science.

I grew up in the water – having lived my early days in Kenya and Fiji.

As a pre-teenager, I ended up in Reading. Swimming was then in my local pool. I can still with ease recall the acrid Chlorine smell. I had been spoiled. The Pacific Ocean in the late 1970s was still a pristine wilderness. Indoor swimming pools had less appeal.

I stopped swimming.

When I was a teenager, my brother gave me a book to read; Waterlog by Roger Deakin**.** It was a diary of his wild swims all over the British Isles. It captivated me and left a lasting impression.

But it didn't manage to persuade me to go swimming. The book sat on my shelf for decades, gently needling me.

Finally, one day in my 40's, I found myself donning a wetsuit and, along with friends, jumping into a lake to swim. The sensation of cold and energy acted like medicine to my brain. I felt immediately soothed; I felt at home.

From that moment, every time I went past a body of water, I would assess its swim worthiness, which soon led me to swim in the Thames.

The Thames is a majestic and powerful force of nature. As one of the most recognisable and known rivers globally, its history is the history of England and the UK. London is a world capital built around and because of it. I feel connected to that history every time I swim in the river.

You can feel its raw power.

Just float, and you realise you are on a giant conveyor belt. Billions of tonnes of water push you gently along.

But it is not just the sum of the water, plants, animals and earth that make it up.

Like all rivers, it is alive – the sum of trillions and trillions of atoms and molecules bound together. It has a personality; you get to know it as you swim. Anyone who spends time near or on the river knows what I am talking about!

I live in Henley. The river Thames is stunning here, both upstream towards Shiplake and Sonning and downstream towards Hurley and Marlow. There is a stretch from The Flower Pot at Remenham to Hurley, which is almost perfect. It is a favourite place for a dip and where the Henley Open Water Swimming Society meets most Saturday mornings.

There is also the Henley Mile, which provides a stretch of river that is straight enough and wide to be ideal for rowing races. It is the course of the Henley Regatta, one of the world’s oldest and most renowned rowing regattas.

It is also the site of several exceptionally well-attended swimming events, including the Henley to Marlow marathon, a 14km swim every August, which I had wanted to swim in 2022.

Just about to start the Henley to Marlow swim

I had the vaguest sense that pollution in the river might be an issue – Feargal Sharkey had started popping up on my Twitter feed. Feargal has become the spokesperson for water quality, so I knew pollution was something to be mindful of. Surely, the water at Henley was okay, I told myself and entered the race.

Race day was at the tail end of the drought that hit the UK in the summer of 2022. It hadn't rained for weeks. However, the water quality was not great and seemed to get progressively worse, and by the time I arrived in Marlow, I was swimming in what appeared to be raw sewage. A fellow swimmer got ill. I posted on LinkedIn about my achievement and mentioned the faecal water I had encountered. A friend of mine saw the post and connected me with one of his buddies, James Wallace, who had recently started as the CEO of River Action, a charity focused on highlighting and addressing the pollution problems our rivers face in the UK. James visited me on a cold winter's day, and we walked along the Thames. He explained what was happening with the water industry and the calamity facing us if we did not address pollution and water scarcity issues. He confirmed that, in all likelihood, I had been swimming in sewage.

By the end of the walk, we had hatched a basic plan for some affirmative action. James introduced me to the **Windrush Against Sewage Pollution (WASP)** action group, Peter Hammond, a retired machine learning specialist and Ashley Smith, a retired detective superintendent. In 2022, The Guardian described them as Sewage Sleuths: the men who revealed the slow, dirty death of Welsh and English rivers.

They had done some sleuthing on the Thames and Henley – what they have found is shocking. Henley's Thames Water sewage works have occasionally legally dumped raw sewage into the Thames. This happens when the sewage system is overwhelmed due to external factors such as heavy rain.

But that's not the whole story. Thames Water has also **illegally** dumped sewage into the Henley Mile. They have been fined millions of pounds twice. The last time was in 2016, when they illegally released almost 4 million litres (or 1.5 Olympic

pools) of untreated sewage, resulting in mass fish deaths (they were fined £2.3m for this breach in 2021). But that is not the total picture. Pete and Ash have good evidence that there have been many other unreported occasions of raw sewage finding its way into the Thames on the Mile.

But they also **legally** discharge 'treated' wastewater daily, headed into the Thames all along the Henley mile through a series of streams. This polluted water is not treated for E-coli or Enterococci or stripped of phosphates or nitrates, which have a major ecological impact. This was news to me.

I assumed that the water coming out of sewage works would be highly treated and pollution few. Maybe not good enough to drink, but not far off.

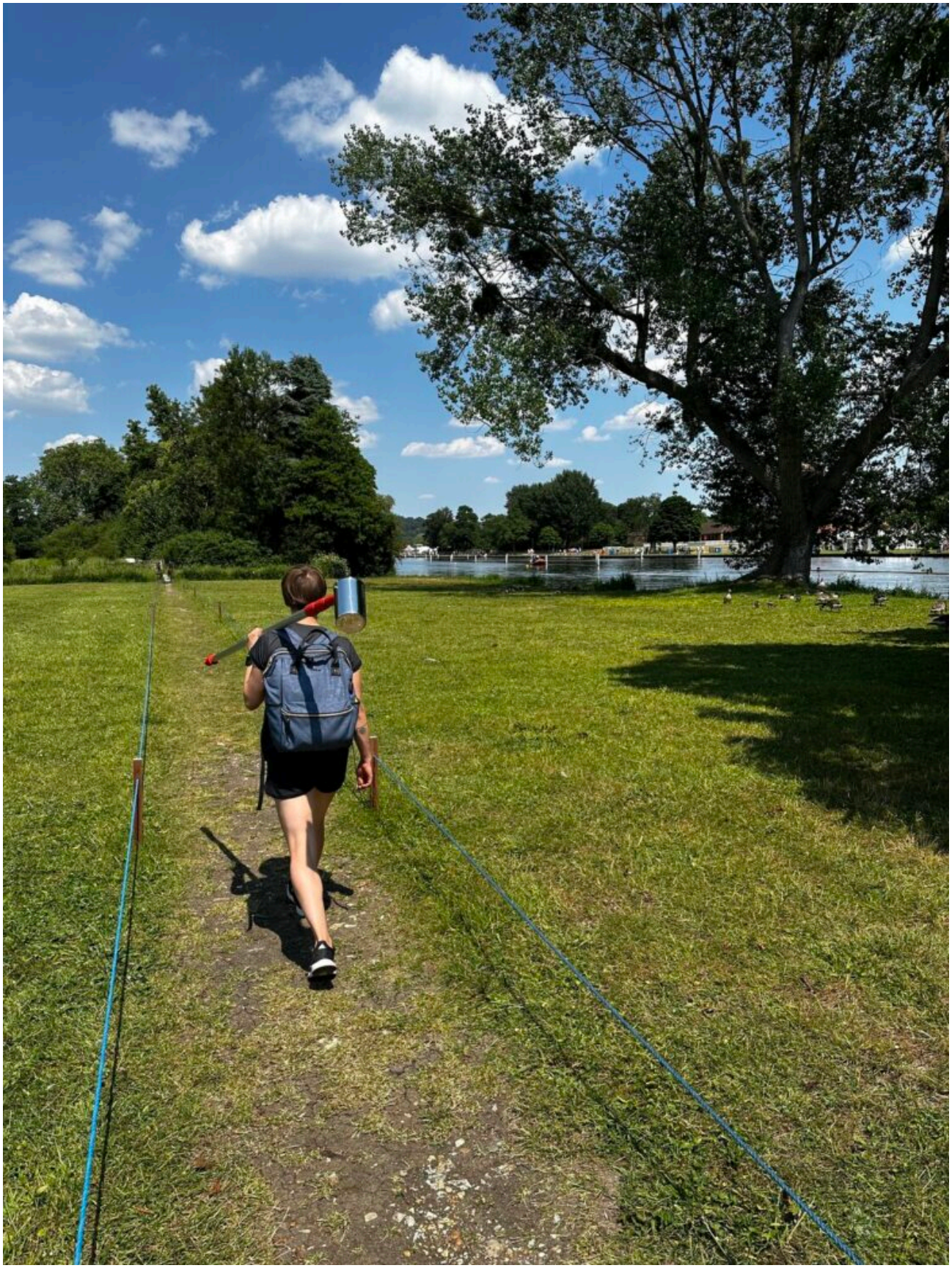
Pete and Ash had oodles of evidence to support their claims. The graphs and analysis they showed hit home, so I volunteered to get tangible proof to add to what Pete and Ash had found.

Supported by River Action, it was decided that we would do testing on the Henley Mile for a whole month. It would be the most intensive testing on a single stretch of river that had ever been undertaken.

River Action paid for the kit we needed and the lab analysis that would be undertaken to check for levels of E Coli and Enterococci. Along with my wife Jacqui, and good friend Chloe Marsh, we were trained by Tim Harris – a consultant who has also worked with the Rivers Trust on water quality projects – on collecting samples in the most contaminant-free way possible.

Additionally, Soraya Wooller from Earthwatch Europe's FreshWater Watch programme provided test kits and training so we could test for Nitrates, Phosphates and water turbidity (how clear the water is). Soraya's kits delivered readings within minutes, which could be uploaded to an app (along with observations) from the river bank.

Tim selected two sites for us to test on the Henley mile, and with the training over, we, the Henley River Action Group, started.



Walking to the test site

Every working day for a month, we visited the designated spots, collected samples, tested the water and made observations.

Testing for Phosphates and Nitrates

Our samples were whisked off by a courier every day and tested, and we started to build a picture of the river's health.

What we found was depressing.

> The E-coli and intestinal enterococci test results showed a significant deterioration in water quality after a rainfall event, taking the overall status at both test locations from 'good' to 'poor'.
> Levels of e-coli were four times higher than had been recorded in the sampling from the start of the testing period. The levels recorded meant that the water in Henley would have posed a significant health risk to all water users, especially swimmers.
> The data collected led Tim Harris to conclude that "point source" inputs and not diffuse runoff are the main cause for the bacterial load in the Henley stretch of the river Thames.
> Phosphate and nitrate testing results indicate that the River Thames at Henley is excessively nutrient enriched and in a very poor ecological condition.
> 34 out of 40 phosphate results recorded were 0.2 mg/l or above. 37 of the 40 nitrate samples measured levels of 2 mg/l or above. Any phosphate reading of 0.1 mg/l or above or nitrate reading of 1 mg/l or above is considered ecologically damaging for rivers.

The results of our testing are being shared widely in the local and national news. River Action and Earthwatch are using this evidence to raise awareness and hold Thames Water to account. It feels good to know that the work of our small band of citizen scientists has had such an incredible impact.

The other outcome was that we connected more deeply with the river.

By visiting and studying it daily, we got to know it intimately. We saw this magnificent river endeavouring to do its best. Despite its ill health, it was still a home, a nursery, a refuge. A larder. A place of enjoyment, solace and reflection. Also, a place of competition.

We watched goslings and ducklings materialise and grow shepherded by apprehensive parents. As time went on, we started to see evidence of fish fry.

One day we spent ten minutes looking at a pike on the muddy bottom. It looked like it was in suspended animation, waiting patiently for a potential meal to swim by. With a flick of its tail, it reanimated and disappeared, leaving nothing but a muddy cloud. It was mesmerising.

We saw dragonflies and plant life on the banks and in the river. We watched as preparations for the Regatta got underway, and young people, having finished exams, appeared on the river bank to enjoy the warm sun, swimming and each other’s company. We watched contented boaters and dog walkers.

Our last day of testing was the first day of the Regatta, so we saw some racing.

It is a busy place. But it is truly enriching.

The Henley Mile is exquisite. It is so beautiful.

But sewage is being discharged into it every day.

The testing has opened my eyes to its struggle. It is sick, and we have the evidence to prove that fact. We are treating this mighty river with contempt. It is abused, and to what end? Without the river, Henley is nothing. We are nothing.

We have to start treating our waterways with the respect they deserve. Solving the problem will require policy changes and innovative technologies, but the power of community-based initiatives should not be underestimated.

Testing continues!

The Thames needs our help. We have our stretch of river and intend to champion it.