# Citizen Science

The trial programme so far

WATER for LIFE®

from Southern Water®

# Contents



# Introduction

## We want to keep improving the quality of our bathing waters and we know it's a top priority for our customers too.

To support the growing demand for comprehensive water quality information, we've launched an innovative Citizen Science Trial Programme - an exciting new initiative that puts water testing technology in the hands of local residents.

We've provided five community groups with specialised water testing equipment to conduct regular water sampling in their areas. This collaboration helps us gather valuable data and fosters a deeper understanding of water quality issues.

Our aim is to involve communities directly in safeguarding their local waters and to enhance transparency in our water quality management efforts.

This report comes at the midway point of our trial. It details the work that has taken place and presents some early findings. We will continue to grow the trial and broaden its scope to include new initiatives that put our customers at the heart of our work.

# Executive summary

## Our Citizen Science Trial Programme has made a good start in engaging local communities in water quality monitoring.

This report outlines the initial findings and experiences from the programme, highlighting both successes and challenges. Here are the key points:

- **Technology trials:** We've tested different monitoring devices to determine the most reliable and efficient methods for water quality assessment. These are the Alert Lab and Alert One, manufactured by Fluidion and the Bacterisk supplied to us by MolEndoTech.
- **Community engagement:** Five groups across the South East are actively participating, equipped with one of the devices.
- **Year-round monitoring:** The programme aims to provide communities with the resources to monitor their own bathing waters throughout the year, not just within the traditional Bathing Season.
- **Data collection and analysis:** Initial data collection has highlighted the complexities of real-time water quality monitoring and the need for more consistent sampling to establish reliable baselines.
- **Stakeholder feedback:** Feedback from community groups and stakeholders has been mixed, highlighting both the benefits of increased awareness and the challenges of achieving reliable, real-time water quality data.

**Water quality** is more than just about what happens between May and September.

## Key findings

1. **Enhanced community awareness:** Volunteers have gained a deeper understanding of water quality issues and the importance of regular monitoring.
2. **Variable data reliability:** Differences between community-collected data and Environment Agency (EA) lab results indicate the need for further refinement in testing methods.
3. **Challenges with real-time data:** Achieving accurate, real-time water quality assessments remains difficult due to the dynamic nature of open water environments.
4. **Community empowerment:** The trial has empowered communities by taking an active role in understanding and protecting their local bathing water.
5. **Establishing best use of technology:** The trial is still in the process of determining the most effective ways to use the technology in a community-led programme. Initial findings suggest that while the technology is in many ways effective, further refinement of the practical application and standardised protocols are needed to maximise reliability and effectiveness.

We are committed to building on these initial findings to create a more robust, community-driven approach to water quality monitoring. Through collaboration and innovation, we aim to ensure cleaner, safer bathing waters for everyone.

We are providing communities with the resources to **test water quality** throughout the year

## Next steps

Based on our initial findings we will be considering the following actions to develop the trial.

**Standardise sampling protocols**
Develop and implement consistent sampling procedures across all participating groups to improve data reliability.

**Integrate with EA data**
Work closely with the Environment Agency to align community-collected data with official lab results, enhancing overall data robustness.

**Expand community involvement**
Introduce additional community groups to the programme, ensuring broader regional coverage and increased data collection.

**Explore additional citizen science opportunities**
Investigate other potential citizen science initiatives, such as river catchment monitoring and grant-funded projects, to further engage communities in water quality improvement efforts.

**Enhance training and support**
Provide more comprehensive training and ongoing support to volunteers to address challenges and improve the accuracy of data collection.

# The water quality sampling initiative

**We're working with community groups, local authorities and the manufacturers of specialised equipment to measure water quality in five locations across the South East as part of an innovative Citizen Science Programme.**

Portable water quality testing devices are being used by groups of volunteers at each trial location. The groups have been given one of these kits:

### Bacterisk

The Bacterisk is a pathogen test kit that tests for bio-markers present in E-Coli. Multiple samples can be screened simultaneously within a 15-minute test time.

### Alert Lab

The Alert Lab is a lightweight battery operated device to quantify E.coli, Total Coliforms, Fecal Coliforms or Enterococci present in any type of water. It provides space for up to six samples and it sends data in real time to a central server.

### Alert One

The Alert One is a hand held device that works in the same way as the Alert Lab but instead provides space for one sample at a time and requires no internet access.

### The aims of the trial are to establish:

- the most reliable and appropriate process for taking, storing and analysing water samples based on the manufacturers' best practice advice and user experience
- how the data can be used to help build an understanding of local water quality, once the processes are agreed
- an appropriate method for governance and collaboration between the participating groups/ organisations to share best practice and key learning in such a way that fosters a sense of partnership working
- whether the technology can be used quickly and efficiently to provide a reliable and timely assessment of bathing water quality at any given time.

# Area profiles

The five locations of the Citizen Science Programme Trial currently are:

- Sandown, Isle of Wight
- Whitstable, Canterbury
- Brighton and Hove
- Hastings
- Eastbourne

**Water quality** testing kits are kept and managed by the group

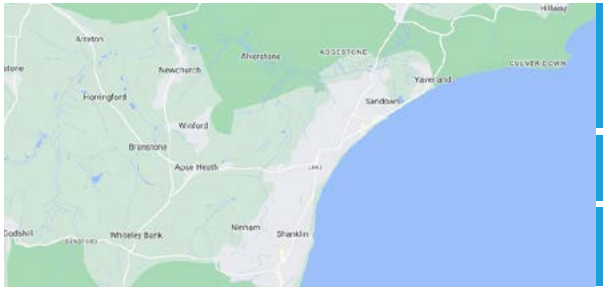
## Brighton & Hove


**Citizen Science Group:** Assorted volunteers and Brighton & Hove City Council

**Device:** Alert Lab

**Start date:** May 2024

## Sandown, Isle of Wight

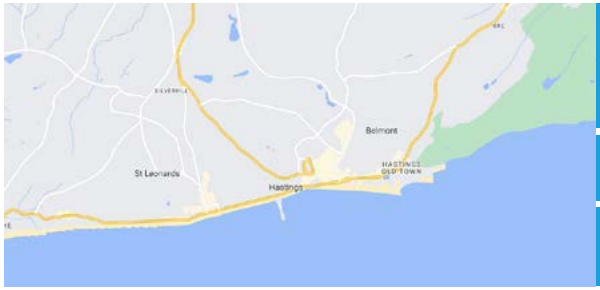



**Citizen Science Group:** Wildheart Animal Sanctuary and Swim the Wight

**Device:** Alert Lab

**Start date:** February 2023

## Hastings




**Citizen Science Group:** Hastings Clean Water Action Group

**Device:** Alert One

**Start date:** April 2024

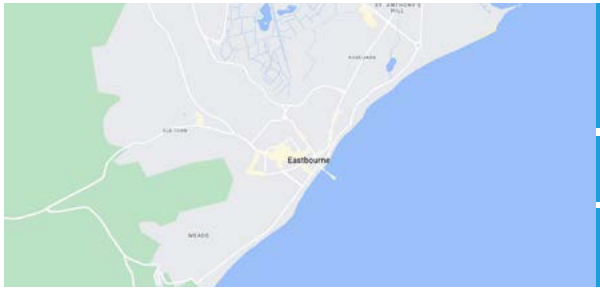
## Whitstable, Canterbury


**Citizen Science Group:** SOS Whitstable and Canterbury City Council

**Device:** Alert Lab

**Start date:** November 2022

## Eastbourne




**Citizen Science Group:** Eastbourne Swimmers

**Device:** Bacterisk and Alert One

**Start date:** December 2023

# A summary of the programme so far

**The Citizen Science Programme was part of our commitment to the Isle of Wight and Whitstable groups to provide year-round water quality sampling using the Alert Lab devices.**

> **THERE ARE HUGE VARIABLES WITH TESTING SEA WATER.**
>
> *SOS Whitstable*

One of the groups' main drivers for starting their own sampling regime was to fill the gap between the seasonal bathing water sampling programme so that they and their communities could feel confident in the water. The once weekly schedule of the Environment Agency's own sampling regime is an important part of the overall story, but our communities felt more information was needed.

Both groups had been taking samples of water for several months before they were joined later by Citizen Scientists in Eastbourne, Brighton & Hove and Hastings.

A more formal structure was put into place so that the groups could be unified into a single Citizen Programme and other communities could join.
The structure included a Citizen Science Strategy, terms and conditions of participation, establishment of a regular steering group and a single point of contact within Southern Water.

The steering groups are held online at a schedule of approximately every six weeks (subject to availability) and are attended by the volunteers, Southern Water staff, the Environment Agency and the manufacturers of the testing equipment.

The Isle of Wight and Whitstable groups were both provided with the Alert Lab. Eastbourne was initially provided with a Basterisk device but after a trial period, the device was replaced with the Alert One.

**Citizen Science** gets communities directly involved

# Working with our stakeholders

**We carried out a short survey with the Environment Agency, Swim the Wight, SOS Whitstable and Canterbury City Council to gather their views about the programme so far.**

We asked:

- **What have you learnt from your experiences?**
- **What are the benefits and challenges of the trial?**
- **How would you like to see the Citizen Science Programme evolve?**

> **"WE, AS A SEA SWIMMING GROUP, SWIM MOST DAYS, YEAR-ROUND IN SANDOWN BAY AND THEREFORE THE ONGOING WATER QUALITY IS IMPORTANT TO US – ALWAYS!"**
>
> *Victoria Thorneton-Field*
> *Swim the Wight*

The citizen science volunteers offered a mixed analysis of the programme so far.

"There are huge variables with testing sea water – it seems impossible to use testing as a reliable method to warn about safety – even getting results within 12 hours means it's the next day and the water will be completely different" reported SOS Whitable. "Much more data is needed to build patterns - testing on a daily basis to build a baseline of what is normal vs releases and how long they take to dissipate. It currently seems like lab tests are the only trusted method for results."

Swim the Wight's Victoria Thorneton Field, suggests that the work has helped her discuss water quality locally. "Although we are yet to publish the data publicly, many people know that we test and often ask about the water quality – our response is 'as you would expect but much better than you would think' as we have learned that the actual water quality is often much better than the perception."

But there have been frustrations expressed with the devices, their use and the structure of the trial itself.

The Environment Agency's bathing season sample programme has long set the standard for water quality information. Across the region, we use the bathing water classifications to understand how well our own bathing waters are performing. One of the challenges that the citizen science trial has thrown up is to what extent does using the devices offer more clarity about water quality.

"The challenges (of the trial) include understanding the high spikes and the various other sources of pollution," says Whitstable SOS "and the difference in results to EA lab tests - we can't compare like for like. Until we get a trusted method, we can't ask volunteers to give up their time."

Matthew Young of Canterbury Council agrees. The challenges include the interpretation of results and how they can be utilised. It needs an agreed/ shared approach to the sampling regimes between the various groups. If we gain trust in the sampling process with filters and it can be compared to the bathing water sampling results, then an extension to year-round sampling for the interested groups would be good. We also need a standard system/process that's utilised by all groups."

# Working with our stakeholders (cont.)

The trial will enable us all to understand better if the testing devices used by volunteer groups can complement the Environmental Agency's own seasonal sampling.

The Environment Agency has pointed out the challenges of getting robust data from sampling:

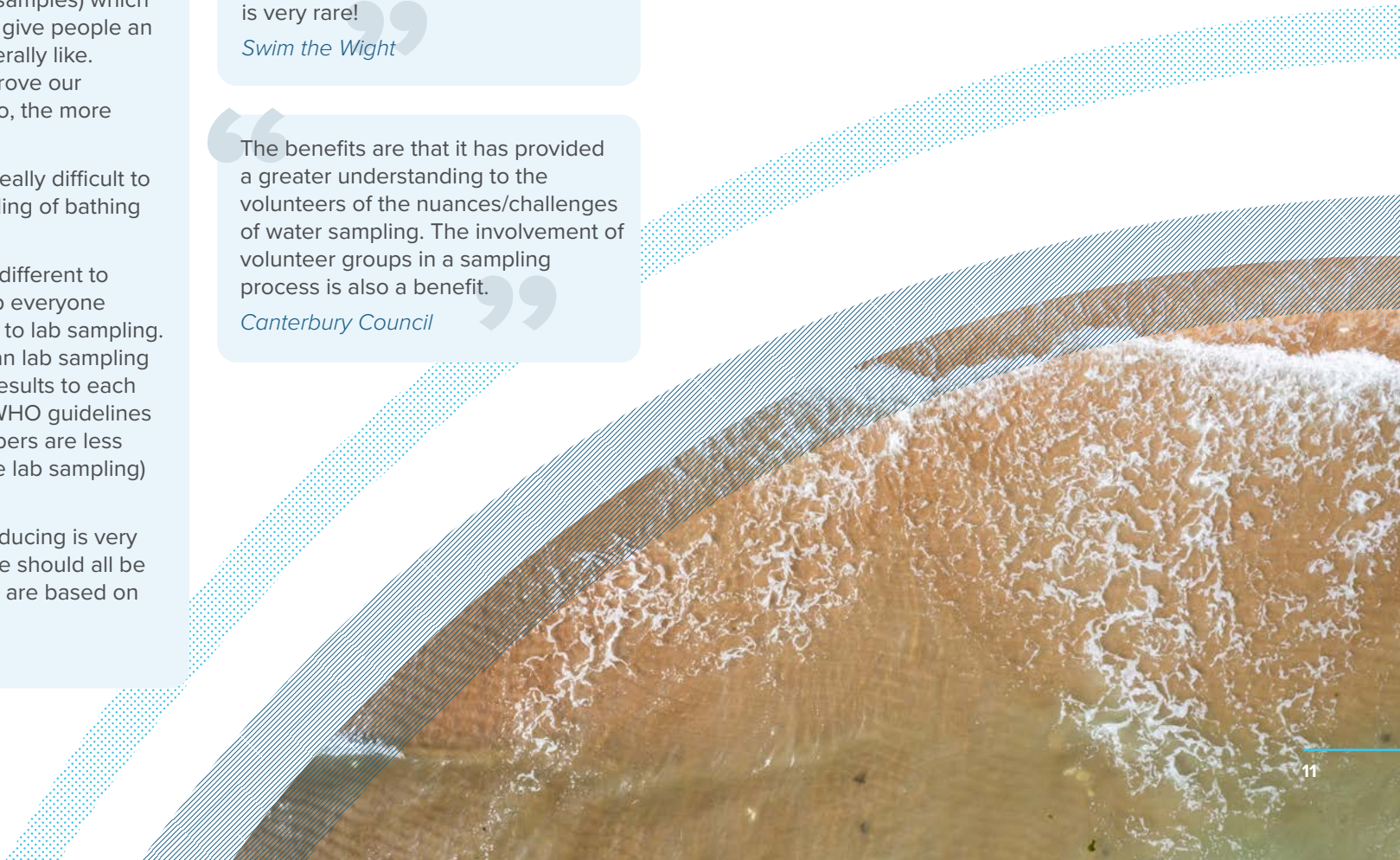
> I know a lot of focus has been on accuracy and comparing to lab sampling. Due to the dynamic nature of an open water environment, water quality can change from moment to moment. This is why the bathing water classification method uses a long data set (four years of samples) which we can also compare over a long period to give people an understanding of what water quality is generally like. Trialling other methods will continue to improve our understanding and the more samples we do, the more we learn.
>
> But, what this has shown so far, is that it is really difficult to get a real time or near real time understanding of bathing water quality.
>
> The analysis method of the devices is very different to lab analysis. I hope that further use will help everyone understand whether we can compare them to lab sampling. Whether it (the device) is more accurate than lab sampling has been raised. We can compare the lab results to each other very accurately. It is this testing that WHO guidelines are based on, so in a way, the relative numbers are less important than the thresholds (based on the lab sampling) that are designed to protect the public.
>
> The additional data that these trials are producing is very useful to develop our understanding, but we should all be careful not to draw conclusions unless they are based on robust science.
>
> *Pete Ehman - Environment Agency*

The volunteers on our Citizen Science programme have told us about some of the benefits of taking part in this trial:

> We have benefited from knowing the actual water quality, we know when it is safe to swim and adjust our swims accordingly – which actually means warning people if it's not too clean but we only tend to cancel if it is rough and high in E-coli, which is very rare!
>
> *Swim the Wight*

> The benefits are that it has provided a greater understanding to the volunteers of the nuances/challenges of water sampling. The involvement of volunteer groups in a sampling process is also a benefit.
>
> *Canterbury Council*

> **THE MORE SAMPLES WE DO, THE MORE WE LEARN. BUT, WHAT THIS HAS SHOWN SO FAR, IS THAT IT IS REALLY DIFFICULT TO GET A REAL TIME OR NEAR REAL TIME UNDERSTANDING OF BATHING WATER QUALITY.**
>
> *Pete Ehmann*
> *Environment Agency*



# The future of the Citizen Science programme

## Conclusion

The initial findings of our Citizen Science Programme highlight the potential of community involvement in enhancing water quality monitoring. This trial has empowered local groups with the knowledge and tools to actively participate in understanding their bathing waters. While challenges remain in achieving consistent and reliable real-time data, the programme has begun the process to monitor waters beyond the traditional season.

Moving forward, we will focus on standardising protocols, expanding community involvement, and refining the use of technology to ensure more accurate and reliable water quality assessments. Through continued collaboration and innovation, Southern Water is committed to improving water quality and ensuring safer bathing waters for all.

## The future

The Citizen Science trial will run for the next twelve months, during which time the new investment period will have begun (2025–30). As we support our newest groups in Eastbourne, Hastings and Brighton & Hove and they establish their own sampling programmes, we hope to add another two groups from different areas of the region.

We have only really just begun to understand how the work of our volunteers can empower communities and raise more awareness of the complicated nature of bathing water quality. This report has set out some of the remaining questions and how we will advance the trial over the coming year.

Citizen Science, however, can mean different things to different people. In fact, we know lots of different projects are underway in other areas of the country under the banner of Citizen Science.

We're going to explore what else our customers would like to volunteer their time towards, and the best ways giving the most value for money that we can support them.

Options might include a grant-funded approach and working inland on our river catchments.

**We'll let you know exactly how we're going to develop the Citizen Science programme as soon as we can. We'd like to thank our existing groups for their hard work.**

We're exploring different ways to develop the **Citizen Science programme**

> **"IT'S JUST REALLY DIFFICULT TO KNOW EXACTLY WHAT IS GOING ON. WE WILL CONTINUE TO IMPROVE OUR UNDERSTANDING AND THE MORE SAMPLES WE DO, THE MORE WE LEARN."**
>
> *The Environment Agency*

# Frequently asked questions

### Is the trial independent?

Southern Water pays for the testing equipment, training and materials (including reagents) that are necessary for the groups to carry out sampling. It also acts as a facilitator to support communication between the groups, the manufacturers, and the EA.

### Does Southern Water influence the sampling?

No, we don't interfere with the sampling – it's carried out solely by the volunteer groups. However we do discuss any high sample readings that are collected by the groups to understand a potential cause, including analysis of our storm overflows.

### Where can I see the data that has been taken so far by the groups?

The sample data collected by the groups in this trial is currently being used to determine the accuracy of the devices themselves. The data collected has shown how difficult it is to draw conclusions from the sampling, so until there is more confidence in how the technology can add value to the existing work done by the EA, our Citizen Science groups have told us they need more time to finish the trial and analyse the data at that stage. The readings taken by the Environment Agency are widely publicised and made available for everyone to use.

### How are bathing waters classified?

Each year the EA classify designated bathing waters as Excellent, Good, Sufficient or Poor using a four-yearly calculation of bacteria levels. The agency samples water quality at every designated bathing water location each week from May to September. They measure the amount of two different types of bacteria in every sample. The two different types of bacteria that the Environment Agency measure are E coli and Intestinal Enterococci.

### How can my community access the programme?

Email tom.gallagher2@southernwater.co.uk

WATER for LIFE®

from Southern Water®

7172_04.24