

Emsworth Water Quality Report

*Six-Month Update: 365 Day
Citizen Science Programme*



Charity no 119150

January - June 2026



Healthy coastal waters are essential for both people and wildlife, and protecting them is a responsibility we all share. This report is a testament to the commitment of our volunteers, whose time, enthusiasm and dedication have created an invaluable record of Emsworth's water quality. I would also like to thank our funding partners for making this project possible. Together, we are deepening our understanding of our marine environment and helping to build the evidence needed to protect and restore these precious waters for future generations.

Bianca Carr, CEO



EXECUTIVE SUMMARY

- This report covers Emsworth.
- The monitoring period in this report covers 169 days, from 1 January to 18 June 2026.
- 135 samples were collected.
- 21 volunteers recruited and trained, delivering 203 volunteer hours of water quality sampling.
- 3 E. Coli readings exceeded 500 CFU/100 mL .

ETHICS STATEMENT

The Final Straw Foundation is committed to conducting its 365-day water quality monitoring programme with scientific integrity, environmental responsibility, and transparency. Sampling is undertaken using standardised methods designed to minimise disturbance to the natural environment, with trained volunteers following established protocols to ensure data is collected safely, consistently, and responsibly.

All water quality data is recorded accurately, stored securely, and presented objectively without alteration or selective reporting. The Foundation is committed to transparency by making data available to relevant stakeholders to support independent scientific review and analysis, while acknowledging any limitations associated with the monitoring programme.

The Foundation's role is to provide a reliable and impartial record of environmental observations rather than to draw scientific conclusions from the data. By maintaining high ethical standards in data collection, management, and reporting, the programme supports evidence-based decision-making and contributes to a broader understanding of coastal water quality within the Solent.

PROJECT OVERVIEW

The Final Straw Foundation 365-day water quality monitoring programme has been established to generate consistent, high-frequency environmental data across coastal and harbour sites within the Solent.

The primary purpose of the programme is to collect and present water quality data in a transparent and structured manner, enabling independent scientific analysis and supporting a broader understanding of coastal water conditions over time.

This work is delivered through a **citizen science approach**, with trained volunteers undertaking daily sampling, where feasible, under defined protocols. This model enables sustained data collection at a frequency that would not typically be achievable through conventional monitoring alone, while also supporting community engagement with environmental science.

A 365-day monitoring approach is critical to this programme. By collecting data daily, the project captures:

- Temporal variation across tidal cycles, weather conditions and human activity
- Seasonal changes in water quality parameters
- The development of a baseline dataset over time

This level of consistency provides a more complete picture of variability within the environment, compared to periodic or ad hoc sampling.

All data collected through this programme is:

- Recorded using standardised methods
- Stored securely and systematically
- Made available to relevant stakeholders

The dataset is shared with stakeholders to support independent scientific review, interpretation and analysis. Final Straw Foundation **does not draw scientific conclusions within this report**; instead, it provides a transparent record of data collected during the reporting period.

METHODOLOGY

Three categories of water quality testing were conducted:

- **Fluidion Alert One system:** Enumeration of *Escherichia coli* (*E. coli*) and total coliform bacteria.
- **Hanna Instruments photometers:** Determination of nitrate and phosphate concentrations.
- **Laboratory analysis:** Quantification of paracetamol and caffeine concentrations.

Equipment and Monitoring: A Fluidion Alert One system was used to measure *E. coli* and total coliform concentrations. Results from the previous sampling day were reviewed and recorded. Elevated bacterial concentrations (>500 colony-forming units [CFU] per 100 mL) were reported to the project lead, who subsequently notified the Environment Agency.

Sampling Protocol: Sampling was conducted within two hours either side of high tide at the Emsworth jetty adjacent to the Mill Pond. Volunteers collected water samples using a sampling pole, sample container, and thermometer. The sampling container was rinsed three times with site water before collection of the final sample.

Water temperature was measured in the metal sampling vessel prior to transfer into a sealed sample container. Excess water was discarded, and the sampling time, weather conditions, wildlife observations, vessel activity, and presence of algal blooms were recorded.



METHODOLOGY CONTINUED

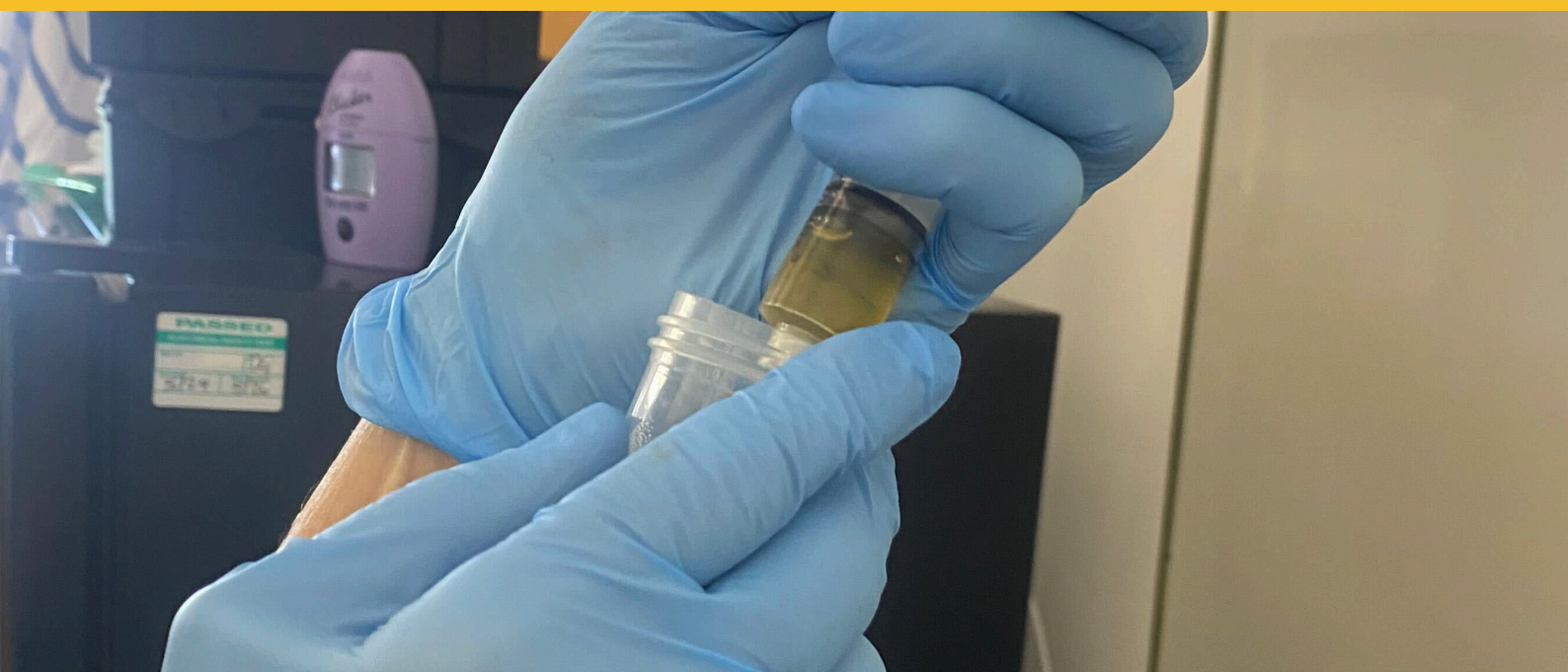
Laboratory Procedures: Upon returning to the laboratory, volunteers donned a new pair of nitrile gloves before sample processing.

E. coli Analysis: A reagent mixture consisting of 1 mL E. coli reagent, 27 mL distilled water, and 9 mL seawater sample was prepared in a Fluidion analysis vial and gently mixed. The sample temperature was measured and entered into the Fluidion system. The vial was then inserted into the instrument, which automatically analysed the sample over approximately 9–10 hours.

Paracetamol and Caffeine Analysis: Seawater samples were transferred into labelled test tubes, identifying the sampling location and date. Samples were stored frozen and subsequently transported to an external laboratory for chemical analysis.

Nitrate Analysis: A 10 mL seawater sample was transferred into a clean cuvette. An initial blank measurement was obtained using the nitrate photometer. Reagent powder was added, and the sample was shaken for two minutes before analysis. The instrument measured nitrate concentration after a seven-minute reaction period.

Phosphate Analysis: Phosphate concentrations were determined using the same procedure as for nitrate analysis. Following reagent addition and mixing, the sample was analysed after a three-minute reaction period.



EQUIPMENT

Decontamination & Waste Disposal

Following sample processing the sampling pole, thermometer, and sample containers were disinfected using a 10% bleach solution.

Cuvettes used for nutrient analysis were emptied and rinsed sequentially with cold water and boiling water before storage. The previous day's bacterial sample was disposed of via the laboratory sink. The sink, work surfaces, and taps were subsequently disinfected with a 10% bleach solution to minimise the risk of cross-contamination.

Used syringes and Fluidion analysis vials were disposed of through appropriate recycling streams and our own circular economy programme - turning plastic waste into new products!



Sampling Frequency

Sampling was conducted daily within a two-hour window either side of high tide.

Methodological consistency was maintained through standardised volunteer training. All volunteers received initial instruction in sampling and analytical procedures, with refresher training sessions provided twice monthly to reinforce protocol adherence and ensure data quality.

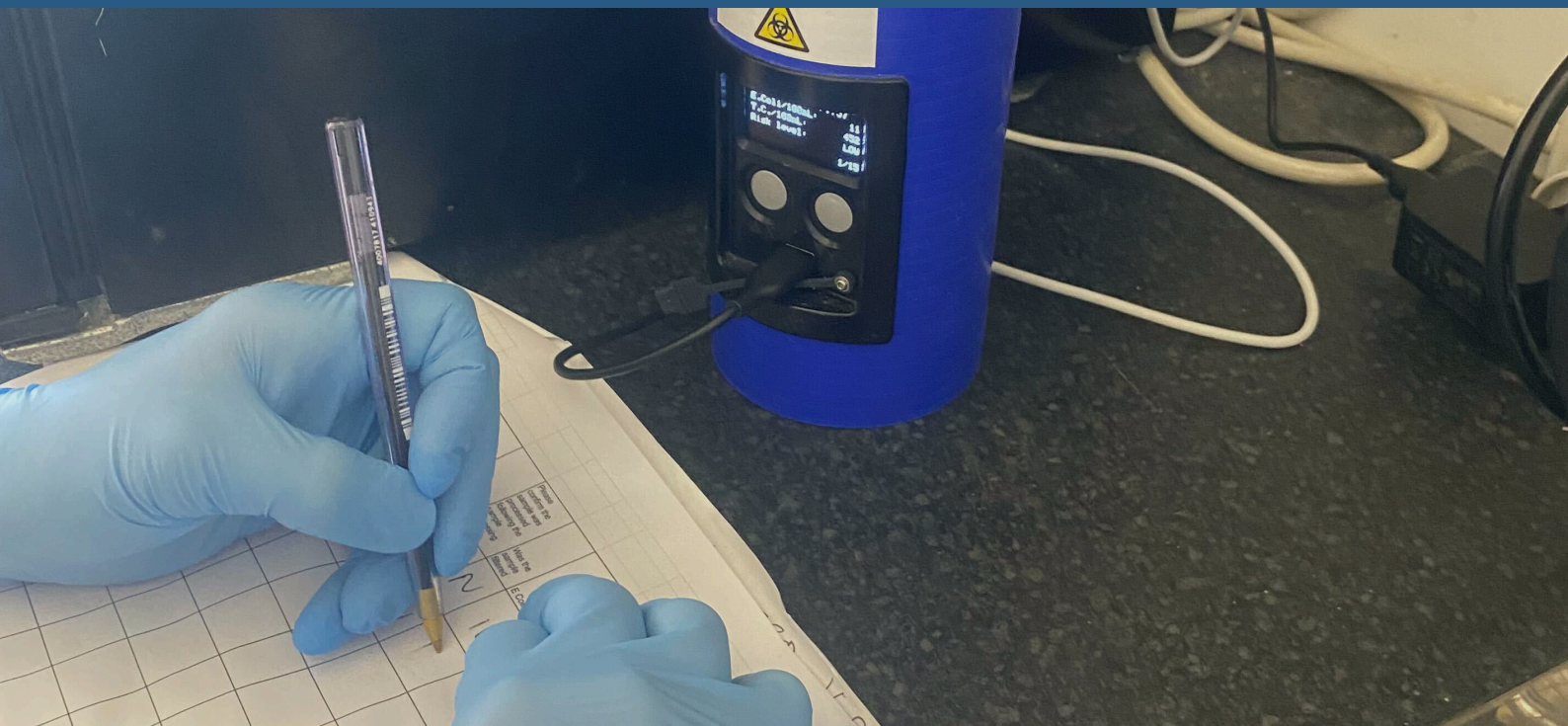
Data Recording

Field and laboratory observations were initially recorded on standardised paper data sheets and subsequently entered into a digital database by trained volunteers.

The following parameters were recorded for each sample:

- Date and time of sample collection
- Date and time of sample processing
- Sea surface temperature
- Ultraviolet (UV) index
- E. coli concentration
- Total coliform concentration
- Nitrate concentration
- Phosphate concentration
- Environmental observations, including wildlife presence and visible pollution

All records were timestamped to provide a complete audit trail and facilitate data validation and analysis.



LOCATION

EMSWORTH HARBOUR

50° 50' 32.6" N, 0° 56' 16.0" W

The habitat surrounding the Emsworth Harbour sea wall forms part of a highly protected intertidal and estuarine ecosystem within Chichester Harbour. The area is recognised for its ecological importance through multiple conservation designations, including Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), and Special Protection Area (SPA) status. The harbour supports a diverse range of habitats that vary according to tidal conditions.

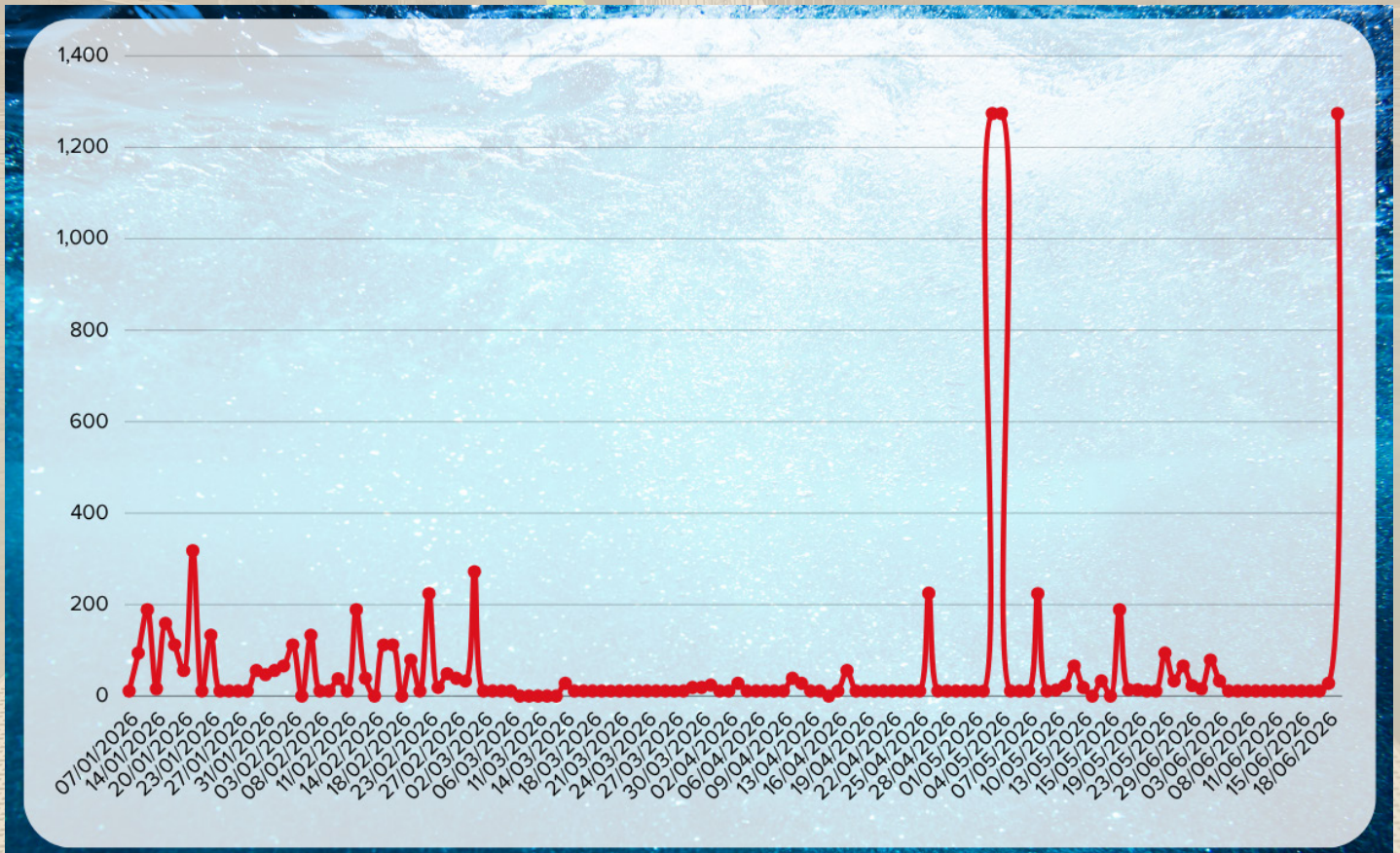
In addition to its ecological value, the area is widely used for recreational activities including sailing, paddle boarding, kayaking, wild swimming, and birdwatching, making water quality an important consideration for both environmental and public health.



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RESULTS

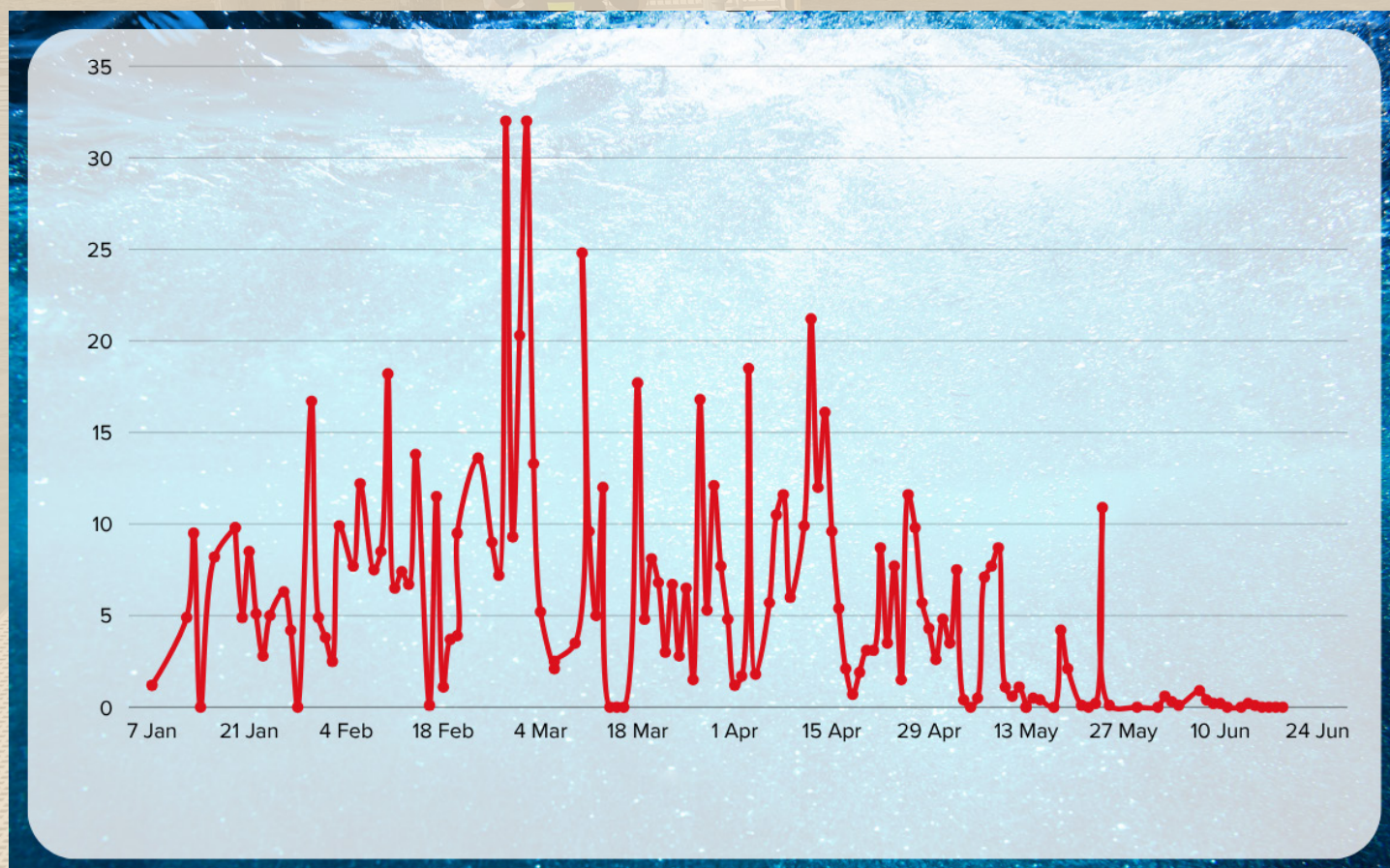
E. coli Concentrations



- Data presented up to 18 June, as monitoring transitioned to the new BactiQuick systems after this date. Further details are provided in the Next Steps
- Caffeine and paracetamol samples are currently undergoing laboratory analysis.
- E. coli concentrations exceeded 500 CFU/100 mL on 3 occasions and were reported to the Environment Agency in accordance with the monitoring protocol.

RESULTS

Nitrates and Sea Temperature



- Nitrate and phosphate levels in the ocean, it is not straightforward to determine what constitutes a “poor” level, as clear thresholds are not readily published by the Environment Agency.
- Sea temperatures ranged from 7.2°C to 21.8°C over the monitoring period. Temperature can influence biological activity and nutrient cycling and is therefore included to provide environmental context for the nitrate measurements.

QUALITY ASSURANCE

Volunteer Training:

- Induction & Onboarding: Meet with the Volunteer Co-ordinator, learn about the programme, sign the volunteer agreement, review health and safety information, and join the volunteer communications group and sampling calendar.
- Training: Receive practical training on water quality monitoring, sampling procedures, and analysis protocols to ensure consistent data collection.
- Independent Sampling: Once trained, volunteers can book and carry out sampling sessions independently, with support and supervision available for initial sessions where needed.

Data Validation Steps:

- The Fluidion system is calibrated every six months in accordance with the manufacturer's recommendations. Additional calibration is undertaken if anomalies, unexpected results, or equipment issues are identified.
- Monitoring data are reviewed by the Project Lead for completeness, consistency, and any anomalous results. Data are compared with previous results, expected ranges, and field observations to identify potential errors or trends requiring investigation.
- Outliers or missing data are investigated by reviewing field records, equipment status, and calibration history. Where necessary, repeat sampling or re-analysis is undertaken, with all data issues documented. The final dataset is verified by the Project Lead or Supervisor before reporting.

Health & Safety

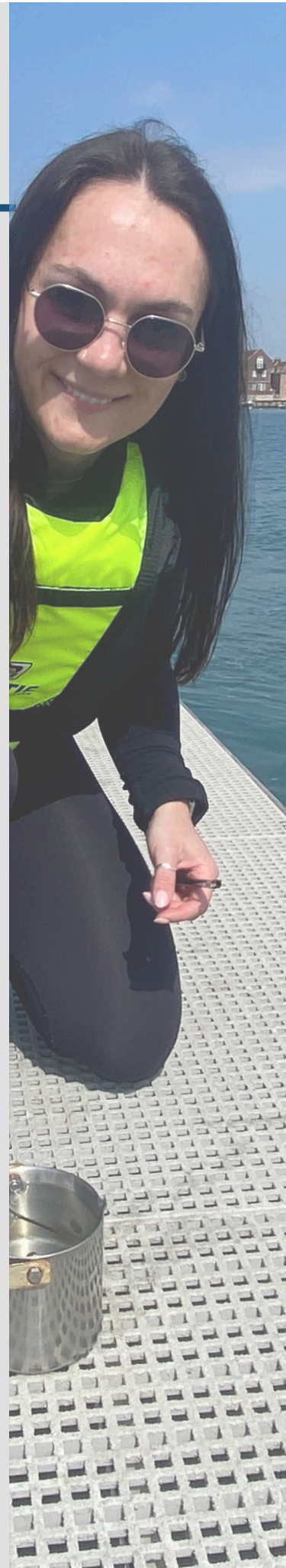
Risk Management

All field activities are underpinned by site-specific risk assessments. These are reviewed and updated regularly to account for changes in environmental conditions, including seasonal variation, weather, and site-specific hazards.

Volunteers receive a mandatory safety briefing and training prior to participation. Only adults are permitted to undertake field sampling independently; volunteers aged 16–17 are permitted to participate only under adult supervision. Appropriate personal protective equipment (PPE), water buoyancy aid, and sampling protocols are implemented for all field activities.

Dynamic Risk Assessment Statement

Field teams are trained to conduct dynamic risk assessments on site, adjusting or suspending sampling activities in response to real-time environmental conditions and emerging hazards.



VOLUNTEER ENGAGEMENT

This monitoring programme relies on the dedication of local volunteers who generously give their time throughout the year to collect and process samples. Their contribution has enabled the development of a unique 365-day water quality dataset, demonstrating the value of citizen science in generating long-term environmental evidence and improving understanding of local water quality conditions.



CORE VOLUNTEERS

21

WATER SAMPLES TESTED

135

VOLUNTEER HOURS

203

IMPACT OF ACTIVITY



I am participating in this project because I believe that evidence is an important tool when dealing with distant and powerful vested interests, like water companies or big industry. At times, it seems that our world is on a terrifying downward trajectory , but projects like this are part of what keeps me hopeful. Many people across the world are concerned and acting to make our world a better place for all life forms and I am glad to play a very minor part in this.

Philippa Garety



The project has supported wider community engagement through outreach activities, including presentations to local community groups and participation in events such as Green Drinks. These activities have helped to raise awareness of coastal water quality issues, promote citizen science participation, and strengthen links with local coastal communities. As a result, engagement with the project has extended beyond data collection, contributing to improved understanding and dialogue around the condition and management of local marine environments.



DATA USE & SHARING

All environmental monitoring data generated through this programme is available via request. Data is shared with relevant stakeholders, including local authorities, environmental agencies, and partner organisations, to support transparency, collaboration, and evidence-based coastal management.

Data is stored securely in a centralised digital database managed by the project team. Access is controlled to ensure data integrity during entry and validation, after which verified datasets are published for open access use.

The dataset is released under an open data approach, allowing use by researchers, practitioners, and the public, provided appropriate attribution is given to the project. No personal data is collected during field activities; as such, data processing does not involve identifiable personal information. The organisation's full data protection and GDPR policy is published on the project website and applies to all administrative and communication processes associated with the project.



LIMITATIONS

We are committed to the transparent collection and presentation of data. The following limitations are acknowledged to support accurate interpretation and to provide context for independent analysis.

Equipment Limitations

Water quality measurements are undertaken using field-based equipment, primarily the Fluidion Alert One system, which enables high-frequency, in-situ microbiological analysis. While this supports near real-time monitoring, results are subject to limitations. The system uses a culture-based method with optical detection, meaning results are typically available 2–12 hours after sampling and should be considered near real-time rather than instantaneous.

Performance may be influenced by turbidity, particulates, and environmental conditions, and requires stable, level positioning during analysis. The fixed sample volume (~40 mL) may also introduce variability compared with standard laboratory methods (100 mL), particularly at low concentrations. Results may show some variability or positive bias relative to laboratory reference methods and should be interpreted as indicative trends rather than standalone values. Equipment is maintained and calibrated in line with manufacturer guidance.

Sampling Constraints

Sampling is undertaken under standardised protocols; however, environmental and operational factors may influence results. These include tidal state, weather conditions (wind, rainfall, wave action), and site accessibility or safety considerations.

Field-based analysis also requires representative sampling at ~1 m depth, careful handling to avoid sediment disturbance, and maintenance of sample integrity prior to testing. While procedures are standardised, exact replication of environmental conditions is not possible in a dynamic coastal system.

LIMITATIONS

Temporal and Environmental Variability

Coastal environments are highly dynamic, with water quality influenced by rainfall, runoff, temperature, seasonal change, and human activity. As results are generated using a culture-based incubation process, there is a time delay between sampling and output. Data therefore reflect conditions at the time of sampling and should be interpreted within broader trends rather than in isolation.

Volunteer Data Collection

Data is collected by trained volunteers operating under standardised protocols with oversight and support. While QA procedures are in place, minor variation in sampling technique, experience, and field conditions may occur.

As with all field-based monitoring, human error cannot be fully eliminated. Training and data review processes are used to minimise and manage these risks.

Data Gaps

Data gaps occur due to typical field constraints, including adverse weather, safety restrictions, volunteer or staff availability, equipment maintenance, or reagent supply delays.

All gaps are recorded transparently, and no data interpolation is applied. These gaps are an expected feature of field monitoring and are considered in trend interpretation.

Scope of Analysis

This report presents observational data only. Final Straw Foundation does not undertake source attribution, compliance assessment, causal analysis, or public health interpretation.

The dataset is intended to provide transparent information on water quality at the time of sampling and should be interpreted alongside its limitations and environmental context. It is not intended to support direct decision-making on water use.

NEXT STEPS

Building on the success of this monitoring programme, Final Straw Foundation will launch SQIRT (Seawater Quality in Real Time), a new community-led, citizen science seawater quality monitoring programme providing independent, near real-time information on coastal water quality. SQIRT will use BactiQuick® rapid testing technology, which provides results in approximately 15 - 30 minutes using Endotoxin Risk Units (ERUs). As monitoring transitioned to this new system after 18 June 2026, data presented in this report conclude on that date.

Routine nitrate testing will not continue under the SQIRT programme, with monitoring instead focused on rapid bacterial contamination to provide timely, actionable information for water users

During 2026 and 2027, SQIRT will expand monitoring across Chichester Harbour, Langstone Harbour, Southampton Water, and the Isle of Wight, creating one of the UK's largest community-led coastal water quality monitoring networks. Increased spatial coverage will support more comprehensive long-term datasets and improve understanding of water quality across the Solent.

Alongside this expansion, Final Straw Foundation will continue to recruit and train volunteers, strengthen quality assurance procedures, and refine sampling protocols to improve data consistency and build a resilient community monitoring network.

The Foundation will also continue to develop partnerships with universities and research organisations, supporting independent scientific analysis of the dataset and helping to inform future research into coastal water quality.





Help Us Build a Bigger Picture

Clean, healthy coastal waters depend on better data, stronger communities, and informed action. By supporting Final Straw Foundation, you can help expand independent water quality monitoring across the Solent and make near real-time information accessible to everyone.

Whether you volunteer, donate, partner with us, or simply share our work, your support helps grow one of the UK's largest community-led water quality monitoring programmes.

Find out more, get involved, or support our work at:

www.finalstrawfoundation.org