Powered by CaSTCo
People. Rivers. Resilience.

IMPACT REPORT

Ofwat Innovation Fund

Project leads

This project was created through the OFWAT Innovation Fund and led by United Utilities and The Rivers Trust.

Project partners

Our named partners aren't the whole story. Each partners with many others, and we're bringing in like-minded organisations, strengthening the network and growing our momentum! Taskforce participants are separate and shared on page 60.

EXECUTIVE SUMMARY

Rivers need better evidence for real change to happen. Over four years, Catchment Systems Thinking Cooperative (CaSTCo) partners across England and Wales have worked together to create a community science movement that provides data to complement evidence from professionals. Together, they've created communities that have developed frameworks and principles, tested methods and implemented tools that make data more trusted, comparable and useful for everyone.

Through collaboration between more than 30 organisations, CaSTCo showed how communities, regulators, and water companies can collect and use evidence together to improve river health. Across eight demonstrator catchments, we put this into practice: co-designing methods, validating data, building tools, and proving that community evidence can drive real decisions and restoration.

SECTION 1: **WORKING TOGETHER**

CaSTCo's strength came from the network that surrounded and supported it. Collaboration flourished through shared research, national innovation, and the trusted relationships that connected partners beyond the demonstrator catchments — proof that progress happens when we work together.

SECTION 2: **COMMON FRAMEWORK**

Partners co-developed the practical foundations for collaboration: shared monitoring principles, planning templates, method audits, data governance, and the CaSTCo Data Hub. Together, these tools have laid foundations to build consistency, trust, and coordination between partners, showing how open, quality-assured data can support decisions at every level.

SECTION 3: **TESTING IN DEMONSTRATOR CATCHMENTS**

The framework came to life through real-world pilots. Catchment teams tested new approaches on the ground: running WaterBlitzes, auditing methods, and developing dashboards that turn data into action. Each catchment fed insights back into the network, strengthening the national framework through lived experience.

SECTION 4: **LOOKING TO THE FUTURE**

Innovation and future planning continues to develop the community and tools stakeholders need. CaSTCo Taskforce's **10-Year Roadmap** shows the comprehensive plan to leverage what we've done so far and scale collaborative monitoring across the country.

CaSTCo proves that collaboration can transform how we monitor and manage rivers. This Impact Report and the Roadmap are an invitation to build on that foundation: to keep sharing knowledge, strengthening partnerships, and turning evidence into action for healthier rivers.








INTRODUCTION

PEOPLE AT THE HEART OF RIVER RECOVERY.

Catchment Systems Thinking Cooperative (CaSTCo) is a cross-sector programme that helps turn community monitoring into decision-ready evidence, bringing water companies, Rivers Trusts, the Environment Agency, national technical partners, NGOs and volunteers together under a common framework of methods and simple tools. It is designed so that frontline evidence can sit alongside statutory datasets and inform practical river management across England and Wales.

About this impact report

What follows is just a snapshot of project outputs and resources, and the work partners have delivered over the past four years. Information is drawn from partners' self-reported surveys, demonstrator materials, their case studies and web pages. Percentages refer to the partners who answered each question, and quotes are respondents' own words. It's just a small taste of the breadth of CaSTCo, intended to orientate you quickly before you dive deeper.

You'll also find an introduction to our Roadmap for the future: a comprehensive, forward-looking guide that sets out the people, tools and policy steps partners say will sustain and scale the work.

This is only the beginning. Ready to dive in?

TABLE OF CONTENTS

SECTION 1

WORKING TOGETHER

CaSTCo came to life through collaboration. This section highlights how shared research, innovation, and trust — built across partners, projects, and places — shaped the network that made it possible.

BUILDING TOGETHER.

Across CaSTCo partners, a clear story emerges: collaboration and a shared vision are turning citizen science from enthusiasm into evidence that influences decisions. Almost all organisations report new or deepened trust across sectors; they value shared tools and a common language for data; and they see multi-year funding for coordinators and data capacity as the biggest force-multipliers.

Volunteers are central: when they have feedback loops, support, and credible methods, their data informs priorities, reveals gaps, and accelerates action. The collective effort of water companies, national/technical partners, NGOs and regulators is building a durable foundation for catchment-scale monitoring and river recovery.

Partners share a mature and nuanced stance on citizen data too: around 92% say they are more aware of its limitations, 71% already valued it, 67% now see it as more valuable/reliable, and 63% remain appropriately cautious.

The majority of organisations most valued the collaboration across sectors and a shared vision for catchment-scale monitoring, with many highlighting shared tools and opportunities to influence decisions into the future.

CaSTCo Principles

Organisations/groups aim to apply best practices to be:

1. **Rigorous**
2. **Open**
3. **Collaborative**
4. **Impactful**
5. **Future-minded**

> "CaSTCo has provided useful skills and knowledge from central and demo partners on MetaData, GIS, Scorecards, Weight Of Evidence that have shaped Western Sussex Rivers Trust Citizen Science guidelines, methods of data disseminations, etc."
>
> **WESTERN SUSSEX RIVERS TRUST**

40+

new innovations deployed, an average of more than 1 per partner

35,000

Volunteers, including approximately 18,000 who monitor (at least) monthly.

250,000 hrs

Donated by citizen scientists, valued at more than £3million.*

13,500 km²

Monitored by Demonstrator areas, with national partners covering England and Wales.

** Based on living wage (£12.21/hour)*

WITH AND **FOR** THE PEOPLE

CaSTCo was grounded in the belief that meaningful catchment management can only succeed when it's designed **for** and **with** the people delivering it. Across the project, co-design was woven into every step, from developing **shared data principles** and shaping the **method audit** process to selecting themes and creating catchment scorecards that help local groups turn data into action. Demonstrator catchments also prototyped and tested **volunteer and training protocols**, adapting them to local contexts and openly sharing what worked (and what didn't) with the wider group so everyone could learn together.

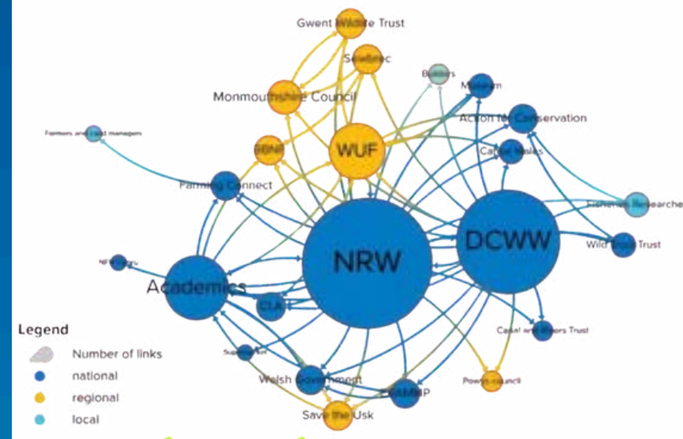
Together, we also developed guidance on health and safety for community-based monitoring, recognising that inclusivity depends on creating safe, supportive conditions for all involved.

Alongside this hands-on development, academic partners carried out research on co-design and stakeholder mapping, helping us understand relationships, motivations, and participation across the catchments.

This collective process, anchored in openness, iteration, and shared purpose, has shown that real innovation in citizen science happens not through top-down design, but through collaboration and reflection across the whole community.

Co-design research for the Arun by the Countryside and Community Research Institute:

- **Citizen science for freshwater monitoring: motivations, purpose and impact**
- **Co-designing citizen science: principles and guidance**



"Working with CaSTCo has helped our organisation to understand the relationships between different organisations interacting with freshwaters. The stakeholder mapping exercise we did for the Usk catchment helped us to develop a systems understanding of how people interact with rivers."

Systems thinking for the Usk by Cardiff University Water Research Institute: *Actors and activities driving the health of Usk catchment freshwaters.*

NATIONAL INNOVATORS

CaSTCo's success (and the success of each Demonstrator) has been strengthened by the leadership, guidance, and collaboration of national partners who have long championed innovation in community-based water monitoring. These National Innovators have developed shared tools, campaigns, and protocols that go beyond individual catchments, creating the foundations for consistent, comparable, and open data across the UK.

Their work, ranging from nationwide volunteer campaigns and modular river surveys to digital data platforms and pollution-tracking apps, has helped Demonstrators test and refine approaches in real-world settings. This shared learning has accelerated progress, avoided duplication, and shown the power of coordinated citizen science at scale.

Expert organisations such as The Rivers Trust, UK Centre for Ecology & Hydrology (UKCEH), and others have provided essential guidance on methods, data management, and training frameworks, ensuring that community-led monitoring contributes meaningfully to evidence and policy. Together, they've built the foundations for a more connected, capable, and resilient monitoring network.

The six panels to the right highlight just some of the case studies from these National Innovators. They're a glimpse into the creativity, rigour, and collaboration that continue to shape the future of catchment monitoring across the UK.

Big River Watch →
The Rivers Trust

Great UK Water Blitz →
Earthwatch Europe

MoRPh →
Modular River Survey, Cartographer

Outfall Safari →
Zoological Society of London

Riverfly →
The Riverfly Partnership

Water Rangers →
Community lab & data.waterrangers.com

TRUST IS KEY.

A CASTCO EXAMPLE OF HOW TRUST IS BUILT

Trained citizen scientists in the Anglian Demo detected nutrient pollution from a mismanaged private sewage system in a headwater stream, which was not monitored by any other organisation. Because of the data validation undertaken to benchmark the citizen science methods, and the training of the volunteers, the Environment Agency had enough confidence in their data to act on it. The responsible party was required to tackle the problem and the citizen scientists were able to record an improvement in water quality. Below we set out the key steps which increased confidence and trust in the data and the citizen scientists' reports, and which led to the data having impact in the river.

The Trust Equation = C R I / S

Credibility: "We trust that the data and evidence are **robust**."
Reliability: "We trust volunteers are supported to collect needed data, and that this creates **impact**."
Intimacy: "We trust people to **share openly, listen, and learn together**."
Self-Orientation: "We do not trust organisations' **hidden agendas**."

Adapted from The Trusted Advisor (2000), David Maister

> "I believe the fundamental part to making CaSTCo a success is the development of trust between partners and stakeholders. CaSTCo has been a fantastic vehicle to allow organisations to come together around a common goal and those relationships will only grow as we look to implement the CaSTCo Roadmap. To be able to use the data and take the date at face value, high quality and credible data is vital."
>
> **BECKY CARTER, ANGLIAN WATER**

This is just a summary!
If you'd like to read the full write-up, you can request it from castco@theriverstrust.org

C

Data validation

Coordinated lab validation of citizen science measurements. Showed the EA Land and Water Team the validation data. EA peers vouch for data quality, reinforcing credibility.

I

Initiation

The Rivers Trust, Norfolk Rivers Trust (NRT) and the Environment Agency (EA), with the support of Anglian demo partners, collaborated to help plan citizen science data validation work.

Planning

EA Land & Water Team explain to Volunteer Coordinator (VC) what information would be most useful to target their limited resources.

I

I S

Training

Volunteers are trained in method protocols and about their role and the role of EA, VC and others. What do do if issues are spotted while monitoring and what feedback to expect.

Monitoring

Citizen scientists use standard protocols to check water quality at agreed locations.

C R

C R

Incident Response

High readings or pollution incidents are reported to EA when discovered. Citizen Scientist states they are CaSTCo trained when ringing EA hotline - report is tagged.

Incident Response

EA Land & Water Team uses data to inform action - contact responsible party to require maintenance.

C R

C R

Monitoring

Citizen scientists record water quality improvements following EA action, demonstrating success of EA response and building trust with citizen scientists.

Ongoing QA

Blind testing of standards and annual field observation by VC to check equipment, and that protocols are being followed. Feedback given to volunteer and both sign off assessment.

C I

Sharing

Outcomes are shared with the community and how it works is shared with local and national partners. This work inspired the development of a collaborative pollution and evidence reporting tool for CaSTCo citizen scientists.

I

GATHERING QUARTERLY

CaSTCo partners gathered project-wide once a quarter to share ideas and make progress on common visions. It was a powerful opportunity to gain confidence in innovating back home and building a trusted network of collaborators. Here are just a few of the things the partners had to say on the benefits of the cooperative and its gatherings.

4/5

MEDIAN SCORE FROM ORGANISATIONS ON THE VALUE OF BEING PART OF CASTCO

"The quarterly meetings allowed for Westcountry Rivers Trust (WRT) and Thames21 staff to interact on several occasions. Following the April 2024 meeting in Exeter, staff at Thames21 reached out to WRT to discuss the training process for WRT citizen science volunteers. WRT was able to advise Thames21 on developing their own training material, which was subsequently shared with WRT in a knowledge sharing exercise.
- Nicola Rogers
Westcountry Rivers Trust

"My opinion has been enriched, in terms of understanding more about the considerable on the ground effort that is required to collect, share and use data of a known quality."
--Kit Macleod, UKCEH

"The CaSTCo project has proven to be an invaluable initiative, significantly enhancing our internal discussions and fostering a robust exchange of knowledge with partners and stakeholders and between departments internally. It has effectively established a highly beneficial network that we frequently reference when engaging with various stakeholders. Furthermore, the project has provided us with a wealth of tangible examples, clearly demonstrating the remarkable achievements and successful outcomes that can be realised through collaborative efforts."
- Michaela James,
South East Water

"Building relationships with a diverse range of individuals and organisations which led to great trust and working relationships – this was an amazing feat for the project to do in 3 years with the number of partners, churn of staff, uncertainties and project reshuffle etc. Realising my understanding and knowledge of freshwater ecology and monitoring is valuable and then trying to pass on this knowledge to a range of other individuals and organisations."
-Bill Brierley,
Independent Expert

"Relationships have been formed and existing relationships greatly enhanced through face-to-face contacts at CaSTCo events. Face-to-face meetings are difficult to replace by other means because they are free-form and so stimulate ideas that would not arise easily in formal on-line meetings. Through these meetings we have greatly strengthened connections with the MoRPh user community. "
-Angela Gurnell, Cartographer and creator of the MoRPh protocol

"Working with CaSTCo has been essential in allowing our the Usk and Wye demo to learn and utilize new monitoring methods and platforms, while also allowing us to connect with other trusts across the UK. The comradery built between fellow CaSTCo participants has helped to inspire confidence, overcome relationship challenges, and create an environment for sharing between disciplines, communities and organisations."
-Sian Mercer, Specials Project Manager , Wye and Usk Foundation

"One of the greatest benefits to joining CaSTCo has been learning from other groups and gaining confidence in different methods and techniques. Inspired by the CaSTCo quarterly meetings and numerous demonstrations, we are now trying various new methods."
-Ellie Brown, Head of Data, Evidence & GIS, Ribble Rivers Trust

"Elizabeth, who worked on our CaSTCo projects as a Project Officer, learnt a massive amount from the wide and open CaSTCo network. She got so into rivers that she has left ZSL to start a PhD with Steve Ormerod. She will help change rivers for the better in the future and has a had a good grounding, learning within the CaSTCo for this."
-Joe Pecorelli, ZSL

"Support for community participation in monitoring and CaSTCo meetings were a great opportunity for the newly appointed Riverfly Development Manager to network and get to know people and organisations directly involved in Riverfly Monitoring, bringing everyone together at regular intervals was very useful."
--Riverfly Partnership

"The RRC has gained a more comprehensive understanding of citizen science methods across the whole spectrum of water management i.e. not just hydromorphology...We better understand the wide range of citizen science initiatives that take place in communities."
-Jo Cullis,
River Restoration Society

PUBLICITY

The CaSTCo project has gained significant visibility through presentations at a wide range of high-profile national and international events. From major environmental and water sector conferences such as New York Water Week, the British Water Conference, the WWEM 2024 Conference, and the Danish Water Forum, to specialist gatherings like the Riverfly Partnership Conference, the Scottish Freshwater Group, and the Yorkshire iCaSP Confluence, CaSTCo has reached diverse audiences across science, policy, and citizen engagement.

Appearances have highlighted CaSTCo's commitment to innovation, co-governance, and community-led environmental monitoring. Together, these engagements demonstrate a strong and growing profile for the project across sectors and borders.

CaSTCo also hosted 10+ webinars over the course of the project for partners and wider stakeholders, exploring topics such as innovative monitoring technologies, the wellbeing impacts of citizen science, and the Weight of Evidence approach for eutrophication.

Project partners also spread the word through the press. Featured here are just a few of the news and blog articles written and published during the project.

25+

CASTCO PRESENTATIONS AT LOCAL, NATIONAL AND INTERNATIONAL EVENTS

GROWING BEYOND

The impact of CaSTCo extends far beyond the core project. Partners have collectively secured well over £1 million, and support from a wide range of funders and investors. For example, the Environment Agency has funded the equivalent of four full-time positions to support this project. This investment reflects the strength of collaboration and shared purpose across the network, helping to sustain and expand community-based monitoring. Funders and supporters include the National Trust, University of York, UKRI Innovate UK, Natural England, Deloitte, Defra, Esmée Fairbairn Foundation, and many others who continue to champion this work.

£1M+

ALIGNED FUNDING SECURED BY PARTNERS

SUPPORTING WORK

Here are a selection of aligned initiatives we've been working with.

Project Taskforce representatives: As part of the CaSTCo Taskforce, key external stakeholders (alongside project partner representatives) brought thieir expertise to five sprints to shape what CaSTCo will scale into in the future, and were instrumental in developing the CaSTCo Roadmap . These external stakeholders include individuals from CIWEM, Ofwat, Afonydd Cymru, Additive Catchments, Water UK, Stantec, Mott Macdonald, University of Sheffield, Storm Water Shepherds, Freshwater Habitats Trust, National Trust, Esmée Fairbairn and Atkins Realis.

Citizen Science delivery groups: have had the opportunity (via signing up on the CaSTCo website) to adopt the CaSTCo principles and apply collaborative monitoring ways of working across new catchment areas, providing a vital opportunity for testing what the roll-out of collaborative monitoring could look like in the future. Stakeholders include Kit Brook River Restoration, The Friends of Bilbrook, River Sid Catchment Group, River Char Action Group, The Bidwell Brook Partnership, River Yealm Water Quality Group, Greening Wymondham, Kinver Climate Action Group, Stour Way Group, For the Love of Water FLOW, River Waveney Trust, River Wey Trust and the Don, Dearne & Rother Network.

Natural Capital and Ecosystem Assessment (NCEA) programme: Defra's largest research and development programme and has citizen science as one important theme for investment. CaSTCo partners have engaged in workshops and conferences to support NCEA's policy and monitoring objectives and provided insight for the NCEA freshwater framework of recommended methods and approaches. NCEA partners have been part of the CaSTCo Taskforce, helping to ensure that the work of NCEA and CaSTCo is complementary [or synergistic?]. One of the CaSTCo demonstrators (the Teme) was chosen as an NCEA pilot area.

The Rivers Trust Movement: Similarly to the citizen science delivery groups, The Rivers Trust network of local Member Trusts across the UK and Ireland have been engaged via webinars, email newsletters and provision of online resources in order to enhance and widen the impact of CaSTCo, by ensuring adoption of its principles into new catchments, testing of project outputs and critical feedback provided regarding the suitability of CaSTCo outputs to support local River Trusts to develop collaborative monitoring and making measurable improvements to river health.

Universities: Academics have been engaged in varied capacities throughout the project. The majority of universities have been engaged with their local demonstators, providing Quality Assurance for local sampling via laboratory testing of comparable samples. Outreach opportunities have also been created with universities in order to improve inclusivity and social impact of CaSTCo. Opportunities for future alignment and aligned funding have also been explored, with a successful application of CaSTCo data principles embedded into a University of York funding bid. Universities which have been engaged (not including partner Universities) include Newcastle University, Birmingham City University, University of Birmingham, Manchester University, University of York, University of East Anglia.

National Farmers Union (NFU): CaSTCo and NFU co-hosted a webinar with project partners to explore potential applications of CaSTCo outputs within the agricultural industry. This has been tested in further detail by the Usk and Arun Demonstration areas which both worked directly with farmers to improve agricultural practices, land management and soil monitoring. Having worked closely with NFU and developed that collaboration, there is potential in the future to explore in further detail the possible impacts a CaSTCo framework could have within the agricultural sector.

Wildfowl and Wetland Trust (WWT) The Trust has collaborated and shared learning during the exploration and development of the CaSTCo data principles, proof-of-concept data hub and data framework which align with the WWT Wetland Data Explorer, to ensure a streamlined approach to platform development for both WWT and CaSTCo.

CaBA (Catchment Based Approach) National Support Group and Catchment Data User Group (CDUG): CaSTCo co-hosted the CDUG annual conference in 2023, ensuring complementary knowledge sharing for data advancements across CaBA stakeholders. CaSTCo has also been presented to the CaBA National Support Group in order to create opportunities for further alignment. In the future there is potential for CaSTCo outcomes to be embedded into CaBA business as usual.

SECTION 2

COMMON FRAMEWORK

CaSTCo partners co-developed a shared understanding and resources for more credible, trustworthy citizen science data.

COLLABORATIVE MONITORING PLANNING

CaSTCo turns “lots of good monitoring” into a shared way of planning for impact. A Collaborative Monitoring Plan helps partners agree why they’re monitoring, what to measure, where, when and how. Agreeing how to share and use data, and who needs to act, helps turn evidence into action.

The CaSTCo approach

1. **Make a plan:** think about the outcomes you want and resources you have
2. **Define your purpose:** align on questions, objectives, and success measures.
3. **Collect data:** choose appropriate methods/tiers, consider how to demonstrate quality
4. **Use your data:** analyse, visualise, and use a Weight of Evidence approach to answer your questions and issues
5. **Work collaboratively:** connect volunteers, NGOs, agencies, and companies
6. **Make a difference:** share findings with decision-makers and track change

(Full guidance, templates, and real examples of Collaborative Monitoring Plans from Demo partners in the Arun, Lark, and the Teme are available on castco.org.)

“One of the most influential elements from CaSTCo has been the introduction of the collaborative monitoring plan, which enabled our organisation to see the value of working with partner organisations to increase the breadth of our data for catchment health. For example, in the Bollin pilot, Mersey Rivers Trust were able to highlight problem areas in the catchment which we hadn’t considered such as historic landfill contamination.”

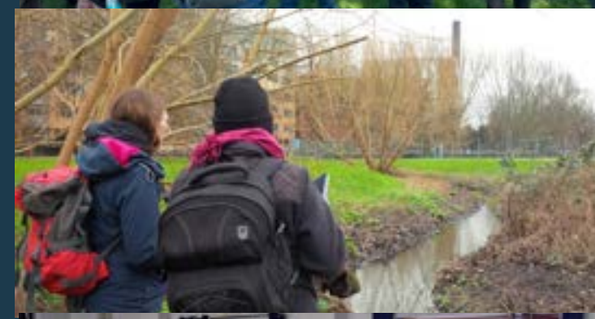
JOHN SANDERS.
MERSEY RIVERS TRUST

“Using the CaSTCo template for collaborative monitoring plans has allowed us to be more strategic in our work with catchment partnerships.”

MADDY FOWLER,
TYNE RIVERS TRUST

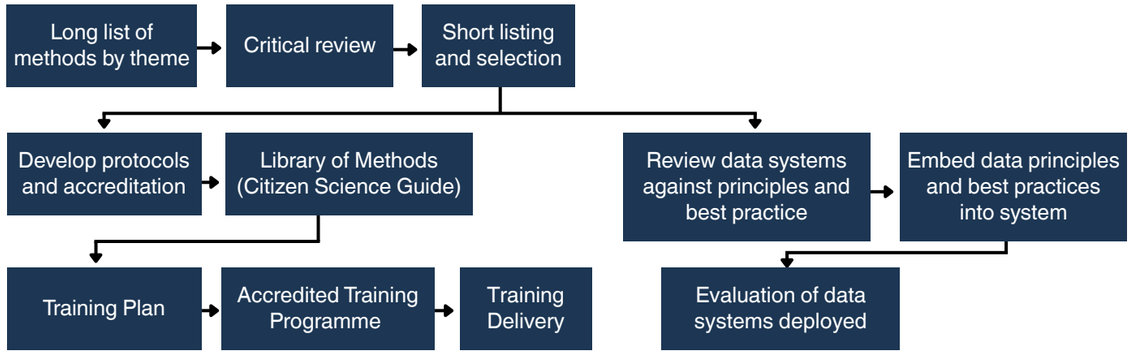
“We procured a Rapid Evidence Assessment from CCRI which set the best practice for collaborative citizen science; we wove this into the Collaborative Monitoring Plan process through in person workshops to create a plan that all partners were happy with.”

BETHANY FAIRLEY,
SOUTHERN WATER



GUIDANCE ON MONITORING METHODS

CaSTCo's method audit process was set up to address the confusion caused by many, disparate citizen science methods and the lack of nationally standardised protocols. A Technical Working Group of monitoring experts, volunteer coordinators and data users defined themes, developed evaluation criteria, and through workshops produced long lists of methods, which were then assessed and narrowed to shortlists of methods recommended for use in CaSTCo's demonstrator catchments. The audited methods cover themes such as water quality, freshwater biology, physical habitat, soil quality, as well as testing approaches. There are many more on our long lists, ready for audit and validation!



Published guidance

As of the publication of this Impact Report, these are available on the website. There are many more methods under consideration and being reviewed by project partners, ready for investment in full auditing.

Biological monitoring methods

- Overview: Fish monitoring
- Overview: Macroinvertebrate monitoring
- Method audit: Riverfly Monitoring Initiative (RMI)
- Method audit: Extended Riverfly
- Overview: Bacteria monitoring

Water quality methods

- Overview: Water chemistry monitoring
- Method audit: Phosphate – Hanna Checker
- Method audit: Phosphate – LaMotte Insta-Test test strips
- Method audit: Phosphate Phosphorus – Kyoritsu Packtest

Physical habitat methods

- Overview: physical habitat monitoring
- Long list: Physical habitat methods
- Method audit: Mudspotter
- Method audit: Modular Rivers Survey (MoRPh)
- Method audit: Citizen River Habitat Survey (cRHS)

Soil testing methods

- Overview: Soil monitoring
- Guidance: Visual Evaluation of Soil Structure (VESS)
- Guidance: Earthworm count
- Guidance: Infiltration test
- Guidance: Soil texture jar test
- Guidance: Soil nitrogen, phosphorus, potassium (NPK) and pH testing
- Guidance: Slake (wet aggregate stability) test
- Guidance: 'Soil my undies' test (optional)

Other / schemes

- Guidance: Designing a Water Blitz
- Method audit: Outfall Safari

"Hanna checkers are now a trusted method / kit for monitoring phosphate after testing through the Teme demo. We have [also] used outcomes of the bacterial monitoring trial to help establish tools for bacterial monitoring for bathing and recreational rivers."

- ANGELA MAYSON SEVERN TRENT WATER

DIVE DEEPER castco.org/knowledge-base/methods-list

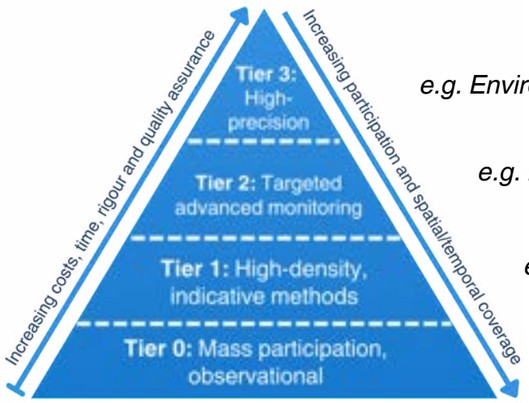
DEFINING MONITORING PURPOSE AND TIERS

Understand and choose the right monitoring tier for your project to collect effective data to contribute to the 'weight of evidence' in decision-making. With a shared understanding of data quality, it can be used more effectively.

Each monitoring programme may span more than one of these tiers, or shift purpose over time. Aligning purpose with monitoring tiers, methods, frequency, spatial design, and resources ensures that the data collected is credible, usable and relevant.

Developing a shared understanding of purpose and data quality has been an integral part of CaSTCo's ability to build a shared understanding between stakeholder groups, leading to better and more frequent opportunities for collaborative improvements in river health.

Monitoring tiers



e.g. Environment Agency investigations

e.g. Riverfly, Lab tests

e.g. Great UK Waterblitz

e.g. Big River Watch

Monitoring purpose

"Through this work we are now more aware of the different levels of data quality and quantity and have adopted the tiered approach to help us categorise different citizen science initiatives to ensure the right data can be used for the right purpose. This has all been published in the EA's first ever Citizen Science Technical Advisory Framework, published in March 2025, with thanks to CaSTCo for their contribution."

ENVIRONMENT AGENCY

"We set out an overarching question at the start of our CaSTCo work, for which we tested a range of scientific monitoring methods against: "Is this an effective way to monitor a river catchment?". All of our Citizen Science worked has served to answer this question, for which we have found it can be a very effective monitoring method. Our work with other monitoring methods has been intertwined with the CitSci work, with the aim to establish the most efficient combinations/applications of processes to get the most out of all the datasets. For instance – citizen science data informing the location and use of robust scientific monitoring equipment."

SIAN MERCER
WYE & USK FOUNDATION

BUILDING A ‘WEIGHT OF EVIDENCE’

When we talk about evidence, we don’t just mean raw data. Valuable information can come in many forms: water quality samples, survey results, local observations, photographs or official records. Each source has its own strengths and limitations, but **when you bring them together, they create a more complete picture of issues with river health and catchments**.

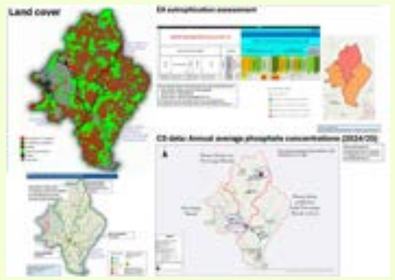
This is what we call the Weight of Evidence (or WoE). Here, “weight” means the ability to balance different types of information to build a picture that can guide decisions. **The picture is never perfect or complete**, but this approach can help groups develop a shared understanding of the issues, build trust, reach consensus, and decide what action to take. Different pieces of evidence can either refute or support an assumption.

Environmental decisions, whether about restoration, regulation, or risk, are never black and white. They require us to interpret information in context, especially when different sectors, disciplines, and monitoring methods are involved.

The **Weight of Evidence approach** helps by:

- **Bridging data gaps** by combining quantitative and qualitative information.
- **Building a shared picture** that groups can use to agree on issues and priorities.
- **Improving transparency** by showing how information from different origins is considered.
- **Making space for local knowledge**, including citizen science contributions alongside professional monitoring.
- **Supporting proportionate decisions**, especially when action is needed despite uncertainty.
- **Identifying where more information is required** to help confirm an assumption – this may, for example, include taking more samples or collecting from different locations or parameters or making more frequent observations.

Project highlight:
Weight of Evidence analysis in the Beane



The Beane Demo was aided by CaSTCo peers at The Rivers Trust, Alex and Paul, to analyse available data to help guide their Collaborative Monitoring Planning. They not only found valuable patterns and insights but also compared the data to a similar range studied by the Environment Agency, providing a broader context and an opportunity for ground truthing.

DIVE DEEPER

castco.org/knowledge-base/guidance-weight-of-evidence

“Citizen science water quality monitoring is wide ranging, across different scales and for different aims, from anecdotal and incidental records to longer term continuous monitoring; our view is that all information is useful to provide catchment intelligence. Our description of tiered data and the potential use of these data can be found in our Technical Advisory Framework and tiered ‘jigsaw puzzle’.

Our internal review of how citizen science is currently used by the Environment Agency includes:

- Providing certainty to complement our data- e.g. eutrophication weight of evidence.
- Providing additional catchment intelligence through increased local spatial and temporal data to complement our monitoring.
- Supporting investigations by providing additional information and highlighting incidents or early warning signs of pollution.”

KELLY HAYNES
ENVIRONMENT AGENCY

DATA

4.9million

Citizen science datapoints shared openly

132,000+

Locations monitored

CaSTCo collected a lot of river data! Guided by CaSTCo's Open Data principles (below), partners worked together to make more data openly available and genuinely useful for effective decision-making. There's lots more to do, but CaSTCo has made genuine progress towards rigorous, reliable data!

As part of the project, partners built the CaSTCo data portal (*data.castco.org*) to bring together data from across CaSTCo partners and others. But that's just one part of the picture. CaSTCo also improved interoperability with platforms like Cartographer and Water Rangers, enabling data sharing via APIs. In addition, the project supported targeted data collection efforts such as blitz events through Freshwater Watch. Plus, partners in the Environment Agency and water companies helped to layer datasets together to develop a "Weight of Evidence" (see page 10). Local evidence packs were created as a 'proof-of-concept' to demonstrate how combined data sources can be visualised together to demonstrate the impact of localised, data-rich information for decision-making.

Collecting and viewing the data is just the start. Much of CaSTCo collaboration focused on building the tools and skills to share, visualise, and interpret data for decisions: prototyping open-source and commercial dashboards, tools for reporting and tracking incidents, and testing new ways of turning insights into accessible report cards.

CASTCO DATA GOVERNANCE PRINCIPLES

1. Open by default
2. FAIR (findable, accessible, interoperable, reusable)
3. Trustworthy
4. Secure
5. User-centred
6. Ethical
7. Resilient

DIVE DEEPER
data.castco.org

"We use and interpret the data - all of our data is FAIR and open source so others can too. We produce reports and share our results through the media, our own socials and scientific publications."

-FRESHWATER WATCH

"Data collected by Citizen Scientists using Cartographer surveys are all subject to QA procedures. This means that the data are of sufficient quality to support both scientific and management-oriented analysis. We are always conscious of QA procedures and how they can be improved and CaSTCo has provided an opportunity to look at these procedures in depth."

-ANGELA GURNELL, CARTOGRAPHER AND CREATOR OF MORPH

SECTION 3

TESTING IN DEMONSTRATOR CATCHMENTS

On the next pages (ordered clockwise, around England and Wales), you'll get just a small taste of the incredible innovation happening across our eight demonstrator catchments. Each one has been testing and proving CaSTCo approaches in real-world settings.

Each demonstrator has also been supported by national partners and regional organisations doing innovative work across the UK, and beyond (see page 12).

Northwest: Targeted Blitzes to create a shared understanding

In this Demo, United Utilities (UU) worked with Ribble Rivers Trust and Mersey Rivers Trust along with other partners across sectors to design targeted Blitzes and build community capacity. Mersey Blitzes prototyped **skill development for at-risk youth** and Ribble Blitzes prototyped the **blitz result analysis in realtime,** feeding surveys directly into data dashboards so partners can spot anomalies. United Utilities join blitzes (through their River Rangers programme), provide lab support, and, critically, use the data in bathingwater investigations (for example, at Edisford Bridge) alongside Environment Agency monitoring. The Trusts have grown and retained a large volunteer base, increased confidence in methods, and standardised data handling, **so evidence moves faster from community collection to planning for action!**

Innovation highlights

- **Blitz format:** Over multiple iterations, organisers have improved how they're run and volunteers are trained. They blend water chemistry, biological (*E. coli* and Riverfly invertebrates), and habitat monitoring, giving a whole-reach picture of river health in hours, not months.
- **UU Community Fund** provides sampling kits for volunteers and CaSTCo has enabled conversations with more community groups.
- **Collaborative monitoring.** On the Bollin, UU River Rangers joined students and volunteers to run targeted blitzes; upstream results then fed Environment Agency/UU investigations and restoration plans. The same approach uses blitzes and follow-up in Stock Beck and Bashall Brook, turning one-day events into repeatable evidence pipelines.

Change & impact

Data collection → embedded practice: Blitz data identifies pollution hotspots and guides farm advice and restoration, targeting and building rich evidence for collaborative action.

Deloitte social investment funding has supported the Mersey demo in using citizen science to engage and upskill young people from inner city schools, colleges and universities, improving social cohesion and growing job prospects.

Weight-of-evidence → investment: Blitz and staff-collected data fed UU source apportionment models and Environment Agency's eutrophication tool which then informed the Ofwat-funded Mainstreaming Nature-based Solutions (MNbS) project's targeting of nature-based solutions (NbS) implementation.

DIVE DEEPER

castco.org/case-study/ribble-riverblitz
castco.org/case-study/upper-mersey-catchment

> **"We cannot stress enough how valuable our learnings from being involved with CaSTCo are. We're now very confident in designing monitoring programmes and the training we need to deliver and, subsequently, that the data collected will be useful and reliable."**
>
> **ELLIE BROWN, RIBBLE RIVERS TRUST**

150+

Unique blitz participants (plus many more regular volunteers) testing across the catchments

Anglian: From pilots to practice across the Wensum & Lark

On the Wensum and Lark, partners treated citizen scientists as peers in collecting evidence and it changed what was possible. Co-developed Collaborative Monitoring Plans and local questions determined sample sites. A **validation programme proved the accuracy of volunteers' phosphate and ammonia readings against lab testing and standards**. The co-created citizen scientist **Pollution Reporting Tool** captures Environment Agency (EA) incident numbers and delivers data and evidence directly to responding EA officers. Norfolk Rivers Trust, Anglian Water & EA are engaging partners and co-leading on developing **data dashboards and integrating citizen science data into pollution reporting and strategic decision making**. The Wensum Catchment Partnership re-structured to **strengthen the pathway from data and evidence to delivery.**

Innovation highlights

- **Tier-2 validation testing.** Using co-designed in-person training and manuals, field evaluations, blind standards and quality assurance audits, citizen scientists demonstrated Tier-2 data quality can be achieved with Hanna meters. Their success is helping citizen scientists locally and nationally build trust into their data too.
- **End-to-end incident workflow.** The Pollution Reporting Tool captures the Environment Agency incident number and assembles citizen scientist's photos, observations and data into a single evidence pack, making it much easier to respond and provide feedback.
- **Plan + platform + sediment tool.** The demo members have co-created Collaborative Monitoring Plans, custom designed data collection systems and visualisation dashboards integrating data across partners. Features like a fixed-photo sediment tool, site and catchment scale data comparison help target effort and track change.

Change & impact

Partnership governance → decisions. The Wensum Catchment Partnership created a Data & Evidence group informing a Delivery group, turning citizen scientists' weekly measurements into recommendations and work plans.
Faster responses, cleaner rivers. Citizen scientists have found pollution in Lark and Wensum headwaters that was otherwise undetectable. Environment Agency investigators received high quality reports allowing faster responses, leading to improvements in water quality subsequently recorded by citizen scientists. Anglian Water is collaborating to build on this success, shortening the path from community report to follow-up action, and promoting legislative change to deliver improvements to headwaters. See also: *Trust is Key*, page 14.
Practice shifts and sharing with others. Learning from the Wensum and Lark has determined approaches and methods used in other rivers nationally. We have run workshops with groups including the Broadland Catchment Partnership and Witham & Welland Catchment Partnerships showing Anglian Demo's framework for the CaSTCo vision can be replicated.

DIVE DEEPER

castco.org/case-study/wensum-catchment
castco.org/case-study/headstart

~60 WEEKLY VOLUNTEERS HAVE CARRIED OUT MORE THAN 3,300 WATER QUALITY TESTS ACROSS WENSUM/LARK

Watch video on YouTube
Error 153
Video player configuration error

"It has been a momentous year for the Wensum Catchment Partnership, with citizen science making significant headway in not only removing pollution, but giving us the confidence to challenge the status quo of strategic models on nutrient apportionment. Our voice is now listened to round the table and much of this is down to your combined efforts."

KELVIN ALLEN, WENSUM CATCHMENT PARTNERSHIP

Beane: Collaborating on chalk streams

The River Beane Demonstrator is a powerful example of **successful collaboration across sectors**. This cooperative effort enabled all parties to quickly share information and address critical issues that might have otherwise gone unnoticed, including freshwater leaks and potential contamination into a unique, vital ecosystem. By bringing together wildlife trusts, community groups, utilities, academic institutions, and government bodies, the project has been able to **identify and implement various interventions to restore and protect this environment in a transparent, coordinated way**. This collaborative model also leveraged data analysis, which combined existing data sources and citizen science data, to better understand other potential issues and to better target further monitoring.

Innovation highlights

- **'Weight of evidence' analysis.** Experts from the Rivers Trust supported the partnership to combine Environment Agency (EA), land use, and citizen science (e.g. Mudspotter) datasets; their analysis uncovering insights one dataset alone could not.
- **Testing new techniques.** eDNA analysis across the Lea and neighbouring Colne catchments in collaboration with the Natural History Museum is investigating both the application of eDNA at catchment scale and the reliability of citizen scientists in collecting this data.
- **Trusted partnerships lead to fast responses.** Citizen scientists from the River Beane Restoration Association (RBRA) guided by Herts and Middlesex Wildlife Trust (HMWT) used Outfall Safari alongside the EA tests to identify issues including freshwater leaks and oil contamination, using their relationships with Thames Water and Affinity Water, to respond quickly.

Change & impact

One stream → whole catchment. Monitoring now covers ~1,000 km² with 41 monthly community sites (18 Riverfly Monitoring Initiative and 23 water-testing). Volunteer numbers are rising thanks to the efforts of the volunteer coordinator in conjunction with the RBRA, and new audiences being reached through community group and school engagement.

Earlier diagnosis. Data collected from Sondes and citizen scientists combined with rainfall flagged up salt-gritting spikes; overland flow mapping points to sediment pathways, generating evidence that directed attention where it matters.

From monitoring to measures. The community worked in partnership with the EA and Affinity Water to use evidence gathered by citizen scientists to help inform Water Industry National Environment Programme (WINEP) measures, inform engagement with land managers, and support pollution investigations.

DIVE DEEPER

castco.org/case-study/beane-demo

12

Metrics investigated, combining citizen science surveys, eDNA, sondes and professional habitat surveys

> We'll use citizen science data to better inform decision making, bridge evidence gaps and target interventions — Working collaboratively is how we can turn monitoring into action. The evidence from the SONDEs alongside rainfall observations helped identify salt-gritting run-off — exactly the kind of practical evidence we can all act upon.
>
> **ALISTER LEGGATT, AFFINITY WATER**

London: Collaborative monitoring and action

London proved that urban citizen science can drive decisions and improve water quality collaboratively. Thames21 amplified quality and impact by aligning CaSTCo with its EMPOWER Rivers Project, developing a citizen science monitoring programme with training, regular online support, and equipment accuracy investigations. The Zoological Society of London (ZSL) and CaSTCo partners audited and expanded the Outfall Safari method, creating a shared protocol where volunteers act as "eyes on the ground," mapping and scoring polluting outfalls. **The Environment Agency (EA) and Thames Water now increasingly use and respond to these data.** Catchment monitoring strategies were co-developed, with citizen science data (such as Hanna Checker results) uploaded to the new Water Rangers open-data portal, co-created with Thames21 and UK volunteers, supported by Thames Water and aligned with CaSTCo's data principles. Data are shared via API with the Rivers Trust Get Data Tool and CaSTCo Data Hub and are being integrated into Greater London dashboards and scorecards. Teams are now working with the EA and Thames Water to streamline issue-reporting systems, strengthening the weight of evidence and enabling faster action.

Innovation highlights

- The **'Become an AquaTracker' citizen science water quality training course** was developed and tested. Equipment includes Hanna Checkers (ammonia, phosphate), conductivity/ temperature meters, and a Secchi tube for turbidity, equipping volunteers with everything needed for surveillance, investigation and evaluation monitoring.
- **Micro-grants for community groups** provided through the EMPOWER Rivers Community Grant Scheme help build hyper-local capacity, funded by The Lund Trust.
- **Data flows by design.** Dashboards are under development at both Thames Water and Thames21 to bring together various datasets, discover pollution hotspots and determine where more data should be collected.

Change & impact

Capability and coverage → 300+ sites monitored now, plus training and grants are helping build skills and a growing network of volunteers.

Actionable evidence → 21,000+ water-quality datapoints were recorded in 2024-2025. This coverage complements EA/Thames Water data collection, accelerated investigations, and allowed Thames21 catchment partnerships to identify locations for new projects.

From equipment to outcomes → trusted kit and standard methods, co-developed and continuously refined together with decision-makers, enable the right data to be collected earlier (e.g., misconnections, road runoff) and post-restoration tracking.

DIVE DEEPER

castco.org/case-study/thames21-empower-rivers

£290k

EMPOWER Rivers Community Grant pot over 2024–2028 seeding volunteer-led monitoring and restoration across Greater London

66%

of cases for the Surface Water Outfall Programme for Thames Water is informed by citizen science

"A good example of this is the fantastic work that the Ching Action Group (CAG) do on the Ching Brook. The EA only has one routine phys-chem sampling point right at the bottom end of the water body whereas the CAG take weekly samples from 15 locations all across the waterbody. This data can be easily viewed on Water Rangers and acts as a fantastic way of understanding what is going on further up the waterbody highlighting the water quality pressure points much more clearly. Utilising this data in tandem with the EA data allows us to establish a much more robust water quality monitoring network and it gives us a much broader understanding of the waterbody as a whole and where the issues are."

-JACK RADFORD
ENVIRONMENT AGENCY

Arun: Co-creation and capacity-building in water and soil monitoring

Demonstrator partners developed successful River Health (River Guardians) and Soil monitoring (Soil SmARt) programmes, **co-created with volunteers and local farmers**. River Guardians, their water monitoring programme, grew from fewer than 10 to 170 trained citizen scientists (≈120 active monthly), giving wide-reaching "eyes on the river" surveillance. River Health Scorecards blend complex chemistry and visual assessment data so partners can target nature-based solutions and track change. On land, the Soil SmARt Soil Health Monitoring Kit helped farmers diagnose compaction and improve infiltration where runoff begins, **adapting and testing scientific methods to a reasonable protocol for farmers and volunteers**. Crucially, Southern Water is a delivery partner, funding a dedicated officer to ensure standards and quality assurance, **aligning joint prioritisation with the Environment Agency (EA) and farm advisors**, and helping turn volunteer evidence into faster operational follow-up.

Innovation highlights

- **River Guardians at scale.** Standardised instructions, simple quality assurance, and monthly routines create important data that's powering positive action across the Arun & Western Streams Catchment. This programme was also short-listed for two awards!
- **Soil SmARt Toolkit.** Co-creating, testing and improving the user experience of field tests (e.g., VESS – Visual Evaluation of Soil Structure, quick infiltration checks) with farmers as citizen scientists.
- **Co-delivery with the water company.** Southern Water is embedded in the workflow with a funded officer, enabling clearer escalation/feedback and collaboration, maximising use of River Health Scorecard to focus effort.

Change & impact

Research on co-design of stewardship projects. Countryside and Community Research Institute (CCRI) at University of Gloucestershire developed and published best practices on co-design with the larger CaSTCo community.

Translating raw data into accessible 'scorecards'. Scorecards help provide an easy-to-digest overview of data integrated from citizen scientists and EA that's being shared with local partners and decision-makers.

Building capacity. Southern Water's funded officer institutionalises citizen science integration so nature-based solutions can be planned and invested in. Combined with Western Sussex Rivers Trust expanding their team, further enabling engagement and awareness in their growing community.

170+

Active citizen scientists (from less than 10 before the project started) showing a massive increase in local capacity

"CaSTCo has enabled the demo project partners to trial new ways of working and learn lessons by doing. It allowed us to be agile and adapt as the project progressed."

Response from Arun demo partners reflecting on their experience in CaSTCo

DIVE DEEPER

castco.org/case-study/wsrt-river-guardians
castco.org/case-study/innovation-and-colllaboration-through-soil

Tamar: Exploring smarter scaling and modelling

982

monthly CSI volunteers explore opportunities and challenges when regions scale citizen science programmes

Across the Westcountry, **a large Westcountry Citizen Science Investigations (CSI) network gives broad coverage** and explores challenges associated with long-term and scalable citizen science programmes. Alongside scorecards and a Collaborative Monitoring Plan for the entire Tamar as well as a pilot on the Cotehele/Morden Stream, the team also **trialled and audited new volunteer-friendly methods, ran calibration days for Tier-2 quality assurance**, and co-developed focus-area mapping with South West Water and Exeter University's Centre for Resilience in Environment, Water and Waste (CREWW). **The aim: turn community insights into quicker investigations, with better-targeted nature-based solutions as a result.**

Innovation highlights

- **Method trials & audits.** Volunteers and partners tested and standardised field techniques (e.g., sediment/flow-path surveys) and ran Tier-2 calibration days, producing simple operating procedures that volunteers can run confidently.
- **Automated scorecards at scale.** "Westcountry CSI" scorecards (150+ waterbody catchments) convert raw readings into clear, comparable information for both volunteers and decision-makers.
- **CaSTCo–Upstream Thinking Upscaled targeting.** South West Water (SWW) and Exeter University/CREWW prototyped open source flow-path/runoff-risk models and began combining citizen data, EA Open data, satellite and sensor streams to create an understanding of where surface water flows from rural catchments were impacting SWW drainage networks and storm overflows.

Change & impact

Investigations and fixes. Citizen Science surfaced phosphate issues at Par, flagged a significant source at Poltesco, and supported bathing-water work at Caerhays, moving quickly from local signalling to partner action.

Informing catchment restoration strategies and Green First solutions. The Upstream Thinking Upscaled hydralic model created by UoE and SWW, which uses open source data and mapping is supporting open source mapping and hydraulic modelling is supporting the targeting of nature-based solutions (NbS) and "Green First" stormwater strategies, now used in business investment planning by South West Water.

Community to funded projects. Groups like Bidwell Brook, Yealm and Calstock now feed university and South West Water pilots (e.g. Ofwat funded Mainstreaming NbS), turning advocacy across 819 km² of the Tamar catchment (56 waterbodies) into resourced delivery.

DIVE DEEPER

castco.org/case-study/westcountry-scaling

"We're making the CaSTCo–Upstream Thinking Upscaled mapping tools openly reusable so any catchment can adapt them—shared code and shared methods, not black boxes."

LAUREN ISBISTER
SOUTH WEST WATER

Usk: Co-developing signals and sustainability

In the Usk, Wye & Usk Foundation (WUF) showed how **citizen science, farm diagnostics, and shared platforms enable decisions and become evidence for their Catchment Market**, creating wins for farmers and nature. A standing network of ~82 weekly volunteers (WUF, Gwent Wildlife Trust, Save the River Usk) now collects regular water quality data. Targeted WaterBlitz days added reach, and Cardiff University empowered volunteers to help them collect samples for eDNA, **extending the traditional limitations of where citizen science ends and professional monitoring begins.** Volunteers enter data that feeds into 'UskViz', their data visualisation platform, and **has been linked into Natural Resources Wales. Cardiff University also embedded learnings into Gateway Wales.** On the ground, continuous monitoring was put into place based on citizen science results. Infiltration testing and wet-weather walkovers are building the case for an **Usk Catchment Market, which rewards farmers for taking on best practices.** Dŵr Cymru Welsh Water (DCWW) is engaged and part of regular catch-ups to ensure it is feeding into priorities on infrastructure and nature-based solutions, and relationships across partners have strengthened as all sides push for simpler, shared tools to use citizen evidence to drive faster changes.

Innovation highlights

- **Testing new methods.** Working together to define what to track and how to prove change. For example, they tested soil methods such as double-ring infiltration, VESS (Visual Evaluation of Soil Structure), wet-weather walkovers, and runoff-risk mapping. They're also tracking baselines, frequencies and thresholds so improvements are defensible.
- **Gathering evidence.** Citizen, sensor and farm-check data are visualised in their custom data visualisation dashboard and are compiled into a consistent evidence pack for Welsh Water and Natural Resources Wales. They can collectively interpret results, improving efficiency and time-to-decision.
- **Programme model that makes small projects investable.** The Wye & Usk Foundation coordinates many farm measures as one programme: prioritising sites, setting before/after tests, handling QA and paperwork, and reporting outcomes, so funders can back a scalable, accountable pipeline of restoration work rather than isolated fixes.

Change & impact

Capacity → coverage. From no programme to ~82 weekly volunteers, WaterBlitz engagement added broad reach across 1,473 km² and 52 waterbodies.

Evidence reused. Natural Resources Wales used citizen evidence in official work; Dŵr Cymru uses shared outputs to focus infrastructure and nature-based restoration priorities.

From advice to action. 50+ on-farm interventions, wet-weather walkovers and farm reports shows deep trust across this community. Infiltration testing now underpins the emerging Usk Catchment Market.

DIVE DEEPER

castco.org/case-study/river-usk-farm-interventions
castco.org/case-study/wye-usk-voices

82

Weekly volunteers taking the river's pulse across the Usk.

40k

Individual tests were carried out at 171 sites

27

Crai farmers engaged, with walkovers and 26 farm reports guiding action.

50+

On-farm interventions (gateways, reseeding/herbal leys, water retention) where runoff begins.

"Small fixes made a big difference once we looked at soil structure and infiltration."

— USK FARMER

Teme: Prototyping citizen science for bathing waters

When the Teme collaboration started, the question was simple: **could citizen science generate bacteria evidence that regulators and recreational river users could trust**? They built the answer in public, collaboratively. Volunteers, Severn Rivers Trust, Severn Trent Water and the Environment Agency co-developed WaterBlitzes, comparing methods against lab controls to learn what to use, where, and why. **Water chemistry data is also collected and fed into both data dashboards and the CaSTCo Data Hub to develop a shared understanding of trends**. The new designated bathing water site on the Teme gave the work a clear purpose: evidence strong enough to guide bathing-water decisions. This new network has already proven its ability to be responsive: a volunteer-reported incident upstream of a bathing site was escalated to Severn Trent and the Environment Agency and actioned upon. Before, they had no citizen scientists. **Now, they have a network of 80 water quality citizen scientists, established collaborative partnerships, and the right methods and training to enable data collection.**

Innovation highlights

- **Co-designed volunteer-ready testing of methods.** Volunteers, Severn Rivers Trust, Severn Trent Water and the Environment Agency tested IDEXX Colilert/Tecta, AquagenX, Bacterisk, Fluidion, Proteus and R-Cards against laboratory results to choose methods that could inform monitoring and benchmark citizen science results. Doing these trials along with refining the methodology has led to further projects with the EA on bathing water investigations.
- **From blitzes to baseline monitoring.** Targeted WaterBlitz (one-day, whole-reach) and light-touch weekly and monthly sampling are designed around volunteer capacity.
- **Data visualisation to understand the catchment**. Custom forms with method and quality-assurance fields feed a shared dashboard, visible by both volunteers and partners.

Change & impact

0 → ~80 volunteers; 75 sites; 1,200+ surveys. An established citizen-science network now produces trusted evidence for partners, supported by strong training, and representation in project governance.

Incident → outcome. A volunteer-reported upstream issue triggered a Severn Trent Water → EA response and action. It's proof of the power of a community's ability to act as advocates for local water bodies, enabling faster improvements for rivers.

Trials to funded projects. The blitz events identified a trusted, cost effective bacteria sampling method which has led to a funded project on bathing water investigations with volunteers.

DIVE DEEPER

castco.org/case-study/severn-bacteria

1,200

Surveys collected by 80 regular citizen scientists, an increase from none before the project began

The Environment Agency has been working closely with the CaSTCo project to aid in the standardisation and integration of citizen science data. In the Teme demo we have worked with partners to contribute advise and expertise into understanding methods for citizen science bacteria monitoring. Through the efforts of the partnership and the citizen scientists we have been able to work on ways this data can be integrated and used in decision making and ultimately lead to positive, data led action for our rivers.

-LYDIA ASHWORTH ENVIRONMENT AGENCY

SECTION 4

LOOKING TO THE FUTURE

CaSTCo laid the foundations for lasting change. This section looks ahead to how the shared frameworks, relationships, and learning built through the project will continue to grow, guiding the next decade of collaborative river monitoring.

BUILDING A MOVEMENT

The demo catchments are only the beginning. The blue markers highlight the first wave of organisations and community groups across the country who are joining in. They're already doing brilliant work and are eager to contribute to our shared tools and understanding. We've highlighted some great examples.

Together, we're building a growing community and this is just the start!

Demonstrator catchments

Emerging and supporting catchment projects

Assessed on the CaSTCo principles and joining the community

TYNE RIVERS TRUST NORTHUMBRIAN WATER

Engaged with national partners in data and evidence conversations, and accessed national information and case studies from other regions.

YORKSHIRE WATER

Collaborated with the codesign of phosphate monitoring protocols.

ANGLING TRUST (NATIONAL)

Angling Trust monitoring data has been shared to the CaSTCo Data Hub.

BRISTOL AVON RIVERS TRUST

EMERGING INNOVATION

CaSTCo has sparked a wave of new partnerships and technologies that are expanding what's possible for community-based and catchment-scale monitoring. These connected projects and collaborations are carrying forward the spirit of innovation, openness, and shared learning that defined the programme. Here are a few highlights.

Bridging citizen science and technology

Across the network, partners continue to test and refine new ideas. A few examples include the CaSTCo and Rivers Trust launching of the Big River Watch, engaging first-time citizen scientists; Earthwatch Europe piloting chemical and E. coli testing as part of the Great UK WaterBlitz; Water Rangers developing easy-to-use testkits for E. coli monitoring; CaSTCo team members testing the new low cost, rapid Bactiquick bacterial testing with Molendotech; multiple partners using Citizen Science results to train water quality prediction models in the River Deep Mountain AI (RDMAI) project; and assessing eutrophication risk by surveying algae using the Rapid Assessment of Periphyton Ecology in Rivers (RAPPER) method.

Through the Innovate UKRI / Innovate UK in Environmental Monitoring programme, CaSTCo partners are also linking citizen science with emerging tools and sensors. For example, Seneye's addition of a micro-sampler and eDNA filter to their "swarm sensing" buoys helps users better understand pollution sources. Another example is Chelsea Technologies' development of a novel multi-parameter fluorimeter to detect polluting organic matter.

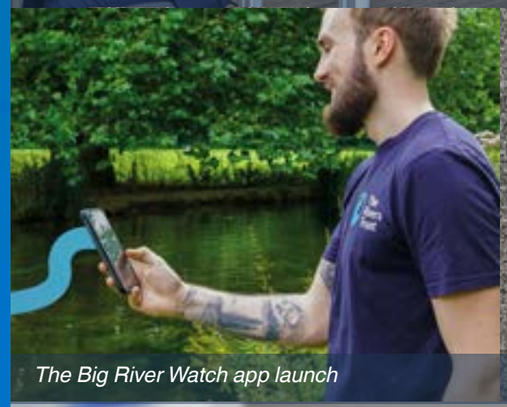
Connecting data and people

Many innovations in data management and sharing are beginning to glue together the beginnings of a better data ecosystem. For example, the CaSTCo data hub brings together a number of Citizen Science data sets in one place for the first time, helping make data more visible and usable and Water Rangers' flexible new data platform exposes meta data around monitoring purpose and equipment in ways that will make citizen science data much more interoperable.

It's just the start, though. Working with the Stream Ofwat Innovation Project, CaSTCo partners helped map the UK's wider water-data ecosystem, exploring how citizen-science data connects with regulatory and company datasets. This collaboration continues to shape how trust and value flow across the system.

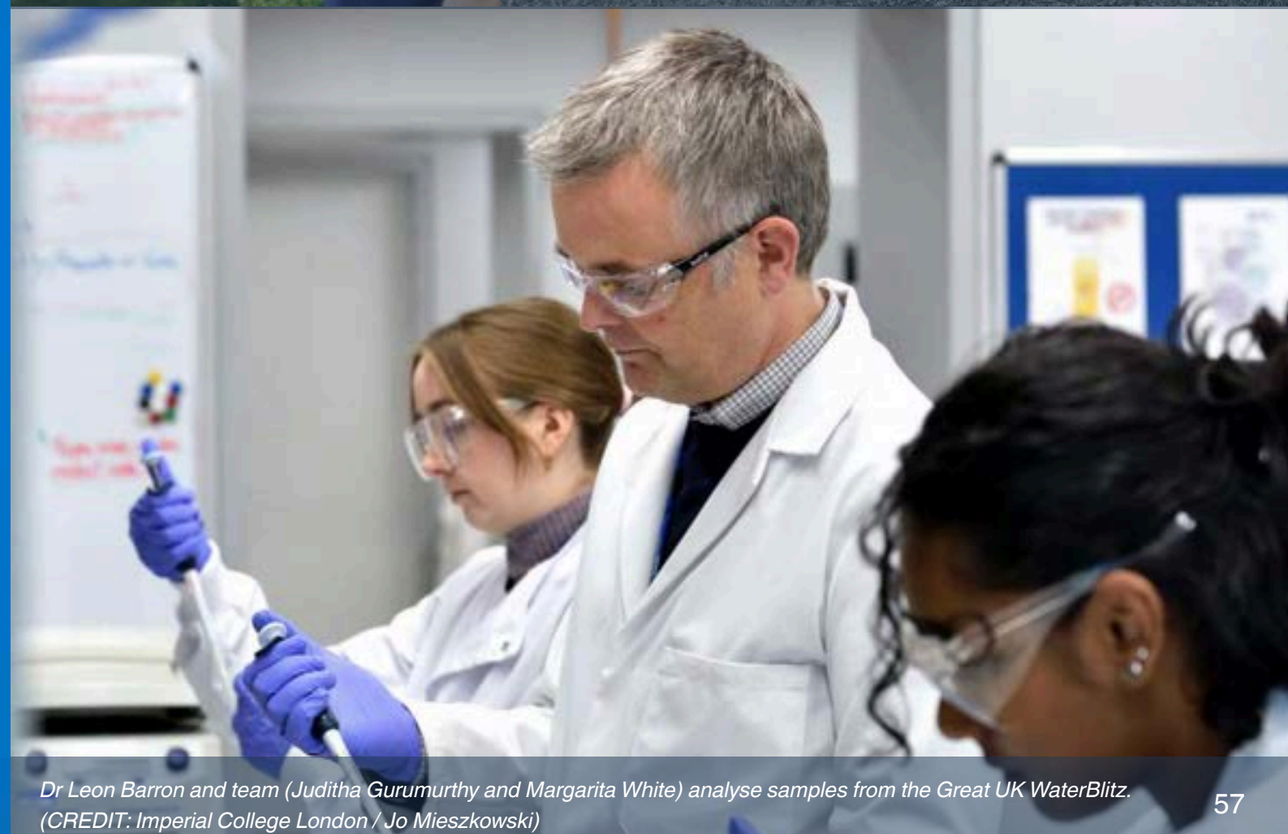
Matthew Stevenson from Seneye at a Sensors for Water Interest Group (SWIG) workshop

Michelle (Rivers Trust) and Kate (Severn Rivers Trust) with Colin from Bactiquick at the Water, Wastewater and Environmental Monitoring (WWEM) exhibition



The Big River Watch app launch

CaSTCo prototype for large-scale blitz E. coli testing designed by Water Rangers



Dr Leon Barron and team (Juditha Gurumurthy and Margarita White) analyse samples from the Great UK WaterBlitz. (CREDIT: Imperial College London / Jo Mieszkowski)

LOOKING TO THE FUTURE

At the CaSTCo end of project conference, there was a buzz in the air: a shared sense that something meaningful had taken root. Across every presentation and conversation, it was clear that extraordinary work had taken place: new relationships built, tools developed, and ideas tested that are already shaping the future of collaborative water monitoring.

What stood out most was the sense of connection. Partners from across sectors (community groups, catchment partnerships, researchers, water companies and regulators) spoke with one voice about continuing the momentum. CaSTCo may have been a project, but it has become a movement: one grounded in trust, shared learning, and innovation.

We're already planning what's next. For example, in partnership with Spring, CaSTCo is developing a knowledge-sharing showcase webinar to engage the water industry and wider audiences on how to take the CaSTCo Roadmap forward.

The CaSTCo Roadmap, introduced on the next page, captures that collective vision: mapping the next steps for how we continue to grow, share, and build together.

CaSTCo partners' top rated needs for building momentum and impact:

TASKFORCE

A Taskforce of senior representatives from decision-makers, sector organisations, and experts from research organisations was brought together to co-design the next steps: How do we build this at scale and for maximal impact? Through a series of development sprints, a set of key recommendations and actions needed to scale the CaSTCo Framework was developed to create the CaSTCo Roadmap.

The overarching objectives of the Sprints were to:

1. **Foster inclusive participation** and engage diverse expertise and perspectives.
2. **Articulate a vision** and theory of change that guides the future implementation of CaSTCo as well as how to overcome any barriers that are currently in place, or could be in the short, medium or long-term.
3. **Explore approaches to integrate Citizen Science** with other data-gathering methods, to create a robust weight-of-evidence approach for decision-making.
4. **Develop a clear roadmap with actionable steps** to achieve the vision, by synthesising insights from sprints, stakeholder engagement, the CaSTCo project and similar initiatives.
5. **Propose sustainable processes**, governance, funding strategies and responsibility mechanisms as part of the Roadmap, to ensure long-term adoption and impact.
6. **Advise key policy development** by providing input to the Independent Water Commission on the shared future vision and recommending a roadmap implementation plan to Defra and other regulatory bodies.

More details about the sprint discoveries are in the Roadmap document.

ROADMAP

The Roadmap sets out the co-created 10 year action plan for scaling the CaSTCo approach. This 78 page plan, launched at the end of project conference in September 2025, is the culmination of the work on the project and contains highlights from project activity which provides the evidence to underpin three key recommendations, each with clear actions, for scaling-up the CaSTCo approach.

This Roadmap sets out how the CaSTCo approach delivers benefits to those monitoring and managing catchments and waterbodies, and importantly how stakeholders can contribute to driving the actions forward, and will be used to guide the development of future work.

1 RECOMMENDATION

Advance citizen science quality, recognition & integration

2 RECOMMENDATION

Establish a national catchment data system and standardised monitoring

3 RECOMMENDATION

Strengthen collaborative governance & stakeholder engagement at local and national scale

Read the full Roadmap:
castco.org/roadmap


Ofwat
Innovation
Fund
Action
for our
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CaSTCo
People. Rivers. Resilience.