Global Water
Research Coalition

Overview of Activities

2025

OUR MISSION

"To maintain a strong partnership between leading world water research organisations to strategically generate, exchange and communicate knowledge through research collaborations to support safe and sustainable water supply and sanitation for the protection of public health and the aquatic environment."

Global cooperation for the exchange and generation of water knowledge

In 2002 twelve leading research organisations established an international water research alliance: the Global Water Research Coalition (GWRC).

The Global Water Research Coalition (GWRC) is a non-profit organisation that enables international collaboration in water research. It delivers value to its members by addressing critical research needs, rapidly sharing leading-edge knowledge, and connecting organisations through a global network of water experts.

The current members of the GWRC are listed below.

- Canadian Water Network (Canada)
- KWR Water Research Institute (Netherlands)
- PUB (Singapore)
- SUEZ (France)
- STOWA - Foundation for Applied Water Research (Netherlands)
- TZW DVGW - German Water Centre (Germany)
- UK Water Industry Research (UK)
- VEOLIA (France)
- Water Research Australia (Australia)
- Water Research Commission (South Africa)
- The Water Research Foundation (US)
- Water Services Association of Australia (Australia)

The US Environmental Protection Agency has been a formal partner of the GWRC since 2003. The Global Water Research Coalition is also affiliated with the International Water Association (IWA).

GWRC Research Priorities

The year 2025 marks the twenty-fourth year of GWRC operations. The organisation continues to serve as a unique platform for aligning and leveraging research efforts across members and external partners.

The global water sector faces increasing and interrelated challenges:

- Climate change and extreme events
- Population growth and urbanisation
- Increasing constraints on micropollutants and risk of "Media Frenzy"
- Increase concern over emerging contaminants and water quality
- Ageing water and wastewater infrastructure
- Rising expectations for resiliency, circularity and sustainability
- Challenges around biosolids disposal and changes in regulations

These challenges transcend national and international boundaries. They require a coordinated global response that only a coalition of leading research organisations can effectively deliver.

The GWRC's primary objective is to facilitate **research coordination and cooperation** across its membership and with strategic partners. Key activities for the next operational period include:

- Continuing collaboration to address critical research priorities across the global water sector
- Prompt dissemination of leading-edge research findings
- Facilitating knowledge exchange across member organisations
- Providing seamless access to a global network of leading researchers
- Strengthening implementation of research strategies and improving execution of joint activities

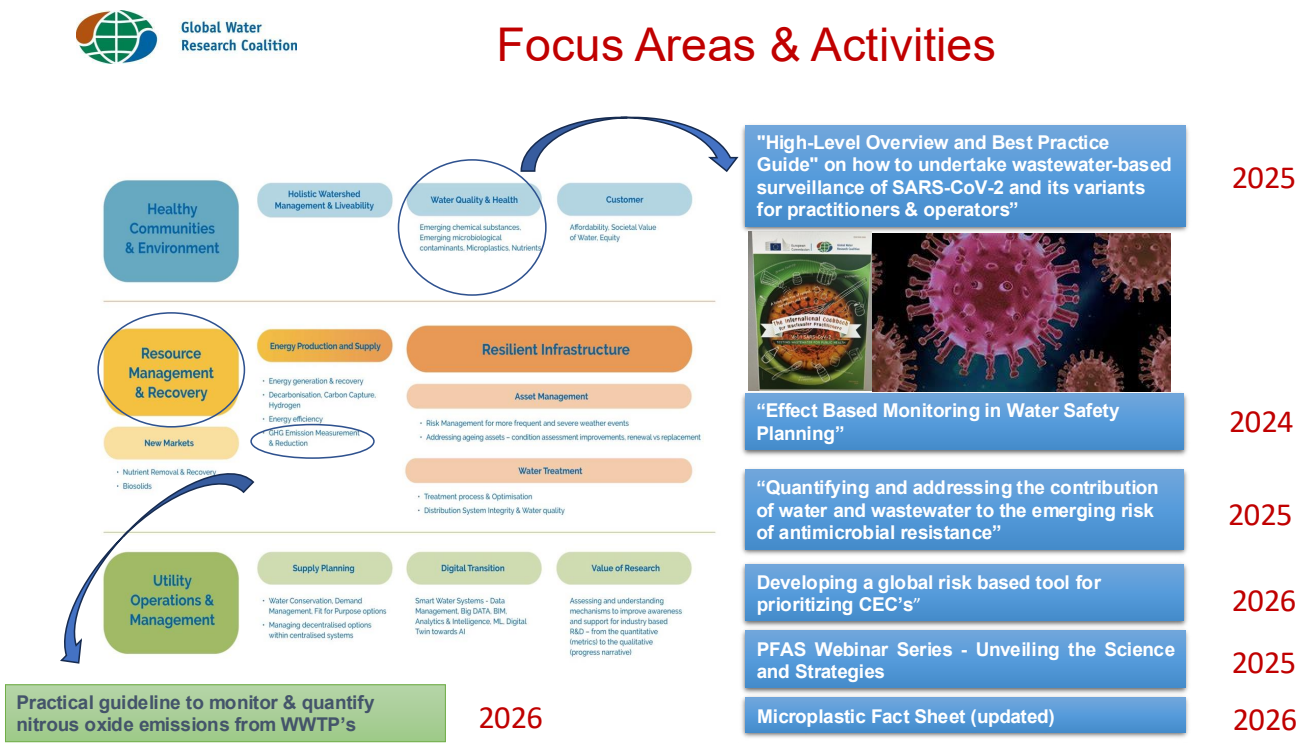
Following a strategic planning session with the GWRC board, three focus areas were selected to explore further for the coming years, namely Greenhouse Gas Emission monitoring and mitigation measures, Water Quality & Treatment (includes Contaminant of Emerging Concerns) and Biosolids and Resource Management. To deliver on these focus areas, the GWRC has established Working Groups comprised of member and partners representatives.

The working groups provide the ability to share and exchange on previous, current and developing research. This approach serves to reduce duplication and highlight opportunities for cross collaboration amongst GWRC members based on shared interests and needs. The formation of the working Groups provides the GWRC membership the opportunity to exchange ideas, knowledge, and learn from good practice. IN doing so the aim is to support the GWRC membership and partners by avoiding duplication and repetition of effort and research, while enhancing global networks and collaborations in this key area for the water services industry.

Rationale for Action

The need for the GWRC has never been greater. Global pressures demand not only high-quality research, but also effective knowledge transfer and collective action. While the Coalition has achieved substantial progress to date, there is a compelling case to enhance our working processes, improve coordination, and increase the impact of our shared research outcomes. International collaboration and research and development are crucial to this transformation. By sharing knowledge, technologies and best practices, we can accelerate progress towards our goals.

Overview of Ongoing and Finalised Projects and Activities



The GWRC Research priorities matrix (Figure 1 above) is reviewed periodically with the members and partners and focus areas for the upcoming year identified. The projects that have been finalized and are currently ongoing are highlighted.

"High-Level Overview and Best Practice Guide" on how to undertake wastewater-based surveillance of SARS-CoV-2 and its variants for practitioners & operators" (Finalised in 2024)

The COVID-19 response brought together an exceptional partnership between the European Commission's Joint Research Centre and the Global Water Research Coalition (GWRC), supported by RIVM, VEOLIA, SUEZ, Water Futures, and KWR. This collaboration played a pivotal role in advancing Wastewater-Based Surveillance (WBS) as a powerful public health tool.

By pooling global expertise from health agencies, water utilities, technology providers, universities, and research organisations, the team produced the *SARS-CoV-2 Wastewater-Based Surveillance Cookbook*—a practical, best-practice guide for practitioners and operators. Developed by an international author team and extensively peer-reviewed, the Cookbook provides clear guidance on monitoring SARS-CoV-2 and its variants, while strengthening preparedness for future health threats.

We extend our sincere thanks to the core team and contributors whose collaboration and shared vision made this achievement possible.

Download the Cookbook: publications.jrc.ec.europa.eu/repository/handle/JRC138489

"Effect Based Monitoring in Water Safety Planning" (Finalised in 2024)

Effect-based monitoring (EBM) complements traditional chemical analysis by capturing the combined effects of chemical mixtures on water quality. Applied within Water Safety Plans (WSPs), EBM strengthens risk assessment and supports more proactive and informed water safety management.

This GWRC-supported project, coordinated by KWR Watercycle Research Institute with partners including Veolia, Suez, Griffith University and UFZ, demonstrated how substance-based and effect-based monitoring can be integrated across the entire water cycle, from source to tap. Case studies showed how EBM can be used to assess treatment performance, identify emerging risks and support decision-making.

The project developed practical guidance on bioassay selection, data interpretation and implementation within cost-effective monitoring programmes. A key outcome is that effect-based monitoring is ready for operational use and can deliver both safety benefits and cost efficiencies, provided methods are applied reproducibly and supported by harmonised guidance and policy integration.

Download the Project reports and resources on the GWRC website under *Effect-Based Monitoring in Water Safety Planning (2019–2023)* globalwaterresearchcoalition.net/resource/reports-resources-presentations/

"A practical protocol to monitor and quantify nitrous oxide (N2O) emissions from full-scale wastewater treatment plants" (Ongoing)

A global collaborative project led by the University of Queensland (Australia) and coordinated via Water Research Australia has been launched in 2024 to tackle nitrous oxide emissions from wastewater treatment plants—one of the most critical challenges in achieving net-zero emissions for the water industry. Nitrous oxide, a potent greenhouse gas, accounts for over 80% of direct greenhouse gas emissions from wastewater treatment plants, making their reduction essential for utilities to meet their climate targets. However, accurate quantification remains challenging due to inconsistencies in equipment setup and data collection, posing a significant barrier to effectively comparing and reducing these emissions.

This project brings together international partners and interdisciplinary experts to develop a globally recognised and implementable methodology for monitoring and quantifying nitrous oxide emissions. This will enable water utilities worldwide to adopt good practices for accurately measuring their nitrous oxide emissions and lay the groundwork for building a comparable global database. The data collected can then be used to provide more accurate representations of nitrous oxide emissions from the wastewater sector, helping the industry take actionable steps toward reducing emissions in the future.

This international collaboration is a vital step toward ensuring that best practices are adopted worldwide, unlocking significant benefits for the water industry. This project will be finalised in 2026 and the protocol will be launched at Singapore International Week 2026 and at the IWA World Water Congress in Glasgow.

"Developing a Global Risk-based Tool for Prioritizing Contaminants of Emerging Concern (CEC) for the Water Industry" (Ongoing)

Contaminants of emerging concern (CECs) pose a risk to the water industry due to their presence in sewage and drinking water sources, as well as their potential formation during treatment and their potential toxicity to humans and the environment.

The widespread use of chemicals has led to their increasing presence in wastewater, surface water, and drinking water. Many of these substances are classified as contaminants of emerging concern (CEC) due to their potential risks to human and ecosystem health, combined with limited regulatory guidance and data on occurrence and toxicity. This creates challenges for water utilities in assessing risks and prioritising monitoring.

To address this gap, Water Research Australia launched ECHIDNA in 2021 as a science-based CEC prioritisation tool, screening approximately 1,800 chemicals using persistent, bioaccumulative and toxic (PBT) criteria and chronic toxicity data to derive risk quotients. In 2024, with support from the Global Water Research Coalition, ECHIDNA was expanded into a "Global Risk Based Tool" to support international application.

The tool now integrates seven matrices—wastewater influent and effluent, surface water, drinking water, recycled water, groundwater, and biosolids/WWTP sludge—addressing key gaps in existing prioritisation frameworks, particularly for biosolids. Country-specific occurrence data allow users to generate location-relevant risk quotients and compare CEC within local contexts. Initial results indicate that compounds such as ibuprofen, ciprofloxacin, and 17-ethinylestradiol may pose risks to soil organisms in some regions.

With nearly 5,000 occurrence data points from 87 countries and broad global coverage, the Global Risk Based Tool provides a robust platform to support risk-based prioritisation and long-term management of CEC by water utilities worldwide. The first phase of the "Global Risk Based Tool" will be finalised in 2026.

Knowledge Exchange & Webinars (Highlights)

Numerous webinars were organised by the three GWRC Working Groups. The **Working Group on Greenhouse Gas (GHG) Emissions Reduction** has organised webinars on understanding, analysing, capturing nitrous oxide with presentations by members from the GWRC and the University of Queensland in particular. Other webinars included presentations on exploring innovative solutions designed to mitigate nitrous oxide (N_2O) emissions from wastewater treatment processes.

The **Water Quality & Treatment Working Group** focused on actions and strategies to handle water quality and treatment challenges within the water services industry, with a focus on imminent and emerging contaminants of emerging concern (CECs).

A new Working Group on **Biosolids and Bioresources Management has been launched at the end of 2025 with the objective** to act as a collaborative platform for collaborative research, knowledge exchange, and best practice development focused on the sustainable management and reuse of bioresources, particularly sewage sludge and post-thermal treatment products. This Working Group will facilitate international dialogue, leverage existing research, and promote practical guidance for utilities and regulators seeking to advance sustainable bioresources management practices. In doing so the aim is to support the GWRC membership and partners by avoiding duplication and repetition of effort and research, while enhancing global networks and collaborations in this key area for the water services industry.

PFAS Webinar Series - Unveiling the Science and Strategies

The Global Water Research Coalition (GWRC) organised a five part webinar series in collaboration with the U.S. Environmental Protection Agency on PFAS (per- and polyfluoroalkyl substances) throughout 2024 and 2025.

Per- and Poly-Fluoro Alkyl Substances (PFAS) are widely used, long lasting chemicals, components of which break down very slowly over time. Because of their widespread use and persistence in the environment, many PFAS are detected in people and animals all over the world and in the environment. Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals. There are thousands of PFAS chemicals, and they are found in many different consumer, commercial, and industrial products. This makes it challenging to study and assess the potential human health and environmental risks.

This comprehensive series, delivered by renowned experts, was designed to educate and empower water professionals, policymakers, researchers, and anyone concerned about PFAS contamination.

The Webinars delved deep into the science and strategies surrounding PFAS, with each follow-on webinar tackling another crucial aspect. The five series webinars covered:

Webinar 1: *PFAS Sources & Occurrences in Water.*

Webinar 2: *Disposal and Destruction of PFAS in difficult to treat matrices and other water industry products such as biosolids, biochar sludges)*

Webinar 3: *Treatment Technologies and Processes for Removing PFAS from Public Water Systems*

Webinar 4: *Analytical Methods for PFAS (Drinking Water, Wastewater, and Environmental Samples (Non-targeted analytical methods for unknown and large groups of PFAS) & Challenges*

Webinar 5: *Public Perception & Communication Challenges*

All the recordings of this Webinar Series are available on the GWRC Website under the following link: https://globalwaterresearchcoalition.net/resource/pfas-webinar-series-unveiling-the-science-and-strategies/

White Paper

"Quantifying and addressing the contribution of water and wastewater to the emerging risk of antimicrobial resistance" (Finalised in 2025)

Antimicrobial resistance (AMR) poses a critical global challenge, with environmental factors such as wastewater treatment plants (WWTPs) playing a significant role in AMR evolution and dissemination. While WWTPs are crucial for reducing antimicrobials and antibiotic-resistant bacteria, concerns remain regarding the amplification and release of problematic mobile genetic elements along with gene/bacterial combinations from WWTP. Studies indicate increased levels of antibiotic resistance genes (ARGs) downstream of WWTP discharges and in soils post-biosolids application, raising worries about human exposure risks via water, soil, and air. Evaluating these risks is complex due to the propensity for transfer of ARGs among bacterial hosts and potential for delayed adverse effects.

Addressing AMR risks associated with WWTPs within a broader One Health framework is vital for informing the development of effective management strategies.

As a follow-on to WRF project 4813 "Critical Evaluation and Assessment of Health and Environmental Risks from Antibiotic Resistance in Reuse and Wastewater Applications, research investigators Kerry Hamilton, Amy Pruden, and Emily Garner with the support of the Global Water Research Coalition and the Water Research Foundation (WRF) have used the existing database (developed in WRF project 4813) to conduct a meta-analysis to develop a white paper informed by literature review and an internal focus group, titled "Contribution of wastewater treatment and disposal to the emerging risk of antimicrobial resistance." This project is financed by the Water Research Foundation and STOWA -Foundation for Applied Water Research (Netherlands) with in kind support from all other members and partners.

The white paper outlines the current understanding of the contributions to antibiotic resistance from wastewater, wastewater treatment, and the use of the products of wastewater treatment (e.g., recycled water and biosolids). This will include a literature review of the current understanding of the contribution of these products to the increased incidence of antibiotic resistance, placing those risks in the context of risks associated with other industries, such as agriculture and healthcare.

Adopting a One Health perspective, the paper emphasises the importance of understanding source attribution and identifying key research gaps. The findings aim to guide future research priorities and inform policy actions to better assess and manage environmental antimicrobial resistance (AMR) risks and associated human health impacts.

Download the white paper on the GWRC website globalwaterresearchcoalition.net/wp-content/uploads/2023/11/Source-apportionment-for-AMR-2024.pdf

Workshops & Conferences

"A Conversation on Water Research and Innovation Futures – Building water security", IWA Water Reclamation and Reuse Conference, Cape Town, March 2025

A special session was organised at the **IWA Water Reclamation and Reuse Conference** in Cape Town facilitated by the GWRC and the Water Research Commission to unlock a conversation on how GWRC members are forecasting and prioritizing research and innovation to ultimately solve existing and emerging water challenges and opportunities in their constituencies and the world. The conversations highlighted, foresight on global water challenges, promising areas of research and innovation and what the governments and institutions should be focusing towards in building water security.

Additionally, GWRC Board members were involved in numerous conference sessions and presenting case studies and sharing expertise and knowledge on reuse projects in their respective countries. Gurdev Singh, Chief Engineering & Technology Officer, PUB Singapore and Adam Lovell, CEO WSAA, Australia (pictured below).

Workshop on "Infrastructure Resiliency", Karlsruhe September 2025

During the first half of the workshop, several guest speakers from Germany, the UK and the Netherlands were invited to share their ongoing work and insights related to resilient infrastructure within their respective organisations

The second half of the Resilient Infrastructure Workshop focused on identifying actionable commitments to support the GWRC community. Discussions were structured around three complementary pillars: **asset health**, **organisational resilience**, and **extreme scenarios & forecasting**.

Members shared diverse perspectives on resilience and collectively agreed that resilient infrastructure requires both resilient organisations and resilient assets.

As a next step, GWRC board members agreed to initiate strategic dialogues among selected leaders to define priority areas and advance a focused, practical agenda for strengthening resilience across the network.

Left: Laure Cuny, Project Management Agency Karlsruhe (PTKA) Karlsruhe Institute of Technology (KIT),

Right: Presenting an Overview of the recently finished 'WaX – Hydrological Extreme Events' funding programme of the Federal Ministry of Research, Technology and Space (BMFRT) at the Resilient Infrastructure Workshop ***hosted by TZW in Karlsruhe on the 22nd of September 2025****.*

GWRC Board of Directors

Board meetings, workshops and topic discussions were organised for the Board of Directors in Cape Town (South Africa) in March 2025, and Karlsruhe (Germany) in September 2025.

Members of the Global Water Research Coalition (GWRC) held its Board of Directors meetings from the 20-21 March 2025 in Cape Town, South Africa. In addition to the board meeting, members of the GWRC were able to get a good understanding of the research portfolio of the host organization, the Water Research Commission. The City of Cape Town delivered a compelling presentation on how it managed the 2017–2018 drought crisis and the looming threat of "Day Zero," when municipal water supplies were close to being shut off. At the peak of the drought — the worst on record — dam levels dropped to just 9.8% of usable capacity. The Citiy of Cape Town highlighted that only through strong stakeholder engagement, extensive public water-saving campaigns, and decisive strategic action, the city narrowly avoided Day Zero. In response to increasingly unpredictable rainfall patterns, Cape Town has since strengthened its long-term water security strategy, prioritising water reuse and desalination.

The Water Research Commission also presented an overview of its RDI Strategy and current research activities, highlighting work across water availability, water use, and water quality and health.

The GWRC Board has also participated in a Strategic Session on the 21st of March 2025 to develop an Action Plan that responds to key challenges, drivers, and opportunities for GWRC members to focus on in the next 2 years.

Board of Directors meeting in Cape Town, South Africa hosted by the Water Research Commission.

The Global Water Research Coalition's Board of Directors gather with the research leaders of the TZW: DVGW-Technologiezentrum Wasser (German Water Centre).

Members of the Global Water Research Coalition (GWRC) held its Board of Directors meetings from the 22-23 September 2025 in Karlsruhe, Germany.

In addition to the board meeting, members of the GWRC were able to get a good understanding of the research portfolio of the host organisation and founding member of the GWRC, namely the TZW: DVGW-Technologiezentrum Wasser (German Water Centre).

During the Board meetings members and partners presented their priorities and challenges for the years ahead. The exchanges of information between members and partners has developed into a very valuable part of the Board meetings. The presentations by the hosting organisations and their stakeholders give an additional dimension to the Board events.

The GWRC Board of Directors is made up of the representatives of the GWRC members.

Members of the Board (as per December 2025)

Peter Grevatt
CEO Water Research Foundation, United States

Jennifer Molwantwa
CEO WRC
South Africa

Zdravka Doquang
Innovation Officer
SUEZ, France

David Bergmann
CEO Water Research Australia

Mike Rose
CEO UKWIR, UK

Marielle van den Zouwen
CEO KWR,
Netherlands

Nicola Crawhall
CEO Canadian Water Network

Gurdev Singh
Chief Engineeering & Technology Officer, PUB Singapore

Adam Lovell
CEO WSAA,
Australia

Josef Klinger
CEO TZW, Germany

Mark van der Werf
CEO STOWA,
Netherlands

Ismahane Remonnay
Veolia, France

The US EPA and the International Water Association have an ex-officio position on the Board and are partners of the GWRC.

Stéphanie Rinck-Pfeiffer is the Managing Director, the Secretary and Treasurer of the Board.

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