



REQUEST FOR PROPOSALS (RFP)

Integrating Requirements, Drivers, and Technologies for Enhanced Distribution System Water Quality Monitoring (5301)

Date Posted

March 4, 2025

Due Date

Proposals must be received by 3:00 pm Mountain Time on Wednesday, May 7, 2025

WRF Project Contact

Grace Jang, PhD, hjang@waterrf.org

Project Sponsors

This project is funded by The Water Research Foundation (WRF) as part of WRF's Research Priority Program.

Project Objectives

- Evaluate existing distribution system water quality monitoring programs designed for different purposes to identify opportunities for integration for future improvements in efficiency and effectiveness.
- Develop comprehensive guidance for designing, implementing, maintaining and using advanced and optimized approaches to manage and monitor water quality in distribution systems.
- Provide actionable recommendations for water utilities and regulators to enhance distribution system water quality monitoring programs and practices in a more integrated manner.

Budget

Applicants may request up to \$350,000 in WRF funds for this project.

Background and Project Rationale

Since the 1980s, water quality monitoring in distribution systems has evolved in response to various regulatory requirements, operational needs, industry standards, and technological advancements, and it is still evolving today. A water quality monitoring program typically includes elements such as water quality goals, sampling program design, identification of parameters to be monitored along with test methods, data collection and management procedures, quality assurance and control procedures, action levels and procedures for response, and reporting protocols. However, the evolution of monitoring programs and

objectives has resulted in disparate programs operating independently and competing for resources within water utilities. Each monitoring program typically has its own set of objectives, methods, and data collection needs. As a result, there is duplication of efforts, conflicting priorities, and missed opportunities to leverage shared resources for greater efficiency and effectiveness. To address these challenges of current and evolving water quality monitoring programs, there is a need to adopt a holistic and integrated approach that involves reviewing existing programs, leveraging new technologies, and optimizing monitoring efforts.

By integrating disparate programs and leveraging technological advancements, water utilities can streamline monitoring practices, improve data collection and analysis, and ensure consistent and reliable water quality in distribution systems. Furthermore, given the diverse demands of regulatory compliance, operational optimization, and customer-focused requirements, there is a need to examine how different monitoring designs can better integrate these diverse needs. Through enhancing overall water quality management, this research aims to create more efficient and effective integrated water quality monitoring programs. Thus, there is a timely need to reconsider water quality monitoring as a whole to address the challenges posed by fragmented approaches and pave the way for comprehensive and integrated monitoring.

Research Approach

We encourage proposers to bring creativity and originality to their proposals. Proposers should outline their research methods and demonstrate how they will achieve the objectives outlined above. The proposal must include the following tasks in the research approach with a detailed description of the research methodologies and a clear plan for addressing each task.

Task 1: Comprehensive Review on Water Quality Monitoring

This task will focus on identifying a broad range of possible distribution system water quality issues important to utilities. The following aspects should be considered (but are not limited to):

- Conduct a comprehensive literature review, surveys, and a workshop to identify current knowledge and best practices in distribution system water quality monitoring, including examining the advantages, limitations, and any gaps in current monitoring practices.
- Review the current regulatory requirements and ongoing discussion regarding future regulatory requirements for water quality management in distribution systems and examine how these requirements influence monitoring programs.
- Review operational and customer service level goals for water quality, as well as water security goals, that go beyond regulatory compliance requirements.
- Review and incorporate water utility experience, various technologies (e.g., supervisory control & data acquisition [SCADA], online sensors/analyzers, smart meters), and system approaches (e.g., district metered areas [DMAs], hydraulic models, software for sensor placement optimization) for integrating with water quality monitoring programs.
- Collaborate with water utilities representing diverse challenges and operational scenarios (e.g., different geographic locations, different regulations, different sizes) to use as detailed

examples of varied challenges they face today (*Please refer to the last page of the RFP under the “Utility and Organization Participants” section for potential utility partners*). The research team must provide justification for the selections and discuss with the project advisory committee upon awarding the proposal.

Task 2: Development of Integrated Monitoring Protocols

This task will propose integrated monitoring protocols. The following aspects should be considered (but are not limited to):

- Clearly identify ways that integrated monitoring programs can provide equivalent or better public health protection, water security, cost, and operational control, considering such factors as monitoring and sampling logistics, procedures for collecting reliable, high-quality data, data management and analysis, improved response strategies, appropriate use of emerging technologies, and requirements for human resources, among others.
- Develop monitoring program(s) based on findings from Task 1 to reconfigure existing monitoring programs into integrated programs. Such programs may be based on contaminant groups or other methods of combining and integrating various monitoring goals and parameters of interest.

Task 3: Evaluation of the Integrated Monitoring Using Case Studies

This task will evaluate the effective application of the monitoring program(s) developed in Task 2. While full implementation of an integrated monitoring program may not be feasible, the goal is to trial applications and assess aspects of an integrated program to collect sufficient data for identifying the challenges, limitations, and benefits it could offer to a specific water utility. The following aspects should be considered (but are not limited to):

- Evaluate the challenges, limitations, and benefits of the proposed integrated monitoring strategies and programs for each case study water utility.
- Adjust the proposed monitoring programs based on utility input and field results. Each case study report should highlight utility experiences, including advantages, limitations, and recommendations for implementation. The team is encouraged to engage with the regulatory agencies for feedback.
- Case studies may be conducted through various methods, such as piloting individual components, conducting desktop evaluations or using other approach to assess the practical implementation, with the goal of helping other water utilities understand the challenges, limitations, and successes of implementing similar programs.

Task 4: Final Report and Guidance Document

This task will entail development of a final report and guidance document based on findings from previous tasks. The following aspects should be considered (but are not limited to):

- Develop a comprehensive final report that encapsulates the findings and insights from Tasks 1, 2, and 3. See the ‘Expected Deliverables’ section for guidance on final report preparation.
- Develop a comprehensive guidance document that provides practical recommendations, methodologies, and tools for designing, implementing, and utilizing integrated distribution system water quality monitoring programs. This guidance can address water quality parameters as a whole or in logical groups, such as physical, chemical, and microbiological parameters or in some other efficient way. The guidance document can be included:
 - Discuss a monitoring approach that integrates grab and online sampling techniques and modeling tools to optimize monitoring efforts.
 - Discuss integrated data management platforms and dashboards.
 - Establish a clear differentiation between regulatory, system optimization, and day-to-day system operations monitoring and investigation, with tailored approaches for each.
 - Explore the potential for integrating distribution system water quality monitoring into smart networks to enhance monitoring capabilities and efficiency.
 - Propose different monitoring designs to better integrate monitoring efforts, recommend actions to facilitate integration, and explore the role of newer technologies in enhancing monitoring capabilities.
 - Provide actionable recommendations for water utilities and regulators to enhance distribution system water quality monitoring practices.
 - Clarify the expectations for monitoring (e.g., monitoring provides a statistical probability that every customer receives water quality meeting system goals) and discuss how monitoring can address environmental justice issues and support the needs of sensitive customers (e.g., hospitals, schools) as well as how these considerations should be incorporated into the monitoring programs.

Expected Deliverables

- A final report summarizing key discussion, findings, and recommendations from the workshop, literature review, and case studies (must use WRF’s [Research Report Template](#)).
- A webinar to share project outcomes with water utility professionals and stakeholders on distribution system monitoring practices and recommendations.
- Comprehensive and actionable guidance document and factsheets outlining enhancement of monitoring designs and recommendations.
- Recommendations for research in technology applications and for federal and state-level discussion on how the findings can support regulatory improvements.
- Multiple peer-reviewed publications and opportunities for regional workshops to bring together utilities and stakeholders to share and discuss integrated monitoring issues and experiences.
- If technology deliverables (e.g., webtool) will be produced, they must follow the [Technology Deliverables Guidance](#).

Communication Plan

Please review WRF's [Project Deliverable Guidelines](#) for information on preparing a communication plan. Conference presentations, webcasts, peer-reviewed publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration

The anticipated period of performance for this project is 36 months from the contract start date.

References and Resources

The following list includes examples of research reports, tools, and other resources that may be helpful to proposers. It is not intended to be comprehensive, nor is it a required list for consideration.

AWWA (American Water Works Association). 2021. Standard G200-21: *Distribution Systems Operation and Management*. Denver, CO: American Water Works Association.

EPA (U.S. Environmental Protection Agency). 2018. *Online Water Quality Monitoring in Distribution Systems For Water Quality Surveillance and Response Systems*: https://www.epa.gov/sites/default/files/2018-05/documents/owqm-ds_guidance_042018.pdf

Karl, M., E. Culbertson, J. Abrera, and R. Janke. 2022. *Utilizing Smart Water Networks to Manage Pressure and Flow for Reduction of Water Loss and Pipe Breaks*. [Project 4917](#). Denver, CO: The Water Research Foundation.

Kirmeyer, G. J., M. Friedman, K. Martel, G. Thompson, A. Sandvig, J. Clement, and M. Frey. 2003. *Guidance Manual for Monitoring Distribution System Water Quality*. [Project 2522](#). Denver, CO: AWWA Research Foundation.

PRO-WASH. 2022. *Technical Guide on Drinking Water Quality Monitoring*. Washington, DC: University of North Carolina and Save the Children. https://www.fsnnetwork.org/sites/default/files/2022-03/STC_TechnicalGuideonDrinkingWater_FINAL-EN.pdf

Van der Gaag, B., and J. Volz. 2008. *Real-Time On-Line Monitoring of Contaminants in Water: Developing a Research Strategy from Utility Experiences and Needs*. Nieuwegein, The Netherlands: Kiwa Water Research. Available at: <https://www.waterrf.org/research/projects/real-time-line-monitoring-contaminants-water-developing-research-strategy-utility>.

Proposal Evaluation Criteria

The following criteria will be used to evaluate proposals:

- Understanding the Problem and Responsiveness to RFP (maximum 20 points)

- Technical and Scientific Merit (maximum 30 points)
- Qualifications, Capabilities, and Management (maximum 15 points)
- Communication Plan, Deliverables, and Applicability (maximum 20 points)
- Budget and Schedule (maximum 15 points)

PROPOSAL PREPARATION INSTRUCTIONS

Proposals submitted in response to this RFP must be prepared in accordance with WRF's [Guidelines for Research Priority Program Proposals](#) and [Instructions for Budget Preparation](#). The guidelines contain instructions for the technical aspects, financial statements, indirect costs, and administrative requirements that the applicant must follow when preparing a proposal.

Proposals that include the production of web- or software-based tools, such as websites, Excel spreadsheets, Access databases, etc., must follow the criteria outlined for web tools presented in the [Technology Deliverables Guidance](#).

Eligibility to Submit Proposals

Proposals will be accepted from both U.S.-based and non-U.S.-based entities, including educational institutions, research organizations, governmental agencies, and consultants or other for-profit entities.

WRF's Board of Directors has established a [Timeliness Policy](#) that addresses researcher adherence to the project schedule. Researchers who are late on any ongoing WRF-sponsored studies without approved no-cost extensions are not eligible to be named participants in any proposals. Direct any questions about eligibility to the WRF project contact listed at the top of this RFP.

Administrative, Cost, and Audit Standards

WRF's research program standards for administrative, cost, and audit compliance are based upon, and comply with, Office of Management and Budget (OMB) Uniform Grants Guidance (UGG), 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and 48 CFR 31.2 Contracts with Commercial Organizations. These standards are referenced in WRF's [Guidelines for Research Priority Program Proposals](#) and include specific guidelines outlining the requirements for indirect cost negotiation agreements, financial statements, and the Statement of Direct Labor, Fringe Benefits, and General Overhead. Inclusion of indirect costs must be substantiated by a negotiated agreement or appropriate Statement of Direct Labor, Fringe Benefits, and General Overhead. Well in advance of preparing the proposal, your research and financial staff should review the detailed instructions included in WRF's [Guidelines for Research Priority Program Proposals](#) and consult the [Instructions for Budget Preparation](#).

Budget and Funding Information

The maximum funding available from WRF for this project is \$350,000. The applicant must contribute additional resources equivalent to at least 33% of the project award. For example, if an applicant requests \$100,000 from WRF, an additional \$33,000 or more must be contributed by the applicant. Acceptable forms of applicant contribution include cost share, applicant in-kind, or third-party in-kind that comply with 2 CFR Part 200.306 cost sharing or matching. The applicant may elect to contribute more than 33% to the project, but the maximum WRF funding available remains fixed at \$350,000. Proposals that do not meet the minimum 33% of the

project award will not be accepted. Consult the [Instructions for Budget Preparation](#) for more information and definitions of terms.

Period of Performance

It is WRF's policy to negotiate a reasonable schedule for each research project. Once this schedule is established, WRF and its sub-recipients have a contractual obligation to adhere to the agreed-upon schedule. Under WRF's [No-Cost Extension Policy](#), a project schedule cannot be extended more than nine months beyond the original contracted schedule, regardless of the number of extensions granted.

Utility and Organization Participation

WRF encourages participation from water utilities and other organizations in WRF research. Participation can occur in a variety of ways, including direct participation, in-kind contributions, or in-kind services. To facilitate their participation, WRF has provided contact information, on the last page of this RFP, of utilities and other organizations that have indicated an interest in this research. Proposers are responsible for negotiating utility and organization participation in their particular proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their particular proposal.

Application Procedure and Deadline

Proposals are accepted exclusively online in PDF format, and they must be fully submitted before 3:00 pm Mountain Time on Wednesday, May 7, 2025.

The online proposal system allows submission of your documents until the date and time stated in this RFP. To avoid the risk of the system closing before you press the submit button, do not wait until the last minute to complete your submission. Submit your proposal at <https://forms.waterrf.org/cbruck/-rfp-5301>.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Grace Jang at 303.347.6112 or hjang@waterrf.org. Questions related to proposal submittal through the online system may be addressed to Caroline Bruck at 303.347.6118 or cbruck@waterrf.org.

Utility and Organization Participants

The following utilities have indicated interest in possible participation in this research. This information is updated within 24 business hours after a utility or an interested organization submits a volunteer form, and this RFP will be re-posted with the new information. **(Depending on your settings, you may need to click refresh on your browser to load the latest file.)**

Benjamin Yoakum

Project Manager-Research and
Orange County Utilities
9150 Curry Ford Rd.
Orlando, FL 32825
689.258.2361
benjamin.yoakum@ocfl.net

Michelle De Haan

Water Quality and Treatment Manager
Park City Municipal Corporation
PO Box 1480
Park City, UT 84060
435.659.6771
michelle.dehaan@parkcity.org

Ann Malinaro

Process Specialist
Aurora Water
Binney WPF
5070 S. Robertsdale Way
Aurora, CO 80016
720.859.4702
amalinar@auroragov.org

John Norton

Director of Research and Innovation
Great Lakes Water Authority
735 Randolph St., Suite 1101
Detroit, MI 48226
313.400.2553
john.norton@glwater.org

Lindsay Anderson

Water Quality Manager
Halifax Water
450 Cowie Hill Rd.
Halifax, Nova Scotia B3K 5M1
902.456.3195
lindsaya@halifaxwater.ca

Erica Brown

Director, Administration
Fairfax Water
8570 Executive Park Avenue
Providence, VA 22031
571.474.7873
ebrown@fairfaxwater.org

Bina Nayak

Water Research Project Manager
Pinellas County Utilities
6730 142nd Ave. N
Largo, FL 33771
727.582.2306
bnayak@pinellas.gov

Peter Goodman

Director, Water Quality and Research
Louisville Water Company
550 So. Third St.
Louisville KY 40202
502.262.7614
pgoodmann@lwcky.com

Erik Cram

Laboratory Manager
Central Utah Water Conservancy District
1120 Cascade Dr.
Orem, UT 84097
385.277.8497
erik@cuwcd.gov

Susan Teefy

Manager of Water Quality
East Bay Municipal Utility District
375 11th Street, MS 606
Oakland, CA 94607
510.287.1210
susan.teefy@ebmud.com

George Kraynick

Water Quality Manager
City of Minneapolis
Fridley Softening Plant
4300 Marshall St. NE
Minneapolis, MN 55421
612.661.4923
george.kraynick@minneapolismn.gov

Kate Martin

Water Quality Analyst II
Golden State Water Company
630 E Foothill Blvd
San Dimas, CA 91773
310.867.0337
kate.martin@gswater.com