THE Water Research FOUNDATION

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REQUEST FOR PROPOSALS (RFP)

Navigating One Water Planning through Municipal Water Programs: Meeting Multiple Objectives and Regulatory Challenges (RFP 5175)

Due Date: Proposals must be received by **3:00 pm Mountain Time on Tuesday, December 13, 2022**
WRF Project Contact: Harry Zhang, PhD, PE, hzhang@waterrf.org

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

Project Objectives

- To apply One Water planning principles and holistic watershed management approaches to multiple municipal programs, enabling utilities and municipalities to meet both environmental objectives and interconnected regulatory requirements (e.g., Clean Water Act [CWA] and Safe Drinking Water Act [SDWA]).
- To create a decision framework that can help utilities choose from and prioritize interconnected projects and initiatives at utilities.
- To facilitate engagement with regulatory agencies and proactively identify the priorities and benefits of various actions, including the use of incentive-based strategies like water quality trading.

Budget
Applicants may request up to $200,000 in WRF funds for this project.

Background and Project Rationale
Municipal water utilities must provide reliable services to customers, maintain infrastructure, ensure financial sustainability, and meet regulatory requirements. In the 21st century, achieving these outcomes in a sustainable and equitable manner requires One Water planning. One Water planning touches many areas of the water sector, including watershed management, energy use (greenhouse gas emissions), utility regionalization, etc. Communities face many types of environmental challenges, which are being exacerbated by climate change impacts. While the water sector traditionally addressed challenges within planning silos, contemporary issues are more complex and intertwined. Today's issues require solutions that span silos and sectors. Yet, many recent efforts to overcome planning silos are still only piecemeal. They fail to promote more integrated strategies that incorporate all aspects of holistic water management. Only when all players and programs are evaluated inclusively can their

interconnectedness be fully leveraged to optimize delivery of both utility and ecosystem services while simultaneously minimizing any potentially negative collateral impacts on other environmental goals.

The intersection between SDWA and the CWA requirements is an important factor in various municipal water programs, which demonstrates an opportunity to manage water holistically through systems-based approaches. This will be one of the key focuses during this study. The CWA focuses on protecting the quality of navigable water by ensuring that the waters are fishable and swimmable, while the SDWA focuses on public health and source water protection. This is a complex regulatory environment for utilities to navigate through municipal water programs. Related examples include Combined Sewer Overflow (CSO) Long-Term Control Plan Updates (LTCPU); impending requirements for Municipal Separate Storm Sewer Systems (MS4s); ongoing and evolving regulations to manage nutrients, harmful algal blooms, constituents of emerging concern such as per- and polyfluoroalkyl substances (PFAS) and microplastics; Lead & Copper Rule Revision (LCRR) requirements; freshwater salinization; water quality trading; and Designated Use (DU) changes and flexibilities with water quality standard revisions. Furthermore, climate change adaptation and mitigation are cross-cutting issues for water utilities. One example of a planning challenge that arises at the intersection of CWA and SDWA compliance is the use of orthophosphate as optimized corrosion control to reduce lead exposure under the SDWA. The corresponding results can negatively impact publicly owned treatment works (POTWs) and downstream water quality requirements under the CWA. In this case, One Water planning to address both challenges would emphasize holistic solutions that optimize water quality and cost outcomes across the water supply and wastewater enterprises. Another example is the opportunity to cost-effectively achieve nutrient water quality targets for point sources by investing the load reductions from non-point sources such as stormwater runoff from agricultural activities. In this case, One Water planning could consider nutrient water quality trading at a watershed level to provide multiple benefits, including enhanced source water protection, new opportunities for water reuse, and innovation such as sustainable agriculture production.

Currently, it remains challenging for utilities and municipalities to utilize integrated planning principles to achieve multiple environmental objectives effectively while meeting regulatory requirements. Siloed pollutant reduction objectives are causing a lack of investment in areas most important to communities, since they do not directly consider the multiple benefits and co-benefits of tackling multiple water challenges across geographic scales at the utility, municipal, metropolitan, and watershed levels. In addition, incentive programs should be incorporated into the consideration of One Water planning, which could be a catalyst for earlier pollutant reduction efforts and offer an alternative to mandatory regulatory requirements or complement them. Utilities may be attracted to incentives, especially if they intersect with other utility needs or compliance requirements. A One Water Planning framework across municipal water programs is needed to take these issues into a holistic consideration, including a robust methodology to evaluate tradeoffs and incentives for doing better with flexible structures to meet multiple objectives and regulatory challenges, including under a changing climate.

This project will illustrate how to apply One Water Planning and holistic watershed management principles in different settings, including meeting regulatory requirements while considering climate adaptation and mitigation collectively. New metrics for success to meet the CWA and the SDWA that align with community benefit enhancements will be developed. A robust utility-facing decision support framework and implementation methodology (including how to connect with existing decision support tools) for holistic management practices could be further enhanced by bridging among requirements for the CWA and SDWA, including the use of integrated planning frameworks. Utilities and municipalities can learn how to adapt to their own specific issues within geographic regions as well as by considering

climate adaptation and mitigation. Incentive-based strategies to reduce pollutant loading at the watershed level, such as water quality trading will be evaluated to support utilities in meeting multiple objectives and regulatory challenges.

Research Approach

The research team will undertake activities in four main tasks as part of this study. First, the research team will perform a review and synthesis of literature on One Water planning that evaluates multi-objective decision analysis approaches and demonstrates implementation examples at utility and municipality levels. The research team will conduct a comprehensive literature review, including WRF's research efforts to date. In addition, the research team will expand existing research on the state-of-the-practices and advancements of One Water planning across interconnected municipal water programs at utilities (please refer to the References and Resources section of the RFP) by further considering how the practices address cost-effectiveness and regulatory compliance needs from CWA, SDWA, and other water-related regulations in the U.S. The experience and practices in similar contexts beyond the U.S. should also be included in the literature synthesis for cross reference purposes. One such example is the province-level regulation, titled Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) in Ontario, Canada. Furthermore, the research team will synthesize the multi-objective decision analysis methodologies that are applicable to utilities, including an inventory of analytical methods such as scenario analysis, sensitivity analysis, optimization techniques, and multi-objective modeling that maximizes multi-sector benefits.

Second, the research team will conduct a survey and targeted interviews with selected utilities and municipalities that cover water, wastewater, stormwater, and reuse, with a goal of synthesizing real-world practices and case studies across geographic regions and different sizes of utilities. This includes evaluating expected benefits of using an integrated planning framework and potential adoption of a "One Water Plan" at an individual utility level. Particularly, use attainability analysis (UAA) and water quality standard revision should be highlighted as available options. Built from previous WRF research (e.g., project 1186) and available EPA guidance, the research team will evaluate the state-of-the-practice and applicability of UAA in municipal water programs, including success stories and lessons learned over the past 15 years. Related metrics for success to meet the CWA and the SDWA that align with community benefit enhancements (e.g., source water protection), if available, should be included. For greater applicability of study results beyond the U.S., this effort should focus on the general principles behind the regulatory contexts in both clean water and safe drinking water. In addition, the research team will engage regulatory agencies, national utility organizations (e.g., Association of Metropolitan Water Agencies (AMWA) and National Association of Clean Water Agencies (NACWA), and One Water advocacy organizations (e.g., US Water Alliance and Alliance for Water Efficiency) to further foster the opportunities for advancing current practice.

Third, the research team will develop an interactive utility-facing "state-of-the-practice" guidance document, which includes a synthesis of case studies across different geographic regions and applicable metrics for success to meet CWA and SDWA requirements that align with community benefit enhancements. A chapter in the guidance document will be included to summarize the knowledge gaps, research needs, and preliminary project concepts for recommended research projects. To facilitate feedback, the research team will host one invitation-only virtual workshop. The virtual workshop participants will include the Project Advisory Committee (PAC) members, representatives from participating utilities, WRF's collaborators and partners, and other invitees recommended by WRF.

Fourth, the research team will conduct two webcasts hosted by WRF and collaborating organizations on the overall findings of this project. The research team should submit at least one open access peer-reviewed journal paper, after the completion of the project. In addition, the research team should consider additional outreach activities (through the applicant's cost share, if possible), such as presenting project findings at conferences.

Expected Deliverables

- A stand-alone literature review synthesis, including annotations for the list of publications and resources used. This will be published as a WRF Project Paper.
- A project paper on the topic of use attainability analysis.
    - A proposed title for such a project paper could be Standard Operating Procedure (SOP) for "Revisiting Use Attainability Analyses: How Utilities Can Navigate Through?", which can be expanded from the published WRF report "Collaborative Water Quality Solutions: Exploring Use Attainability Analyses" (1186).
- One invitation-only virtual workshop, along with workshop planning and all supporting materials (e.g., agenda, presentations, meeting notes, and workshop summary).
- An interactive utility-facing guidance document.
    - This will include a synthesis of case studies across different geographic regions, the utility survey results (along with survey questions and appliable statistical analysis), and an innovative decision support framework that can help utilities customize their solutions through a One Water Planning approach.
    - In addition, this document will include a chapter and supporting technical appendix that summarizes the knowledge gaps, research needs, and preliminary project concepts for recommended research projects.
- Broader outreach:
    - Webcasts and public outreach materials (e.g., infographics on "One Water Planning" that can help communicate research findings to both utilities and the general public).
    - Submitting at least one open access peer-reviewed journal paper and additional outreach products as applicable.

Communication Plan

Please review WRF's *Project Deliverable Guidelines* for information on preparing a communication plan. The guidelines are available at https://www.waterrf.org/project-report-guidelines. Conference presentations, webcasts, peer review publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration

The anticipated period of performance for this project is 24 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.

Arabi, M. Forthcoming. One Water Cities: Development of Guidance Documents and Assessment Metrics. Project 4969. Denver, CO: The Water Research Foundation. https://www.waterrf.org/research/projects/one-water-cities-development-guidance-documents-and-assessment-metrics

Arnold, R. Forthcoming. Using Phosphate-Based Corrosion Inhibitors and Sequestrants to Meet Multiple Water Treatment Objectives. Project 5119. Denver, CO: The Water Research Foundation. https://www.waterrf.org/research/projects/using-phosphate-based-corrosion-inhibitors-and-sequestrants-meet-multiple-water

Clark, D., T. Stober, and M. Falk. Forthcoming. Holistic Approach to Improved Nutrient Management: Phase 1. Project 4974. Denver, CO: The Water Research Foundation. https://www.waterrf.org/research/projects/holistic-approach-improved-nutrient-management-phase-1

Clements, J., J. Henderson, and A. Flemming. 2021. Economic Framework and Tools for Quantifying and Monetizing the Triple Bottom Line Benefits of Green Stormwater Infrastructure. Project 4852. Denver, CO: The Water Research Foundation. https://www.waterrf.org/research/projects/economic-framework-and-tools-quantifying-and-monetizing-triple-bottom-line

EPA (United States Environmental Protection Agency). 2006. Use Attainability Analyses and Other Tools for Managing Designated Uses. Report No. EPA 821-R-07-001. https://www.epa.gov/sites/production/files/2014-11/documents/uaa_casestudies-all.pdf

EPA (United States Environmental Protection Agency). 2019. Water Quality Trading Memorandums. https://www.epa.gov/nutrient-policy-data/water-quality-trading-memorandums

EPA (United States Environmental Protection Agency). 2021. Report to Congress on Integrated Plans and Municipality Profiles. https://www.epa.gov/npdes/report-congress-integrated-plans-and-municipality-profiles

EPA (United States Environmental Protection Agency). 2021a. CWSRF Best Practices Guide for Financing Nonpoint Source Solutions: Building Successful Project Funding Partnerships. Report No. EPA 841B21012. https://www.epa.gov/system/files/documents/2021-12/cwsrf-nps-best-practices-guide.pdf

EPA (United States Environmental Protection Agency). 2022. Navigating the NPDES Permitting Process for Water Reuse Projects/Strategies to Enable Recycling and Protect Water Quality. https://www.epa.gov/system/files/documents/2022-03/navigating_the_npdes_permitting_process_for_water_reuse_projects_march_2022.pdf

EPA (United States Environmental Protection Agency). 2022a. Accelerating Nutrient Pollution Reductions in the Nation's Waters (April 2022 Memorandum). https://www.epa.gov/nutrient-policy-data/2022-epa-nutrient-reduction-memorandum

EPA (United States Environmental Protection Agency). 2022b. Use Attainability Analysis (UAA). https://www.epa.gov/wqs-tech/use-attainability-analysis-uaa (Web page updated on June 22, 2022)

Grant, S. B., M A. Rippy, T A. Birkland, T. Schenk, K. Rowles, S. Misra, P. Aminpour, S. Kaushal, P. Vikesland, E. Berglund, J. D. Gomez-Velez, E. R. Hotchkiss, G. Perez, H. X. Zhang, K. Armstrong, S. V. Bhide, L. Krauss, C. Maas, K. Mendoza, C. Shipman, Y. Zhang, and Y. Zhong. 2022. Can Common Pool Resource Theory Catalyze Stakeholder-Driven Solutions to the Freshwater Salinization Syndrome? *Environ. Sci. Technol. (Publication Date: September 14, 2022).* https://doi.org/10.1021/acs.est.2c01555

Mehan, G. T. III. 2022. The Clean Water Act Turns 50: A Critical Partner to the Safe Drinking Water Act. *Journal of American Water Works Association*, July/August 2022. Page 57-63.

Moore, T. 2006. Collaborative Water Quality Solutions: Exploring Use Attainability Analyses. Project Number 1186/04-WEM-7. Alexandria, Va.: Water Environment Research Foundation. https://www.waterrf.org/research/projects/collaborative-water-quality-solutions-exploring-use-attainability-analyses

Mukheibir, P., C. Howe, and D. Gallet. 2015. Pathways to One Water: A Guide for Institutional Innovation. Project Number 1745 (SIWM2T12a). Alexandria, Va.: Water Environment Research Foundation. https://www.waterrf.org/research/projects/pathways-one-water-guide-institutional-innovation

National Association of Clean Water Agencies (NACWA). 2021. Clean Water Act / Safe Drinking Water Act Intersection. https://www.nacwa.org/advocacy-analysis/campaigns/cwa-sdwa-intersection

National Association of Clean Water Agencies (NACWA). 2022. Considerations for Using Integrated Planning: What Clean Water Utilities Should Know. https://www.nacwa.org/docs/default-source/resources---public/ip-considerations-document.pdf

Nemura, A. 2020. Toolbox for Completing an Alternatives Analysis as Part of an Integrated Planning Approach to Water Quality Compliance. Project 4854. Denver, CO: The Water Research Foundation. https://www.waterrf.org/research/projects/toolbox-completing-alternatives-analysis-part-integrated-planning-approach-water

Paulson, C. 2017. Blueprint for One Water. Project 4660. Denver, CO: The Water Research Foundation. https://www.waterrf.org/research/projects/blueprint-one-water

US Water Alliance. 2016. One Water Roadmap. http://uswateralliance.org/sites/uswateralliance.org/files/publications/Roadmap%20FINAL.pdf

Wright, B. and B. Weeks. Forthcoming. Leveraging the Role of Pretreatment Programs in One Water Initiatives: Synthesis of Best Practices and Path Forward. Project 4971. Denver, CO: The Water Research Foundation. https://www.waterrf.org/research/projects/leveraging-role-pretreatment-programs-one-water-initiatives-synthesis-best

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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 the WRF document *Guidelines for Research Priority Program Proposals*. The current version of these guidelines is available at https://www.waterrf.org/proposal-guidelines, along with *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 *Web Tool Criteria and Feasibility Study for The Water Research Foundation Project Deliverables* at https://www.waterrf.org/project-report-guidelines#deliverables.

Eligibility to Submit Proposals
Proposals will be accepted from domestic or international 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. The policy can be reviewed at https://www.waterrf.org/policies. 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*, both available at https://www.waterrf.org/proposal-guidelines.

Budget and Funding Information
The maximum funding available from WRF for this project is $200,000. The applicant must contribute additional resources equivalent to at least 33 percent 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 percent to the project, but the maximum WRF funding available remains fixed at $200,000. **Proposals that do not meet the minimum 33 percent of the project award will not be accepted.** Consult the *Instructions for Budget Preparation* available at https://www.waterrf.org/proposal-guidelines 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. The policy can be reviewed at https://www.waterrf.org/policies.

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 Tuesday, December 13, 2022.

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 to: https://forms.waterrf.org/222616166134855.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Harry Zhang, PhD, PE at hzhang@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**.**

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The following utilities have indicated an 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 upon your settings, you may need to click refresh on your browser to load the latest file.)**

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