

Request for Proposal (RFP)

Drinking Water Crises in the United States

Phase 2: Predictive Modeling

Budget: \$38,000

Submission Deadline: January 11th, 2021 by 11:00 am Central Time

Who is WQRF?

The [Water Quality Research Foundation \(WQRF\)](#), formerly the Water Quality Research Council, was formed in 1952 to serve with the guidance and assistance of the Water Quality Association (WQA) and its members as a universally recognized, independent research and education sponsorship organization. The mission of WQRF is advancing knowledge and the science of high quality, sustainable water. WQRF's vision is water quality improvement through relevant research.

Since inception, WQRF has sponsored numerous research studies which have examined a broad range of water chemistry, technology and environmental impact issues, generated essential water technology use, effectiveness and consumer information, positively impacted legislative change, and helped advance efficiencies and methodologies in product certification, evaluation and testing.

Background

With the combination of aging infrastructure and the continuing rise in new chemical production/use, it is likely that increases in short and long-term outages of the public drinking water systems will be seen. The crisis in Flint, MI impacted roughly 100,000 citizens who relied on the water treatment system to deliver clean tap water to their homes for hydration, bathing, and cooking. In this case the response was slow with the result that many children in the area tested positive for elevated Lead levels. To deal promptly with water crises, two things must be in place. First, a means to identify the unknown contaminant is needed. In the case of Flint, there were established methods for Lead detection and the health risks were well-understood. Second, data is needed on treatment options to solve or mitigate the contaminant. Again, in the case of Flint there existed NSF and WQA certifications of Lead reduction to rely on. In future water crises, detection methods and/or treatment options may not be well-established, and the drinking water treatment industry will need to develop data to provide short and long-term treatment solutions.

WQRF funded a research project that identified drinking water crises which occurred in the United States between 2009-2019. This effort resulted in a real-world dataset with nearly 250,000 historical crises identified. Additional information on the completed work is included in Appendix A. The main objective of this study is to develop a predictive model that can use the available dataset on past drinking water crises to identify contaminants of concern for the future and help the point-of-use (POU) and point-of-entry (POE) industry prepare to provide treatment options.

Detailed information on the project

The following criteria were set to define a “crisis” in the recently completed study:

- The contamination event occurred between 2009-2019 in a public or private water supply
- The contaminant involved is known, or suspected, to cause adverse health effects (acute or chronic) in humans
- The contaminant could be either federally regulated, or unregulated
- The population served by the contaminated water supply was at least 100 people

The goal of this research is to:

1. Expand the existing data to fill any identified gaps
 - It is recommended to conduct a review of chemical production volumes and uses in the US. In this way, the predictive model will not only be based on historical data, but it will also have a better chance of predicting unique crises that are likely to occur in the future which could never have been predicted by reviewing past data. A good example of this would be the Elk River event, which involved a chemical that had never caused a previous drinking water crisis.
 - Possible data sources are the EPA’s Toxic Release Inventory and the Chemical Data Reporting (CDR) program. Personal care products and chemicals being produced that are similar in nature to those that have caused drinking water concerns in the past would also be a good place to focus this review.
 - Researchers should propose any other datasets that may be useful in expanding upon the existing work, detailed further in Appendix A.
2. Use the existing data, along with any new data collected, for predictive modeling of what the POU/POE industry might expect in the future, such as:
 - What contaminants are likely to be involved in the next drinking water crisis?
 - Are crises and the number of people impacted trending upwards or downwards?
 - Are there key factors which indicate high or low risk, such as geographical or socioeconomic factors?
3. Validate the predictive model, and refine if necessary
4. Consider how POU and POE drinking water treatment technologies could be used to alleviate identified risks
 - Utilize the predictive modeling results to focus this evaluation
 - Researchers will have the full cooperation of Subject Matter Experts within the WQRF Research Task Force to identify proven treatment solutions
 - The report should identify research gaps which might help the POU/POE industry develop technologies that would be effective to alleviate risks associated with potential future crises

Requirements for Researchers

Researchers must be well-qualified and have expertise in point-of-use/point-of-entry (POU/POE) drinking water treatment technologies. The names, qualifications and detailed curricula vitae of primary investigators involved in this project must be provided.

The researchers must have the facilities and capabilities to accomplish this project or must provide a list of the proposed partner organizations and their qualifications required to accomplish this project. Again, a list of the names, qualifications and detailed curricula vitae of primary investigators from those partner organizations should be provided.

The researchers must complete work on this project within 9-12 months of the approved start date.

Restrictions

Please read this section carefully. Researchers are encouraged to consult with WQRF if you believe your proposal encompasses one or more of these restrictions. Proposals whose scope fall within any of these restrictions will not be funded by WQRF:

- The proposal will be scoped to prevent use of the study to promote or disparage a specific product model, company/organization or brand name. It is WQRF's policy that brands, models, and manufacturers are confidential, only the specifications of the products tested can be included in the report(s).
- The research will not be of a type ordinarily expected to be carried on by private enterprises in the ordinary course of research and development, the testing and inspection of materials or products, particularized market or consumer research or the design and construction of water treatment equipment, products or parts.
- While WQRF supports the many benefits of product validation evaluation and testing, WQRF does not fund product development-related activities, such as validation testing of new products or emerging technologies.
 - Projects that involve general validation or study broadly the benefits of certain categories of technologies relative to other categories of technologies have been funded (e.g., the benefits of softening study, the evaluation of emerging scale prevention technologies) only when they were scoped to benefit the entire industry and not to promote a specific product, benefit a specific manufacturer or develop intellectual property.
 - Consistent with this policy, WQRF bylaws require that any patents or trademarks owned by WQRF resulting from research they fund shall be made available to the public-at-large on a non-discriminatory basis.
- Researchers are prohibited from having a commercial interest in any products or technologies proposed for inclusion in the research study.

Information on the Proposal Selection Process

All proposals submitted in response to this RFP will be reviewed by the WQRF Scientific Consultant and designated WQRF Research Task Force. The proposal review process is overseen and facilitated by WQRF staff. The Task Force is comprised of subject matter experts who volunteer their time to WQRF.

Researchers may be contacted for further information regarding their proposal throughout the selection process. It is not uncommon for the Task Force to request written responses to questions, or to request that the research team present its proposal and hold a Q&A session via a webinar. The length of the proposal selection process will vary depending on the number of proposals received, their complexity and the Task Force's availability to engage in discussions.

After the Task Force has selected a proposal for its funding recommendation, the proposal is presented to the WQRF Board of Directors for review, due diligence, a decision on acceptance and approval of funding.

Business Requirements and Responsibilities

In support of an accepted research project, WQRF ordinarily would proceed as follows:

- WQRF will provide the researcher with any background information needed, such as a list of industry and other interested parties and stakeholders.
- The WQRF Research Task Force and WQRF technical staff ordinarily will take an active role in the technical review of progress/interim reports and acceptance of the final report. They may seek input from the WQA Water Sciences Committee, particularly with respect to industry specific knowledge or operations to aid the researcher.
- WQRF will track progress and provide any necessary coordination with industry stakeholders throughout the course of the research, will supply technical input and will facilitate any support and input requested from the WQA Water Sciences Committee.
- WQRF will provide public access to an executive summary and the full report. Ordinarily, upon release or publication, the researcher will be permitted to make the report available as best determined.

The researcher will enter into a research sponsorship agreement with WQRF, the terms of which broadly will include the following commitments from the researcher:

- Undertake, manage and perform all aspects of the contracted research and any necessary support activities.
- Provide an invoicing schedule for completing the research, including a schedule of progress/interim reports and a draft final report for review by the WQRF Research Task Force, and complete the study in a timely manner according to the schedule. After completion of the final report, a 1 to 3-page executive summary document/report will be submitted to WQRF.
 - All invoices must be linked to a deliverable or scientific milestone. Typically, it is WQRF's preference that invoices and progress reports are submitted quarterly throughout the duration of the project, unless the project warrants review on a more frequent basis.
 - Historically, WQRF has been able to provide 10% to 25% of the budget at the start of the project. Ten percent (10%) of the project cost must be associated with the delivery of the final report.
- Engage with WQRF, its Research Task Force and its technical staff and provide responses to WQRF questions relating to progress and coordination, as well as comments on progress/interim reports.
- Agree that all intellectual property will be owned by WQRF or perpetually licensed to it without royalty or charge:
 - Generally, WQRF will own the entire right, title, and interests, including all copyrights and other intellectual property rights, in and to all Project Intellectual Property developed by WQRF personnel. Project Intellectual Property that is jointly developed by the researcher and WQRF personnel will be jointly owned by the researcher and WQRF.
 - Generally, WQRF will reserve the intellectual property associated with the final report submitted to WQRF, including the copyright thereof, and all rights to distribute the final report. WQRF will make publicly available the research funded and knowledge gained through research, and the researcher ordinarily will be permitted to make available and publish sponsored research and use the knowledge gained to further its own research.

However, no research results can be published by the researcher without prior review by WQRF.

- Publish the study in a peer-reviewed publication:
 - It is WQRF's preference that after review and acceptance of the final report, the researcher will seek to publish the study in a peer-reviewed publication. Whenever referencing or publishing the study, or information and/or data derived from the study, researchers must cite as its source to the report delivered to WQRF. The study should be submitted for peer-review publication within 6 months from the date that WQRF accepted the final report. WQRF does not commit that the research will be withheld from the public during the 6-month period.

Confidentiality

All proposals submitted to WQRF will be treated as confidential and will not be shared beyond WQRF, its Research Task Force and its technical staff, except that WQRF may grant access to members of the WQA Water Sciences Committee and members of identified WQA committee and task forces as well as WQA staff members all of whom would act on behalf of WQRF under specific confidentiality restrictions.

Proposal Format

Proposals shall follow the format provided in Appendix B.

Selection Criteria

Proposals will be evaluated by assessing the potential impact of the research compared to the cost. The special nature and requirements of the proposed research will also be taken into consideration along with the researcher's credibility, previous experience, qualifications and prior publications. A strong proposal will include a dissemination plan detailing how the research team will share the results of the study with the appropriate audience(s). Additional factors will be considered where applicable.

Questions

The contact for this RFP is Kayla Heriaud. Questions can be directed to her at any time.

Contact info:
Kayla Heriaud
630-929-2599
kheriaud@wqrf.org

Due Date

Proposals must be received no later than January 11th, 2021 by 11:00 am Central Time. Proposals should be sent to [Kayla Heriaud](mailto:kheriaud@wqrf.org).

APPENDIX A – Drinking Water Crises in the United States, 2009-2019

A summary of the data collection methodology and results is provided. This data was collected by independent, 3rd party researchers as a part of a WQRF-funded research project, and as of yet is not published in an academic journal. Upon the start of the Predictive Modeling Study, the full datasets and relevant reports will be provided to the awardee for analysis.

The following criteria were set to define a “crisis”:

- The contamination event occurred between 2009-2019 in a public or private water supply
- The contaminant involved is known, or suspected, to cause adverse health effects (acute or chronic) in humans
- The contaminant could be either federally regulated, or unregulated
- The population served by the contaminated water supply was at least 100 people

102,548 crises caused by regulated contaminants were identified from the following sources:

- **Safe Drinking Water Information System (SDWIS)/Envirofacts** – Search criteria consisted of health-based violations of the Maximum Contaminant Level (MCL), Maximum Residual Disinfection Level (MRDL), Treatment Technique (TT), and Action Levels (AL).
- **Waterborne Disease & Outbreak Surveillance Reporting (WBDOS)** – Recorded data as a crisis if there were 100 or more illnesses identified by the CDC.
- **News and Related Media** – Manually searched news sites, Google, Non-governmental organizations’ (NGO) websites, and academic journals with keywords (state name, drinking water, illness, 2009-2019 time period). The number of identified diseases and the scale of the potentially affected population was used to determine if the exposure qualified as a crisis.

145,667 crises caused by unregulated contaminants were identified from the following sources:

- **Unregulated Contaminant Monitoring Rule (UCMR) 2-4 Datasets** – Recorded data as a crisis if a qualifying contaminant was detected in any given utility.
- **News and Related Media** – Manually searched news sites, Google, Non-governmental organizations’ (NGO) websites, and academic journals with the keywords (state name, drinking water, illness, 2009-2019 time period). The number of identified diseases and the scale of the potentially affected population was used to determine if the exposure qualified as a crisis.

Public Water System (PWS) ID/name, population served, contaminant name/concentration, and duration of non-compliance were documented in the database. Detailed geographical information for each crisis was collected from the EPA’s Facility Registry Service (FRS), SDWIS Federal Reports Search, and SDWIS Search. In instances when the exact city served by the public water system was not reported, information on the county was added to the database. Socioeconomic information (racial and gender composition, income, age, and education) sourced from the IPUMS’ National Historical Geographic Information System (NHGIS) database was included whenever possible.

APPENDIX B – Format

Proposals must *not* be password protected to restrict editing. Upon receipt, WQRF will add a watermark to the proposal to identify it as confidential and will password protect the document prior to its internal distribution. Proposals should include the following sections, and if necessary, other sections may be added:

Proposal Summary – The proposal summary form is available as a downloadable Word document at <http://www.wqrf.org/open-rfps.html>. This form should be included as the first page of your proposal.

Abstract – Summarize the research project, plan, timeline and objectives.

Introduction and literature review – Include an overview of the research project, especially focal points which are relevant to the proposed work, objective(s), and a review of related research or publications.

Detailed research plan and methodology – Describe proposed experiment(s), including any equipment and methods, which will be used to undertake the research. Be sure to address what data will be collected, all methods of data collection and how you intend to analyze, interpret, and present the results. As **there is no word/page limit for the proposals**, methodology should be written thoroughly. Proposals without a detailed methodology will likely be eliminated from consideration.

Deliverables – Describe the deliverable(s) that you will be providing for this work. Interim research reports, a draft of the final report, the final report, an executive summary and a presentation of the findings at a relevant conference must be included as deliverables for the research. Additional project deliverables might include raw data, hosting a workshop, etc.

Estimated timeline – This should be completed based on an as yet unidentified start date (e.g., the first interim report will be issued 3 months from the research start date). The projected start date is subject to adjustment, but estimated to fall between April 2021 and May 2021 inclusive. The project should be completed within 9-12 months from the start date, and is not to exceed 12 months. Please include an estimated invoicing schedule along with your timeline that includes the upfront payment amounts due at the start of the project and a payment schedule based on deliverables and milestones. [Click here](#) to reference back to the specific requirements, per the *Business Requirements and Responsibilities* section.

Budget – Total budget shall not exceed \$38,000, the maximum funding available for the project. However, researchers should attempt to submit proposals for the lowest dollar amount that is practical. Preference may be given to a lower cost proposal that still best meets all the requirements/deliverables. At a minimum, the budget should be segmented by the following categories (as applicable): Salaries, Fringe Benefits, Equipment (including materials & supplies), Travel, Subcontract Fees, and Indirect Costs. Indirect costs need to be included in the budget only if this is something that the bidding organization ordinarily tracks through its financials. Indirect costs shall not exceed 13% of total direct costs. Other categories may be included as required.

Potential conflict circumstances statement and disclosure of any additional organizations who would potentially contribute to this project – Include a statement reporting any direct or indirect facts or circumstances which could potentially create a conflict of interest. For example, if the results of proposed study could further the interests of a company with which the researcher or the research organization has a financial interest or relationship (including any contractual agreement or practice to provide testing, certification, consulting or other services (or is negotiating such an agreement), that is to be disclosed as a potential conflict circumstance. WQRF will have final authority in its sole discretion over whether a potential conflict circumstance represents a disqualifying Conflict of Interest. Please also disclose the name(s) of any organizations who you have contacted to potentially contribute to this project (in-kind or monetary contribution).

Credentials and qualifications – Include a statement of qualifications, previous experience, and related publications (including full curricula vitae) of the primary and supporting investigators.