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REQUEST FOR PROPOSALS (RFP)

Assessment of Molecular Techniques to Detect and Predict Cyanotoxin Occurrence (RFP 5120)

Due Date: Proposals must be received by **3:00 pm Mountain Time** on **Tuesday, September 14, 2021**

WRF Project Contacts: Julie Minton, jminton@waterrf.org;
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Project Objectives

Develop a field guide to support drinking water system cyanotoxin risk management strategies, including:

- Decision criteria for selecting and applying genetic tools (both DNA-and RNA-based) to assess cyanotoxin-producer presence and activity in source water, providing not only the criteria but also the supporting rationale.
- Explanation of the tools available to evaluate toxigenic organisms in source water and their relative advantages and disadvantages.
- Interpretation of the utility of genetic tools to evaluate cyanotoxin formation potential in terms of their ability to be readily utilized by non-specialized water system personnel.
- Instruction to guide the application and integration of the results of molecular analyses with existing source water monitoring using chlorophyll *a*, algal fluorescence, direct toxin phytoplankton identification and enumeration, and cyanotoxin analysis by LCMS or ELISA.
- Available statistical tools to assess correlation between genetic tools, fluorescence assays, phytoplankton communities, and cyanotoxin quantitation to support site-specific criteria to guide drinking water system cyanotoxin risk management strategies.

Budget

Applicants may request up to \$100,000 in WRF funds for this project. WRF funds requested and total project value are evaluation criteria considered in the proposal selection process.

Background and Project Rationale

Genetic tools can reveal the presence of potential toxin-producing cyanobacteria in source waters, provide estimates of their abundance, and provide insight into whether or not they are actively producing cyanotoxins. A biomolecular-based monitoring approach for the assessment of water quality hazards and risks associated with cyanobacteria represents the next step and opportunity in the application of newer molecular techniques for monitoring cyanobacteria and their metabolites. These methods have been referenced or described in previous WRF publications ([WRF 2881](#)). What is missing,

however, is an accessible field guide that helps treatment plant managers work with the staff of analytical laboratories to develop appropriate sampling strategies, trigger levels, and response plans, and make effective decisions about which analyses to implement and integrate the results with data generated by other analytical methods such as fluorescence instrumentation, phytoplankton identification and enumeration, and cyanotoxin analyses. The proposed field guide would provide treatment plant managers with:

- A visual and intuitive explanation of how cyanotoxins are produced at the cellular level
- A visual and intuitive explanation of how samples of molecular genetic material are collected, processed, and analyzed
- A visual and intuitive explanation of how to interpret the results of genetic testing; this is critical because the units and quality assurance/quality control criteria for genetic testing results differ from those of the water quality indicators with which plant personnel are more experienced
- A visual and intuitive explanation of how to combine the genetic results with other cyanobacteria-related data streams to build an understanding of bloom behavior

Accessibility and user-friendliness are central foci of field guide development to ensure that plant managers and other decision-makers have a clear understanding of the concepts provided within the guide.

Currently, the WRF Research Area *Cyanobacterial Blooms and Cyanotoxins* has two WRF projects nearing completion that focus on developing a combination of web tools, a guidance document, and decision trees to assist utilities in early warning decision-making and understanding of cyanobacteria blooms ([WRF 4912](#) and [WRF 4914](#)). The goal for this new project is to build on the deliverables from these two projects with the purpose of providing more details in the form of a clearly understandable field guide that will utilize molecular analysis results to guide decisions made by treatment plant operators.

Based on a survey from WRF 4912, utilities are constantly seeking improved methods that provide early warning for potential cyanotoxin contamination in their water supplies. Interest in molecular techniques for rapid evaluation of toxigenic cyanobacteria blooms is growing among source water managers to obtain the earliest indications that an event could be on the horizon. The project is expected to bridge the fundamental knowledge available in literature to practical field-scale application.

Research Approach

This RFP is intentionally flexible in the research approach to encourage creativity and originality from proposers. Proposers should describe how they will conduct the research to meet the objectives listed above. The following approach is intended as a starting point.

- This project will provide a state of the science assessment of techniques (i.e., qPCR, Next Generation Sequencing [NGS], etc.) with context for field application.
 - The review should include context of physicochemical data from freshwater sources (lakes, reservoirs, and rivers) to better understand environmental conditions and factors that promote cyanotoxin-producing blooms.
 - The review should also include similar context regarding the ability of these techniques for measurement of taste and odor producing blooms.
 - The review should include context for both pelagic and benthic blooms.

- Develop a guidance document providing graphical abstract explanations of molecular techniques to be used for cyanobacteria/cyanotoxin monitoring similar to [WRF 4692b](#).
 - Discuss required level of analyst experience, cost, storage conditions, sampling techniques, response time, etc. for utilities to understand what it will take to perform these analyses.
 - Discuss the development of threshold levels that prompt action by a source water manager (increased monitoring frequency, confirmation samples, algaecides, nutrient limitations)

Expected Deliverables

- State of the science on genetic analyses and methods
 - Possibly published in open-sourced peer-reviewed journal
- Guidance Document/Field Guide
 - The target user of the guide is a water treatment/water quality superintendent, and the goal is for the guide to allow the superintendent to communicate effectively with staff and contractors, particularly laboratories providing analytical services.

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 18 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.

- [WRF 2881 Early Detection of Cyanobacterial Toxins Using Genetic Methods](#)
- The international need for this area of research is evident. Earlier this year, Water Research Australia (WaterRA) released a Request for Funding entitled [Guidance for Integration of Gene Testing in Cyanobacterial Management](#). Several Australian utilities and health departments joined forces to support the WaterRA project, which will commence in October 2021. There is great alignment on these two projects, and WRF has begun conversation with WaterRA to potentially create a partnership. Dr. Arash Zamyadi (arash.zamyadi@waterra.com.au; [@ArashZamyadi](#)) is the WaterRA point of contact working with WRF.
- [WRF 4912 Developing Guidance for Evaluation and Implementation for Control of HABs in Source Water](#)
- [WRF 4914 Utility Responses to Cyanobacterial/Cyanotoxin Events: Case Studies and Lessons Learned](#)

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 20 points)

- Communication Plan, Deliverables, and Applicability (maximum 15 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/sites/default/files/file/2021-07/WebToolCriteria.pdf>.

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 \$100,000. 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 \$100,000. **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 Mountain Time on Tuesday, September 14, 2021.

The online proposal system allows submission of your documents until the date and time stated in this RFP. Submit your proposal at <https://forms.waterrf.org/212005734732851>

Please ensure you upload the required documents before the deadline. **Proposals submitted after the deadline will not be accepted.**

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Julie Minton at (301) 922-7860 or jminton@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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