



REQUEST FOR PROPOSALS (RFP)

Method Refinement and Standardization for Microplastics Sample Collection and Analysis (5287)

Date Posted

Monday, September 9, 2024

Due Date

Proposals must be received by 3:00 pm Mountain Time on Thursday, November 14, 2024.

WRF Project Contact

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Project Sponsors

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

Project Objectives

- Identify rigorously evaluated sample collection and analysis methodology, including QA/QC protocols, for source water, finished water, wastewater, and solids matrices that supports reliability and consistency of collected data and allows for meaningful data interpretation and policy implementation.
- Evaluate the suitability of surrogate methods to provide more rapid and cost-effective measures of microplastic occurrence.

Budget

Applicants may request up to \$325,000 in WRF funds for this project.

Background and Project Rationale

Microplastics in the environment are an emerging concern and may represent a risk to human health and ecosystems. Research on microplastics methods, occurrence, treatment removal efficacies, and other aspects is fast growing, with 2018 legislation in California requiring microplastics monitoring. These requirements are likely to expand to other states or federal programs.

Various organizations and researchers have defined microplastics in different ways. For example, the definition provided by the California State Water Resources Control Board (SWRCB) in 2020 is that microplastics are "solid polymeric material to which chemical additives or other substances may have been added, which are particles which have at least three dimensions that are greater than 1 nanometer (nm) and less than 5,000 micrometers (μm).

Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded.” The size-based nomenclature used by SWRCB is as follows for reference:

- Nanoplastics: 1 nm to <100 nm
- Sub-micron plastics: 100 nm to <1 µm
- Small microplastics: 1 µm to < 100 µm
- Large microplastics: 100 µm to <5 mm

More recent research articles are differentiating nanoplastics and microplastics because their environmental behavior and fates may be different, and the corresponding testing methodology may also be different.

The lack of consistency in current sampling and analytical methodologies limits meaningful interpretation of the data or utility in guiding the most effective control measures.

Specifically, sample collection and analysis for microplastics still need to be refined and standardized in order to improve analysis efficiency and data reliability. Collection devices intended for finished water are challenging for source water collection, and options for sampling a large volume with minimal background interference are limited. For example, the often-referenced ASTM method is prone to background interference and not practical when large-volume samples are needed (e.g., >1,500 L as required by California). Water utilities need guidance on sample collection methods and robust quality assurance/quality control (QA/QC) measures to ensure data reliability and data comparability among different studies/utilities/laboratories before further research can effectively be conducted on occurrence, removal, and toxicity.

There are limited Fourier Transform Infrared spectroscopy (FTIR) and Raman spectroscopy data for source and treated drinking water, so more and validated data are needed with improved methods for sample collection and analysis. Sample analysis often takes many hours to days per sample, which is not practical when there are many samples to analyze. How to capture the data for the whole sample instead of sub-samples is also challenging. Additional methods such as those that use optical photothermal infrared (O-PTIR) and pyrolysis-gas chromatography/mass spectroscopy also need to be evaluated.

This project will refine and standardize methods for microplastics sample collection and analysis in source water, finished drinking water, wastewater, and solids matrices to improve analysis efficiency and data reliability. The immediate need is for sample matrices such as source and finished drinking water due to monitoring requirements in California and potentially other states. Other states are preparing for the anticipated monitoring requirement to include complex matrices such as wastewater and biosolids.

Research Approach

The research team will need to conduct a literature review of the various microplastics sampling and analytical techniques, which should include published articles as well as project

reports from WRF, Ocean Protection Council, and other organizations. This review should identify sampling and analytical limitations that warrant improvements in order to increase the reliability of the resulting data.

The research team will conduct a survey and targeted interviews of water and wastewater utilities currently conducting sampling and analysis for microplastics to identify real-world challenges with specific methodologies.

Optimization and standardization of sample collection methods and analysis of microplastics are needed for source and treated drinking water, wastewater, and solids matrices. This includes a comprehensive evaluation of sample collection, digestion to remove organic materials, extraction of microplastics particles, and multiple instrumental analyses. Critical measures should be included to minimize background interference and to assess the feasibility of reusing sampling devices. Robust QA/QC protocols are needed for data reliability and to allow for meaningful comparisons among different studies and management strategies. If different sampling and analytical approaches are used for different size classes of microplastics, this should be identified (e.g., nanoplastics may pose a unique sampling and analytical challenge).

The research team must include an evaluation of potential surrogates, such as total organic carbon, turbidity, particle counts, total dissolved solids, and total suspended solids, currently included in the California monitoring requirements.

Expected Deliverables

- Research report (must use WRF's [Research Report Template](#)).
- Literature review documenting current sampling and analytical methodologies and limitations of each.
- A guidance manual, which includes detailed sample and analysis methods with robust QA/QC protocols that water and wastewater utilities can use to collect reliable data to inform policy development and management actions. This should also include conclusions regarding the suitability of surrogates to provide more rapid and cost-effective measures of microplastic abundance.
- A webcast or conference presentation that identifies the limitations observed in existing sampling and analytical methodologies and the team's approach to developing standardized methods.
- Peer-reviewed journal article.

Proposers are encouraged to partner with academic institutions, federal agencies and research organizations conducting field monitoring of microplastics.

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 24 months from the contract start date.

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 \$325,000. 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 \$325,000. 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 Thursday, November 14, 2024.

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-5287>.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Lola Olabode, MPH, BCES, lolabode@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.)**

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