



REQUEST FOR PROPOSALS (RFP)

Regionalized or Integrated Solutions for Brine Management and Recovery (5256)

Date Posted

Monday, September 11, 2023

Due Date

Proposals must be received by 3:00 pm Mountain Time on Tuesday, November 14, 2023.

WRF Project Contact

Lyndsey Bloxom, Research Program Manager, lbloxom@waterrf.org

Project Sponsors

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

Project Objectives

- Research various approaches for regionalized or integrated brine management (e.g., shared infrastructure, centralized treatment, integrated methods to reduce brine volume, and recovery of marketable high value products).
- Identify and provide guidance for assessing the key factors related to implementation of regional or integrated brine management solutions, evaluating opportunities based on current and future one water scenarios (including municipal, agricultural, commercial, co-produced water, and industrial sector needs).
 - Example key factors could include but are not limited to identifying sources and qualities of brine, blended quality, point of disposal, treatment requirements, volumetric goals or limitations, and high-level cost comparisons.
- Develop regionalized or integrated brine management planning guidance.

Budget

Applicants may request up to \$150,000 in WRF funds for this project.

Background and Project Rationale

Brine management is a major challenge in the planning and implementation of water treatment projects for groundwater desalination, industrial product water, and recycled water applications. The high costs and environmental challenges associated with conventional disposal methods are driving municipalities and industries to look for ways to enhance project feasibility. In response to this challenge, extensive research has been conducted and guidance

developed on the alternatives for brine treatment, disposal, and recovery (see references section).

Many of these resources identify the potential for partnership, integration, or colocation to reduce technical, cost, or aesthetic concerns; however, limited research has been conducted on the most effective strategies for identifying and implementing these approaches. For the purposes of this study, partnerships to address brine management are considered *regionalized* (more than one entity participating in the brine management strategy) or *integrated* (project incorporates treatment and recovery) approaches. Examples of regionalized or integrated approaches could include shared conveyance or disposal infrastructure, centralized or integrated/collocated treatment, or partnership for the recovery of by-products. It should be noted that *regionalized* in this context refers to multiple brine producers in a region taking a joint approach for management and not a determination of how brine management varies across different regions of the United States, which was previously addressed in WRF 4072 (Mackey and Seacord 2008).

This project will aim to assess the opportunities (existing or feasible) for regionalization or integration of brine management, including consideration of treatment, disposal, recovery of marketable products, and volume minimization. The project will provide guidance for utilities/regions to utilize in project planning and evaluation of these partnership approaches. If implemented, these solutions will accelerate membrane-based treatment projects through reduced brine disposal costs, which are often prohibitive for project implementation—particularly for inland facilities.

While this project is intended to be primarily focused on regionalized or integrated approaches to brine management after treatment, the inclusion of regionalized source control strategies to address high total dissolved solids (TDS) discharges where feasible is encouraged.

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.

Expected Deliverables

The deliverables from this project are flexible and encourage creativity and originality from proposers. Example deliverables could include, but are not limited to, the following:

- Research report
- Guidance manual/document
- Literature review
- Webcast, conference presentation, etc.
- Peer-reviewed journal article
- Fact sheet, case study, white paper, etc.
- Workshop (consider plan to document workshop)

- Web tool (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#webtool-criteria>)

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#project-deliverable-guidelines>. 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 up to 18 months from the contract start date.

References and Resources (Optional)

Limited research has been completed on regionalized or integrated brine/concentrate management approaches. The following list includes examples of research reports, tools, and other resources that may be helpful to proposers on the broader topic of concentrate management, including treatment and disposal, and material recovery. It is not intended to be comprehensive, nor is it a required list for consideration.

- Archuleta, E. G., Fahy, M., Reinert, S., Gonzalez, H., Raucher, R. S., Clements, J., Exenford, J., Mickley, M., Dugat, W., Cappelle, M., Davis, T., Tarquin, A., Hargrove, W., Michelsen, A., Sheng, Z., Lacewell, R. and Fernald, A. 2015. *Desalination Concentrate Management Policy Analysis for the Arid West*. Project 1819. Alexandria, VA: WateReuse Research Foundation. <https://www.waterrf.org/research/projects/desalination-concentrate-management-policy-analysis-arid-west-1>
- Bellona, C. L., Waldron, A., Min, J., and Jin, L. 2015. *Guidance for Selection of Salt, Metal, Radionuclide, and Other Valuable Material Recovery Strategies*. Project 1390. Alexandria, VA: WateReuse Research Foundation. <https://www.waterrf.org/research/projects/guidance-selection-salt-metal-radionuclide-and-other-valuable-metal-recovery>
- Mickley, M. and Jordahl, J. 2013. *Development of a Knowledge Base on Concentrate and Salt Management*. Project 1383. Alexandria, VA: WateReuse Research Foundation. <https://www.waterrf.org/research/projects/development-knowledge-base-concentrate-and-salt-management-practices>
- Goldman, J.E., Howe, K.J., Thomson, B.M., and Fowlie, R. 2013. *Selective Salt Recovery from Reverse Osmosis Concentrate Using Interstage Ion Exchange*. Project 1381. Alexandria, VA: WateReuse Research Foundation. <https://www.waterrf.org/research/projects/development-selective-recovery-methods-desalination-concentrate-salts>
- Bruno, M. 2012. *Geologic Map and Permitting Roadmap for Biosolids and Brine Injection*. Project 1810. Alexandria, VA: Water Environment Research Foundation.

<https://www.waterrf.org/research/projects/geologic-map-and-permitting-roadmap-biosolids-and-brine-injection>

- Benjamin, M.M., Shi, W., Kwan, P., and Chang, Y. 2010. *Evaluation of VSEP to Enhance Water Recovery During Treatment of Brackish Water and RO Concentrate*. Project 4148. Denver, CO: Water Research Foundation.
<https://www.waterrf.org/research/projects/evaluation-vsep-enhance-water-recovery-during-treatment-brackish-water-and-ro>
- Fox, P., Abbaszadegan, M., Mohammadesmaeili, F., and Kabiri-Badr. 2009. *Inland Membrane Concentrate Treatment Strategies for Water Reclamation Systems*. Project 3096. Denver, CO: Water Research Foundation.
<https://www.waterrf.org/research/projects/inland-membrane-concentrate-treatment-strategies-water-reclamation-systems>
- Sethie, S., Walker, S., Xu, P., and Drewes, J. 2009. *Desalination Product Water Recovery and Concentrate Volume Minimization*. Project 3030. Denver, CO: Water Research Foundation.
<https://www.waterrf.org/research/projects/desalination-product-water-recovery-and-concentrate-volume-minimization>
- Mackey, E. and Seacord, T. 2008. *Regional Solutions for Concentrate Management*. Project 4072. Alexandria, VA: WateReuse Foundation.
<https://www.waterrf.org/research/projects/regional-solutions-concentrate-management>
- Jordahl, J. 2007. *Beneficial and Nontraditional Uses of Concentrate*. Project 1106. Alexandria, VA: WateReuse Foundation.
<https://www.waterrf.org/research/projects/beneficial-and-non-traditional-uses-concentrate>

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*. The current version of these guidelines and the *Instructions for Budget Preparation* are available at <https://www.waterrf.org/proposal-guidelines>. 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#webtool-criteria>.

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. 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 \$150,000. 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 \$150,000. Proposals that do not meet the minimum 33% of the project award will not be accepted. Consult the *Instructions for Budget Preparation* available at <https://www.waterrf.org/proposal-guidelines#RPP-instr-budget-prep> 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, November 14, 2023.

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-5256>.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Lyndsey Bloxom at lbloxom@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.

5256 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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