



REQUEST FOR PROPOSALS (RFP)

Operationalizing the Benefits of Nature-based Solutions to Inform Decisions in a Changing Climate (5305)

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

- To assemble quantitative metrics and synthesize or correlate these with existing qualitative metrics used across disciplines to link the benefits of Nature-based Solution (NbS) to design criteria and implementation
- To compare a variety of innovative NbS applications with conventional approaches according to performance, construction costs, operational costs, and multiple benefits
- To assist decision-makers with more accurately valuing the benefits and tradeoffs of NbS as part of their holistic water management strategy

Budget

Applicants may request up to \$250,000 in WRF funds for this project.

Background and Project Rationale

Nature-based solutions to water quality and supply challenges include but are not limited to practices such as treatment wetlands, managed aquifer recharge, riverbank filtration, protection of forested lands, and planting urban forests to protect surface and subsurface drinking water supplies. From a One Water perspective, NbS can be integrated with centralized and decentralized/distributed/onsite water treatment systems to help achieve water supply and quality goals.

Although these solutions often require more land area than gray infrastructure approaches, they are attractive to communities because they can provide multiple benefits and often cost

less than conventional water, wastewater, and stormwater infrastructure. Practitioners and engineers from multiple sectors (e.g., road construction, urban/city planning, architects, and water engineers) need to know how certain design choices (e.g., plant selection, media placement, public access, and hydraulics) impact the delivery of important benefits from NbS designed to improve water quality or quantity. These multiple benefits (i.e., “co-benefits” or “ecosystem services” in some literature) could include habitat quality, water supply reliability, recreation, aesthetics, flood mitigation, heat stress mitigation, greenhouse gas sequestration or avoidance, and improved local hydrology. However, the measurement of these benefits is not standardized, which limits practitioners' abilities to incorporate multiple benefits into design decisions. It may be difficult to monetize these benefits, and/or the beneficiary of the project may differ from the project financier/owner/customer base.

Built from WRF’s completed projects and other work to date, this proposed research will bring together researchers and practitioners across disciplines (e.g., ecology, social sciences, and water quality engineering) to develop a framework for measuring benefits that could be applied to NbS for water quantity and quality challenges. By linking various benefits to design factors, engineers can use the information from this research to design NbS that effectively delivers multiple benefits to the communities that financed the project as well as beneficiaries who did not directly fund the project (e.g., communities who may access public NbS park spaces but who live outside of the utility’s customer base). This holistic approach to co-benefit accounting could support decisions that better serve ratepayers and the public as a whole while enhancing watershed health and water availability at a systemic level. Stakeholders may also use this information in multi-criteria decision-making tools to support investment in NbS. This research will help compare a variety of NbS to conventional approaches, including for both centralized and decentralized/distributed/onsite systems. Hybrid systems that blend nature-based and conventional approaches should also be part of the analysis. The proposed research should be conducted on multiple scales (i.e., individual treatment system, city, regional/watershed scale) because many of the benefits of NbS accrue across these scales. Some examples of multiple benefits for consideration could include but are not limited to infrastructure resilience to climate change/disruption, decreased localized flooding, increased recreational opportunities, preserved wildlife habitat, increased employment opportunities, improved aesthetics, reduced heat stress, increased health benefits, and carbon reduction/avoided carbon emissions.

This research differs from past WRF projects because it will create an alternative framework to quantify the benefits from NbS that are not easily monetized, such as climate resilience, water availability, habitat, recreation, heat stress reduction, and health benefits. The new framework will enable decision makers to weigh these benefits along with traditional cost-benefit metrics such as construction and operational costs. This will help decision makers more effectively compare NbS with traditional water treatment and supply processes. This proposed research will incorporate summary-level information to assess potential climate change hazards faced by water, wastewater, and stormwater management organizations (such as drought; increased riverine, pluvial, and coastal flood risks; increased urban flooding; seawater intrusion; urban heat stress; and biodiversity loss). It will also pair a suitability analysis of various types of NbS to determine where there are opportunities for NbS to improve the resilience of infrastructure to

climate change. Research could also identify opportunities where water reuse would facilitate NbS implementation (e.g., by co-locating NbS with wastewater treatment infrastructure to supply recycled water to the NbS, by integrating NbS as part of the reuse project (such as an aquifer recharge system), or by implementing an onsite water treatment system that utilizes a hybrid approach of wetland treatment and more conventional membrane bioreactors (MBR)). This project would help utilities, municipalities, and global communities (e.g., for UN Sustainable Development Goals) more accurately value the benefits and tradeoffs of NbS to advance a holistic water management strategy in a changing climate.

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.

- Conduct a comprehensive literature review.
- Synthesize case studies from utilities and municipalities, built from published work by WRF and other organizations.
- Assemble an interdisciplinary team to develop metrics for multi-benefits.
- Develop a decision matrix tool and support new standard development based on quantitative and qualitative NbS features.
- Conduct a field demonstration/pilot project in partnership with utilities/municipalities to show the applicability of research outcomes.
- Organize a utility-focused virtual workshop for peer-to-peer information exchange.
- Prepare a utility-facing guidance document.
- Prepare presentations for webcasts and conferences.
- Prepare one peer-reviewed journal article.

Expected Deliverables

Expected deliverables from this project should include the following:

- A stand-alone literature review synthesis document, including annotations for the list of publications and resources used.
- Summary of survey results with an analysis on how utilities/municipalities have used the framework for quantifying the benefits from NbS.
- A utility-focused invitation-only virtual workshop (with two sessions offered at two different times) for peer-to-peer information exchange, along with workshop planning and all supporting materials (e.g., agenda, presentations, meeting notes, and workshop summary).
- A user-friendly utility-facing guidance, including application case studies. The utility-facing guidance will include a field demonstration/pilot project that can show applicability of research outcomes. In addition, the guidance document will include a separate chapter that summarizes the knowledge gaps, research needs, and preliminary research concepts for recommended future projects.
- Webcast and conference presentations.
- Submission of at least one open-access peer-reviewed journal article.

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.

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.

- Bledsoe, B., R. Lammers, J. Clary, J. Jones, A. Earles, M. Leisenring, S. Struck, and E. Strecker. 2022. *Stream Restoration as a BMP: Crediting Guidance*. Project 5075. Denver, CO: The Water Research Foundation.
- Callahan, B. and E. Bill. 2023. *Advancing Benefits and Co-Benefits Quantification and Monetization for Green Stormwater Infrastructure: An Interactive Guidebook for Comparison Case Studies*. Project 5105. Denver, CO: The Water Research Foundation.
- 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.
- Hayek, C., U. Lall, W. Becker, P. Knowles, L. Faber, and S. Teevan. 2024. *Successful Implementation of Onsite and Distributed Water Reuse Systems*. Project 5040. Denver, CO: The Water Research Foundation.
- Hersh, E., A. Verdin, and M. Bartlett. 2023. *Holistic Approaches to Flood Mitigation Planning and Modeling under Extreme Events and Climate Impacts*. Project 5084. Denver, CO: The Water Research Foundation.
- The Water Research Foundation (WRF). 2024. *Community-enabled Lifecycle Analysis of Stormwater Infrastructure Costs (CLASIC)*. Accessed August, 26, 2024. <https://www.waterrf.org/clasic>
- The Water Research Foundation (WRF). 2024. *Climate Change Related Projects*. Denver, CO: The Water Research Foundation <https://www.waterrf.org/serve-file/WRF-Climate-Change-Project-List.pdf>
- UK Water Industry Research (UKWIR). 2024. *The Greenhouse Gas Emissions of Nature-based Solutions for Wastewater Treatment*. Report Reference: 24/CL/01/42. UKWIR.

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](#). These 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 \$250,000. 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 \$250,000. 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-5305>.

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 h Zhang@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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