



**Date Posted: Wednesday, December 9, 2020**

## **REQUEST FOR PROPOSALS (RFP)**

### ***Advancing Benefits and Co-Benefits Quantification and Monetization for Green Stormwater Infrastructure: An Interactive Guidebook for Comparison Case Studies (RFP 5105)***

**Due Date:** Proposals must be received by 2:00 pm Mountain Time on  
**Thursday, February 25, 2021 (modified due date)**

**WRF Project Contact:** Harry Zhang, PhD, PE, [hzhang@waterrf.org](mailto:hzhang@waterrf.org)

#### **Project Sponsors**

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

#### **Project Objectives**

- Develop a user-friendly interactive guidebook with comparison case studies for utilities and municipalities to advance the quantification and monetization of benefits and co-benefits of green stormwater infrastructure (GSI) at the community level.
- Synthesize comparison case studies that have used a rigorous analysis framework for quantifying the benefits and co-benefits of GSI at a national scale, including those from two existing WRF projects.
- Advance the practice of benefits and co-benefits quantification by identifying and prioritizing the research needs among GSI benefits and co-benefits categories.

#### **Budget**

Applicants may request up to \$52,000 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**

More and more utilities and municipalities are implementing green stormwater infrastructure (GSI) to reduce the overall costs of meeting stormwater management requirements, while addressing other considerations that are important to the community such as offering additional co-benefits. GSI can be a cost-effective approach to improve water quality, move to a "one water" philosophy/mindset, and help communities maximize the value of their infrastructure investments by providing other environmental, economic, and community benefits.

Currently, there are two different, but inter-connected approaches for evaluating benefits and co-benefits of GSI through two WRF companion projects that are in their final stage of completion:  
1) Economic Framework and Tools for Quantifying and Monetizing the Triple Bottom Line Benefits of

Green Stormwater Infrastructure (project 4852 / SIWM4T17) and 2) Community-enabled Lifecycle Analysis of Stormwater Infrastructure Costs (CLASIC) (project 4798).

The CLASIC project is developing a transparent, robust, peer-reviewed, and end-user informed Life Cycle Cost (LCC) framework and modeling platform for stormwater infrastructure alternatives that can accommodate regional and scale variations to support integrated planning. CLASIC has applied multi-criteria decision analysis (MCDA) to score performance of user-developed scenarios in each economic, social, and environmental category, including a methodology for estimating performance scores (rather than monetized values) for scenarios in co-benefit categories.

In comparison, through WRF project Economic Framework and Tools for Quantifying and Monetizing the Triple Bottom Line Benefits of Green Stormwater Infrastructure (4852), a rigorous analysis framework has been established that can quantify and monetize a dozen GSI co-benefit categories along with a supporting tool, whose intended end users are utilities and municipalities. The project provides a systematic approach to help stormwater practitioners quantify and monetize the financial, social, and environmental benefits of GSI at the community or neighborhood scale. The co-benefits analyzed include water quality and water supply benefits, ecosystem benefits, energy savings, carbon emission reductions, public health benefits associated with reduced urban heat stress, improved air quality, increased recreational opportunities and green space, enhanced community livability, and green job creation.

Several case studies were developed independently through the two projects. However, more comprehensive case studies with utilities and municipalities (including success stories along with potential barriers for applications) are needed in order to better compare the two different technical approaches at different scales and across different geographical and climatic regions.

In addition, the current GSI Co-Benefits project (4852) has found it challenging to develop a meaningful, rigorous method for quantifying and monetizing flood risk reduction benefits associated with GSI. This is because flood risk analysis is very site specific and typically requires hydrologic modeling to determine benefits. The research team has discussed this with participating utilities and reviewed methods that others have employed, but do not believe that the existing methods correctly capture this benefit. As such, the current project has only provided a summary of how utilities can use local information / modeling to assess flood risk reduction benefits. However, it has not included specific calculations for this co-benefit category in the current supporting tool. Additional research is needed to further assist utilities and municipalities in evaluating investments and co-benefits from GSI relating to flood mitigation for holistic stormwater management.

The plan for this study is to build on the two WRF projects discussed above to make it easier for utilities and municipalities to use the two analytical frameworks and supporting tools by developing a variety of case studies in which the tools can be used independently or collectively. Additional framework and supporting tools available to date will be evaluated by the research team and a comparison summary will be incorporated into a guidebook. An interactive guidebook with diverse case studies across different geographical and climate regions will further advance benefits/co-benefits quantification and expand its applications through a national network of utilities and municipalities.

Given the close connection between this project and the two existing WRF projects above (i.e., 4852 and 4798), preference will be given to prospective proposals that clearly demonstrate an in-depth

understanding of these two WRF projects, and how to better build synergy and maximize cost efficiency across all three projects.

### **Research Approach**

**Task 1:** Compile cost and benefit quantification from existing studies on green stormwater infrastructure compared to gray infrastructure:

The research team will build from existing studies and use common metrics that allow for better cross comparison at a national scale, such as cost per gallon of stormwater reduced from Municipal Separate Storm Sewer Systems (MS4), and cost per pound of pollutants of concern removed. Consistent cost metrics (e.g., capital costs, operation and maintenance costs, and/or life cycle costs) will be used during the comparison. The list of priority pollutants of concern will be defined before initiation of the study, which will include Total Suspended Solid (TSS), Total Phosphorus (TP), Total Nitrogen (TN), *E. coli* (EC or enterococci), as well as physical pollutants such as litter and trash.

**Task 2:** Apply benefits and co-benefits analysis frameworks and supporting tools from two WRF projects and additional comparison case studies:

The research team will build off case studies from two of WRF's existing projects (i.e., 4852 and 4798) and expand to more diverse geographic and climate regions for additional comparison case studies. The comparison case studies should include benefits of green infrastructure to private sector (residential, commercial, and industrial sectors) whenever possible and return on investment information if available. The research team will collaborate with WRF and WRF's Project Advisory Committee (PAC) in the selection of comparison case studies.

**Task 3:** Development of an interactive guidebook for benefits and co-benefits quantification with comparison case studies:

The research team will prepare a detailed annotated outline and submit it for PAC review. After the PAC's review, the research team will prepare an interactive guidebook.

An interactive guidebook (including a web-based version) for benefits and co-benefits quantification which includes the following components:

- A decision support framework for applying different approaches (e.g., quantifying and monetizing GSI benefits and co-benefits and combining with qualitative analysis based on regionalization such as climate region).
- Detailed technical appendices with comparison case studies that cover different geographic and climate regions.

The research team will discuss the draft findings with the PAC and participating utilities through a webcast/web-based workshop. The research team will prepare the workshop agenda, facilitate the workshop discussion, and prepare a synthesis document containing a summary of the workshop and workshop discussion outcomes.

For broader community outreach (including through other national organizations), the research team will conduct a webcast hosted by WRF on the overall findings of this project and utilize other platforms

such as national conferences (without support from the project funding) and one peer-reviewed publication.

### **Expected Deliverables**

- Summary tables with GSI cost and benefit quantification from existing case studies using common metrics such as cost per gallon stormwater reduced from MS4 areas and cost per pound pollutants of concern removed.
- User-friendly online guidebook with real-world comparison case studies of applying the rigorous analysis framework and supporting tools for utilities and municipalities in different geographic and climate regions.
- The guidebook will include a synthesis of no less than six new comparison case studies using two different approaches for quantifying benefits and co-benefits of GSI with their applications by utilities and municipalities.
- A stand-alone document that summarizes the knowledge gaps, research needs, and preliminary project concepts for recommended research projects.
- Webcasts and conference presentation materials.

### **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 project 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.

Green Infrastructure Leadership Exchange. 2019. Green Infrastructure Co-Benefits Valuation Tool, <https://giexchange.org/green-infrastructure-co-benefits-valuation-tool/>.

Marlow, D., D. Beale, and S. Gould. 2014. *Practitioner's Guide for Economic Decision Making in Asset Management: Part 1: Background*. Alexandria, VA: Water Environment Research Foundation; and London: IWA Publishing. Project SAM1R06b1. <https://www.waterrf.org/research/projects/practitioners-guide-economic-decision-making-asset-management-part-i-background>.

Marlow, D., D. Beale, and S. Gould. 2014a. *Practitioner's Guide for Economic Decision Making in Asset Management: Part II: Guidance*. Project SAM1R0b2. <https://www.waterrf.org/research/projects/practitioners-guide-economic-decision-making-asset-management-part-ii-guidance>.

National Academy of Sciences. 2020. *Incorporating the Costs and Benefits of Adaptation Measures in Preparation for Extreme Weather Events and Climate Change Guidebook*. Washington, DC: The National Academies Press. <https://www.nap.edu/catalog/25744/incorporating-the-costs-and-benefits-of-adaptation-measures-in-preparation-for-extreme-weather-events-and-climate-change-guidebook>.

NYCDEP (New York City Department of Environmental Protection). 2019. *Innovative and Integrated Stormwater Management*. NYCDEP. <https://www.waterrf.org/resource/innovative-and-integrated-stormwater-management>.

NOAA (National Oceanic and Atmospheric Administration). 2016. *A Guide to Assessing Green Infrastructure Costs and Benefits for Flood Reduction*. <https://coast.noaa.gov/data/docs/digitalcoast/gi-cost-benefit.pdf>.

NOAA (National Oceanic and Atmospheric Administration). 2020. “Water Resources Dashboard.” <https://toolkit.climate.gov/topics/water/water-resources-dashboard>.

Pacific Institute. 2020. *Incorporating Multiple Benefits into Water Projects: A Guide for Water Managers*. <https://pacinst.org/publication/incorporating-multiple-benefits-into-water-projects/>.

Spahr, K., M. Bell, C.D., McCray, J.E., and T.S. Hogue. 2020. Greening up stormwater infrastructure: Measuring vegetation to establish context and promote co-benefits in a diverse set of US cities. *Urban Forestry & Urban Greening*, Volume 48, February 2020. <https://doi.org/10.1016/j.ufug.2019.126548>.

University of Maryland. 2017. *Holistically Analyzing the Benefits of Green Infrastructure: Guidance for Local Governments*. <https://arch.umd.edu/research-creative-practice/centers/environmental-finance-center/resources/publications/holistically-analyzing-benefits-green-infrastructure>.

U.S. EPA (U.S. Environmental Protection Agency). 2012. *Integrated Municipal Stormwater and Wastewater Planning Approach Framework*. <https://www.epa.gov/npdes/integrated-municipal-stormwater-and-wastewater-planning-approach-framework>.

U.S. EPA (U.S. Environmental Protection Agency). 2017. *Prioritizing Wastewater and Stormwater Projects Using Stakeholder Input*. Report Number EPA 830-R-17-002. <https://www.epa.gov/npdes/prioritizing-wastewater-and-stormwater-projects-using-stakeholder-input>.

U.S. EPA (U.S. Environmental Protection Agency). 2017a. *Expanding the Benefits of Seattle’s Green Stormwater Infrastructure: Examining Values Previously Unmeasured from Past and Potential Future Efforts in Seattle, Washington*. Report Number. EPA 832-R-16-011. [https://www.epa.gov/sites/production/files/2017-03/documents/seattle\\_technical\\_assistance\\_010517\\_combined\\_508.pdf](https://www.epa.gov/sites/production/files/2017-03/documents/seattle_technical_assistance_010517_combined_508.pdf).

WRF (The Water Research Foundation). 2020. *Climate-Resilient Planning for Urban Stormwater and Wastewater Utilities: Workshop Proceedings and An Action Agenda for the Water Sector to Advance Methods for Achieving Integrated Climate Resilience*. Project 5001. <https://www.waterrf.org/research/projects/climate-resilient-planning-urban-stormwater-and-wastewater-utilities-workshop>.

WRF (The Water Research Foundation). 2020a. “Community-enabled Lifecycle Analysis of Stormwater Infrastructure Costs (CLASIC).” Project 4798. <https://www.waterrf.org/clasic>.

WRF (The Water Research Foundation). 2020b. *User’s Guide for Integrated Wastewater and Stormwater Planning*. Project 4854 / SIWM9R14. Alexandria, VA: WRF.

<https://www.waterrf.org/research/projects/toolbox-completing-alternatives-analysis-part-integrated-planning-approach-water>.

WRF (The Water Research Foundation). Forthcoming. Framework and Tools for Quantifying Green Infrastructure Co-Benefits and Linking with Triple Bottom Line Analysis. Project 4852 / SIWM4T17. <https://www.waterrf.org/research/projects/framework-and-tools-quantifying-green-infrastructure-co-benefits-and-linking>.

WRF (The Water Research Foundation). Forthcoming. *Enhancement of Resilience to Extreme Weather and Climate Events: Proactive Flood Management*. Project 4842/SIWM-17-15. <https://www.waterrf.org/research/projects/enhancement-resilience-extreme-weather-and-climate-events-proactive-flood>.

### **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.

### **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 **\$52,000**. 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 **\$52,000**.

**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 2:00 pm Mountain Time on Thursday, February 25, 2021 (modified due date).** All proposal documents must be compiled into two PDF files consisting of your technical review documents and your financial review documents. All forms and components of the proposal are available in the *Proposal Component Packet* zip file on the proposal website at <https://proposals.waterrf.org/Pages/RFPs.aspx>. An FAQ and a tutorial are also available. A login is required to access the proposal website and download the packet. Proposers are encouraged to create logins and verify the validity and compatibility of the system well in advance in order to avoid last-minute errors or delays.

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.

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 (571) 384-2098 or [h Zhang@waterrf.org](mailto: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](mailto: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 upon your settings, you may need to click refresh on your browser to load the latest file.)**