



THE  
Water  
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## Solicited RFP

*This project is being funded through the Solicited/Focus Area Program, which enables WRF to solve broadly relevant subscriber issues and challenges with a targeted, sustained research effort. The program is developed around research topics that are of high interest and priority to WRF subscribers because of a challenge or opportunity that is present, emerging, or anticipated, and for which research will help subscribers manage and address the challenge or optimize the opportunity.*

*This project is funded under the Sustainable Integrated Water Management (SIWM) Research Area and is intended to support the research area objective(s).*

*The objective of the Sustainable Integrated Water Management program is to engage partners to advance sustainable integrated water management for communities by:*

- Transitioning an integrated water management approach into practice by taking a holistic view of wastewater, stormwater, drinking water, and reclaimed/reused water;*
- Optimizing stormwater programs through lifecycle analysis and green infrastructure implementation to create adaptable and resilient water infrastructure;*
- Transforming comprehensive planning and watershed management by engaging partners in the agriculture, forestry, and planning communities at the national, state, regional, and local levels.*

## Enhancement of Resilience to Extreme Weather and Climate Events: Proactive Flood Management (RFP #4842)

### Project Objectives

- To develop a synthesized, easy-to-use pocket guide for enhancement of wastewater and stormwater utility resilience to extreme weather and climate events by focusing on proactive risk assessment and management of flooding due to extreme rainfall;
- To build on the previous WRF projects *Water/Wastewater Utilities and Extreme Climate and Weather Events* (WERF et al. 2014) and *Water Quality Impacts of Extreme Weather-Related Events* (Stanford et al. 2014) by reflecting the latest trends and best practices, including technological advances on proactive wet weather and flood management;
- To connect with the WRF project *Managing Heavy Precipitation, Water Quality, and Flooding in Urban Environments: An Urban Stormwater and Wastewater Planning Workshop*.

### Budget

Proposals may request WRF funds for \$75,000. WRF funds requested and total project value will be criteria considered in the proposal selection process.

### Background

Extreme weather events appear to be more commonplace and have the potential to disrupt all types of water services. The Water Research Foundation (WRF) previously completed the projects *Water/Wastewater Utilities and Extreme Climate and Weather Events* (WERF et al. 2014), *Water Quality Impacts of Extreme Weather-Related Events* (Stanford et al. 2014), and *Implications of Climate Change for Adaptation of Wastewater and Stormwater Agencies* (Stratus Consulting Inc. and MWH Global Inc. 2009).

The primary objective of this study is to build on these previous projects, along with the latest literature, to synthesize an easy-to-use pocket guide for enhancement of resilience to extreme weather and

climate events for wastewater and stormwater utilities (e.g., clean water agencies) by focusing on proactive wet weather and flood management.

This study will identify best practices for assessing flood risk from extreme rainfall, including a range of simplistic and complex flood modeling approaches (1D versus 2D models) and production of flood maps. In addition, it will use available resources and established goals to identify a range of available interventions for managing extreme precipitation events, while considering the compound impacts due to sea level rise and storm surge. This study will also evaluate the potential applicability and adequacy of Bulletin 17C, *Guidelines for Determining Flood Flow Frequency* (USGS, 2018), on the stormwater and wastewater sectors by focusing on an improved method and more accurate estimate of flood frequency and its potential impact.

The research will focus on how municipalities/utilities can proactively prepare for both more extreme events and smaller, yet more frequent, nuisance storms/urban flooding problems. This will include an examination of current drainage systems and drainage system standards, identification of best practices and modeling approaches for flood risk assessments, evaluation of intervention scenarios, and differentiation between actions taken at the home-scale versus larger planning scales.

Example issues of interest include:

- (1) Different flood types with regional variations:
  - Hurricane-induced extreme rainfall, such as what occurred during Harvey, Irma, and Florence;
  - Localized floods from inland rainfall, including flooding stemming from a combination of extreme weather and land use changes, such as in Ellicott City, MD;
  - Flash storms such as those that occurred in Arizona and California;
  - Nuisance flooding in urban areas;
  - Urban and household flood risk due to a combination of land use changes (at the site scale and watershed scale) and climate change impacts;
  - Flooding due to rain on saturated soil groups resulting from multi-day rain events;
  - The impact of surface water and groundwater interactions.
- (2) Evaluation of factors that, in practice, affect varying wet weather goals:
  - Meeting water quality goals versus runoff/flood management goals;
  - Developing appropriate and defensible flood models and validation for mapping, planning, and engineering, balancing resolution and complexity with resource and computing requirements. Role of centralized versus decentralized systems (e.g., increasing sewer capacity/storage versus green infrastructure and on-site detention/retention system), along with cost and benefit considerations;
  - Resilience enhancement prioritized for short-, medium-, and long-term implementation measures based on flood risk assessment;
  - Trade-offs between meeting discharge permit compliance and keeping sewers from overflowing into homes during events;
  - Considering home-by-home flood risk management versus larger neighborhood or watershed-scale flooding;
  - Using climate projection techniques/tools to inform flood management and integrated planning;
  - Any innovative approaches from the One Water and “Fit for Purpose” perspectives;

(3) Institutional issues on flood management:

- Flood management structure (e.g., state agencies versus flood control districts, drainage systems with state DOTs; city/county codes and standards; connection between municipal and transportation entities).

The expected outputs of this study are:

- An interactive pocket guide on proactive flood risk assessment and management for utilities and municipalities to use as a quick reference. Consideration should also be given to other entities; for example, coordination with planning departments, transportation departments, agricultural communities, and emergency management departments to holistically manage the flooding;
- A decision-tree approach and heuristic thinking that can be customized to the user's needs in response to different flood types and geographic regions stemming from changes in wet weather (including but not limited to nuisance floods);
- Case studies reflecting the best appropriate approaches for each flood type;
- Connection with, and leverage of, the outputs from a separate workshop on Managing Heavy Precipitation, Water Quality, and Flooding in Urban Environment, to be held in summer 2019.

## Research Approach

### ***Task 1: Evaluation of the state of the knowledge through literature review***

The research team will evaluate the state of the knowledge on the subject matter through a combination of literature review, web searches, and phone interviews with selected entities. The literature review should cover the latest studies and practices on proactive flood risk assessment and management within the United States and globally. In addition, networking and potential collaboration with other national organizations (e.g., American Society of Civil Engineers, American Public Works Association, National Association of Flood & Stormwater Management Agencies, and American Water Resources Association) is encouraged.

For example, the previous report and supporting materials for *Water/Wastewater Utilities and Extreme Climate and Weather Events* (WERF et al. 2014) should be reviewed, by considering examples from 2016 to 2018 billion-dollar weather/climate disasters by NOAA. In addition, nationwide wastewater and stormwater infrastructure resilience trends in metropolitan areas should be synthesized. Selected literature and useful web links are provided in the reference section of this RFP as examples.

Deliverables:

- A summary document of the literature review, along with concise notes from conversations with selected entities, that summarizes the state of the knowledge and best practices on proactive flood risk assessment and management.
- Identification and synthesis of the available flood modeling approaches for producing validated flood maps and assessing intervention scenarios while balancing resolution and complexity with resource and computing requirements. This section shall be included in the summary document as a stand-alone chapter.
- Identified knowledge gaps and research needs should also be synthesized into the summary document as a stand-alone chapter.

## ***Task 2: Development of a pocket guide for proactive flood risk assessment and enhancement of flood resilience to extreme weather, in the context of utilities and municipalities***

The research team will develop a pocket guide for proactive flood risk assessment, modeling, interventions, and enhancement of flood resilience to extreme weather, with end users as utilities and municipalities. This pocket guide needs to provide a summary page of experiences, applications, and recommendations in a user-friendly format (e.g., web-based; for portable use such as interactive PDF files). Other commonly-used best practices for preparing the pocket guide should be considered as well.

The pocket guide should include a specific section on cost benefit analysis. Proactive flood management practices will require substantial funding. Therefore, cost benefit analysis needs to be addressed as a resource that can help educate decision makers on appropriating funding for such efforts or initiatives.

The research team should begin by developing an annotated outline of the pocket guide. A WRF Project Advisory Committee (PAC) will review the outline to make sure that it sufficiently covers the subject matter. Upon acceptance of the annotated outline, the research team will develop a user-friendly pocket guide. One round of consolidated comments from the PAC will be provided to the research team.

### **Deliverables:**

- Draft annotated outline for the pocket guide;
- Final annotated outline after addressing PAC's comments;
- Draft pocket guide for proactive flood risk assessment, including flood modeling and mapping, and enhancement of flood resilience;
- Final pocket guide, after addressing one round of consolidated comments from the PAC;
- Supporting materials used during the development of the pocket guide.

## ***Task 3: Community Outreach***

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 conferences and peer-reviewed publications.

### **Deliverables:**

- Webcast and presentation materials;
- Conference presentations and publications (minimum two conferences, one peer-reviewed publication).

## **Selection Process and Criteria**

Proposals will be reviewed by WRF and the Project Advisory Committee (PAC) and/or Issue Area Team (IAT) for the Sustainable Integrated Water Management (SIWM) issue area. This review team may be complemented as needed by subject matter experts. As part of the evaluation process, WRF reserves the right to request interviews, either via conference call or in person, with qualified applicants if necessary.

Applicants are encouraged to develop and submit research plans that meet the research goals of this RFP, provide sufficient details of their budget, and outline schedules and milestones that can be successfully delivered on the stated research goals, objectives, and tasks.

WRF will evaluate proposals on the following components:

- **Understanding the Problem and Responsiveness to RFP (20%)**  
Does the proposal adequately explain the problem? Does it reflect knowledge of the issue and how solving the problem will benefit the water industry? Have the RFP objectives been adequately addressed? If proposed objectives differ from the RFP, do stated objectives address current or future needs of the water industry?
- **Technical Approach and Scientific Merit (40%)**  
Was the proposal prepared with supportive information and is it self-explanatory and clearly understandable? Is the proposed effort technically defensible? Is the approach practical? Can the project objectives be achieved in the stated time period with the allotted personnel and budget?
- **Management and Communication Plans (20%)**  
Are the roles, responsibilities, and assignments clear? Do the supporting organizations on the team have complementary skills? Does the lead organization have adequate resources to provide the appropriate level of management, oversight, and project implementation? Are data quality objectives specified? Is the Quality Assurance/Quality Control Plan acceptable? Are schedules and deliverables clearly defined?
- **Budget and Schedule (10%)**  
Is the budget within the advertised budget for the project? Has the applicant provided an appropriate (at least 25%) and significant in-kind contribution to the project? Is the level of effort allocated to each task logical? Is the indirect cost rate reasonable (35% or less is competitive), and has it been detailed in the proposal? Is the schedule realistic? Do the proposed budget and schedule match funding needs to milestones and demonstrate the value of the research relative to the proposed cost?
- **Qualifications of Organization and Key Personnel (10%)**  
Does the lead organization have demonstrated experience and expertise in the issues and objectives discussed in the RFP? Do the key project personnel have experience in the proposed area of research? Have key personnel committed an appropriate amount of time to the project? Are water supply and wastewater agencies involved?

### **Proposal Preparation Instructions**

Proposals submitted in response to this RFP must be prepared in accordance with The Water Research Foundation's document *Guidelines for Focus Area Program Proposals*. The most current version of these guidelines is available at:

<http://www.waterrf.org/funding/ProposalDocuments/GuidelinesForFocusAreaProgramProposals.pdf>.

The guidelines contain instructions for the technical aspects, financial statements, and administrative requirements that the applicant must follow when preparing a proposal.

*Please note that the selection criteria listed here are different from those listed in the Guidelines for Focus Area Program Proposals document. The selection criteria in this RFP will be used to evaluate the proposal.*

## Eligibility to Submit Proposals

This RFP solicits proposals from all technically qualified applicants, including educational institutions, research organizations, federal or state agencies, municipalities, 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 <http://www.waterrf.org/funding/Pages/policies.aspx>. 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. If you have any questions about your eligibility for WRF projects, please contact the WRF research staff listed at the bottom of this RFP.

## Administrative, Cost, and Audit Standards

WRF's Solicited Research Program standards for administrative, cost, and audit compliance are based upon, and comply with, Office of Management and Budget Uniform Grants Guidance, 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 Focus Area 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 financial staff should review the detailed instructions included in the current *Guidelines for Focus Area Program Proposals*.

## Budget and Funding Information

The maximum funding available from WRF for this project is \$75,000. A minimum 25 percent of the total project value must be contributed by the applicant (i.e. the applicant's minimum contribution must equal one-third of the WRF funds requested). For example, if an applicant requests \$100,000 from WRF, a minimum of \$33,333 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 25 percent to the project but the maximum WRF funding available remains fixed at \$75,000. **Proposals that do not meet the minimum 25 percent of the total project value will not be accepted.**

## Period of Performance

The proposed project schedule should be realistic, allowing ample time for the preparation of final reports and for review of project results. 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 <http://www.waterrf.org/funding/Pages/policies.aspx>.

## Utility and Organization Participation

WRF is especially interested in receiving proposals that include both participation and contribution of resources from water utilities and organizations in the research effort. Information on utilities and/or organizations that have indicated an interest in participating in this research project are listed on the last page of this RFP. While WRF makes utility and organization participation volunteers known to applicants, it is the applicant's responsibility to negotiate utility and organization participation in their particular proposal, and the utilities and/or organizations are under no obligation to participate.

## Application Procedure and Deadline

**Proposals are now being accepted exclusively online in PDF format and must be fully submitted before 2:00 PM Mountain Time, Tuesday, June 4, 2019.** All of the forms and components of the proposal are available online in the "Proposal Component Packet" zip file. A login is required to download this packet and use the proposal website. This information is available at <http://proposals.waterrf.org/Pages/RFPs.aspx>

The online proposal system allows submission of your documents until the date and time stated in the 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 Request for Proposals and WRF's administrative, cost, and financial requirements may be addressed to the Program Director, Dr. Harry Zhang, at (571) 384-2098 or by e-mail at [hzhang@waterrf.org](mailto:hzhang@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 of when a utility submits a volunteer form, and this RFP will be re-posted with the new information.

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## References and Useful Web Links

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- City of Los Angeles (2018). *Resilient Los Angeles*. (<http://www.lamayor.org/sites/g/files/wph446/f/page/file/Resilient%20Los%20Angeles.pdf>)
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