THE Water Research FOUNDATION

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REQUEST FOR PROPOSALS (RFP)

Establishing Seasonal Targets for Receiving Waters: Rethinking Wet Weather versus Dry Weather Expectations (RFP 5123)

Due Date: Proposals must be received by **3:00 pm Mountain Time on Tuesday, September 28, 2021**

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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
1. Initiate a first phase project to evaluate the implications of wet weather conditions on permitting and pollutant load reduction targets as a baseline for future studies.
2. Produce a well-documented summary of the currently available tools and study results evaluating watershed pollutant loads and receiving water responses under wet weather and dry weather conditions (including different hydrological conditions).
3. Outline possible implications on target setting (i.e., surface water and effluent goals for pollutants; may include designated uses) and regulation.
4. Use the available information to generate recommendations for wet weather target setting.

Budget
Applicants may request up to $200,000 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
In 2013, the United States General Accountability Office (GAO 2013) concluded that even with tens of thousands of Total Maximum Daily Loads (TMDLs) adopted, few impaired waterbodies had attained water quality standards. Of about 50,000 TMDLs developed and approved, nearly 35,000 were approved more than 5 years earlier, long enough for the GAO to consider them "long established." The state officials that the GAO surveyed in its review of a representative sample of 191 TMDLs reported that "…pollutants had been reduced in many waters, but few impaired water bodies have fully attained water quality standards." The state officials further reported that "…long-established TMDLs generally do not exhibit factors most helpful for attaining water quality standards, particularly for nonpoint source pollution…" (e.g., farms and stormwater runoff). The primary aim of the 1972 Clean Water Act (CWA) was to "…restore and maintain the [*collective*] chemical, physical and biological integrity of the Nation's waters." Yet, more than 40 years after Congress passed the CWA, the Office of Management and Budget

(OMB) concluded that many of the nation's waters were still impaired, and the goals of the act were not being met. Further, the CWA's goals will likely remain unfulfilled unless there is a change to the approach to nonpoint source pollution. Among other ideas, they recommended that:

- The U.S. Environmental Protection Agency (EPA) issue new regulations for TMDL development, adding key features, and
- Congress consider revising the Clean Water Act's approach to addressing nonpoint source pollution.

While the Clean Water Act is administered to address both dry and wet weather environmental conditions with regards to the support of designated uses such as recreation, fish and shellfish consumption, and aquatic life, the initial policies and protocols developed to regulate discharges to surface waters focused on dry weather conditions. One example that has been extensively used in the National Pollutant Discharge Elimination System (NPDES) program is the "Technical Support Document for Water Quality-Based Toxics Control" (TSD) published in 1991. Much of the work done to develop this document occurred prior to 1985; over 35 years ago. The NPDES program largely focused on "toxics" in these early days, so the TSD provided guidance as to how one could characterize critical conditions in a receiving water and define unacceptable discharges. The logic here was that pollutants should be regulated based on assumptions that would predict the highest frequency, duration, and magnitude of exposure, but predominantly on an individual pollutant basis in isolation from site conditions and their inherent variability in time and space. This approach presumed that the highest effluent flow and the lowest receiving water flow (i.e., dry weather conditions) represented the state of highest risk of impact.

Water quality problems experienced today have become more complicated by the loss of structural and functional integrity that contributes to the collective stress caused by multiple drivers of ecosystem change. Development, agriculture, and climate change are the major contributors of aquatic ecosystem health impacts and the decline of essential ecosystem services that support human well-being. Meeting standards for single toxic pollutants or non-conventional pollutants like nutrients often does not yield levels of ecosystem health consistent with the goals and intent of the CWA for collective chemical, physical, and biological integrity. The situation is further complicated by intractable ecosystem transitions caused by climate change and permanent land alterations that cannot be "restored" to historic conditions that may no longer be supportable and rely on management practices that do not provide the structural and functional features that support healthy aquatic ecosystems. Often, under the best management scenarios, the "best attainable condition" falls far short of CWA standards and aims for environmental "integrity" as indicated by the GAO (2013) report and slow progress with TMDL implementation. This puts state regulatory agencies in the difficult position of putting excessive amounts of energy and dollars into efforts that do not yield anticipated outcomes.

Based on decades of collaborative empirical research with state agencies and academic institutions, EPA's *Practitioner's Guide* (EPA 2016) provides a science-based protocol for linking collective watershed pressures to stream biointegrity outcomes along a biological condition gradient (BCG)—a foundational ecosystem response to multiple, integrated stressors. The BCG quantitatively defines the relationship between a declining biological diversity index as it responds to increased stress exposure reflected in watershed conditions and pollution sources. Importantly, it is a foundational, ecosystem-based relationship that can guide complex, multi-stressor management challenges in an integrated, ecosystem context that single sector approaches, like stormwater management, overlook.

<u>Stormwater Management and Its Challenges in an Ecosystem Context</u>

Stormwater discharges, by definition, are only expected in direct association with wet weather events. A common reality for Publicly Owned Treatment Works (POTWs) is infiltration and inflow (I&I) during wet

weather events, as well as the occasional bypass of sewage around the treatment works. Few collection systems are not vulnerable to I&I impacts. In most cases, POTWs only realize their highest discharge rates during wet weather events, which also occur when receiving water flows greatly exceed the low flow conditions commonly used for NPDES permitting decisions. While it is common for regulators to establish permit requirements based on a steady state receiving water condition, i.e., one that does not vary over time, this is clearly not the case for wet weather events. Use of the TSD to make NPDES permit decisions for wet weather circumstances is unduly conservative and will inaccurately represent actual exposure and risks to aquatic life. However, permit writers are rarely provided with alternative information or tools to estimate ecological exposure and risk in the wet weather environment.

The implications of wet weather events and their unique qualities for dischargers to surface waters is not limited to permit limits. The concept of blending wastewater and stormwater streams that have been treated to different levels of quality prior to discharge has become very controversial in recent years. EPA has attempted to address it directly, but this effort has not been completed. The states and EPA regions, without sufficient guidance, have taken different positions on the topic. However, this leaves permittees and permit writers at a loss as to how to consistently manage blended discharges and determine if designated uses are being supported with this practice.

Further complicating the goal of achieving water quality standards is overwhelming loading of pollutants to receiving waters by unregulated nonpoint sources, as identified above. The presence of those loads thwarts water quality improvement despite the investments and improvements made by municipal wastewater and stormwater treatment. Additionally, design for management of discharges associated with wet weather events is confounded by the documented change in rainfall magnitude and intensity in recent years. The seasonal characteristics of wet weather flow based on data collected 10-50 years ago no longer represent the characteristics observed today. Today's altered hydrology requires that the CWA community revisit assumptions relative to the goals for receiving waters. By their transient nature, wet weather events may not impact the designated uses of surface waters over the long term. A different approach to water quality management needs to be taken for seasons that have proportionately higher incidences of wet weather events than drier, more steady state seasons. Management objectives and ability are further stymied by the transitions in ecosystem state—chemical, physical, and biological—caused by myriad intractable forces that cannot be effectively managed, and cannot be managed by addressing only the stormwater sector out of context with the prevailing and changing structures, functions, and sensitivities of the local ecosystem.

A recent issue associated with wet weather events and expectations for receiving waters relative to designated uses and water quality standards has come to light for communities involved in long-term control plans (LTCPs) addressing combined sewer overflows (CSOs). Many communities have developed LTCPs, with regulatory approval, specifically addressing CSO discharges associated with wet weather events. Although the communities have completed their planned work, whether designated uses and water quality standards are being consequently met remains questionable. This, again, emphasizes the need for more clear guidance and direction as to how wet weather-related discharges should be evaluated relative to goals normally applied to dry weather conditions.

An emerging issue for municipalities and POTWs lies within the interests of reuse and wastewater. Given their I&I concerns, and the unpredictability of wet weather events, water resource recovery facilities are designing reuse capability around daily flow expectations. This may mean that these facilities will only discharge to surface waters during, or as a result of, wet weather events. This will be a challenging discharge to permit because now, for a facility that reuses the vast majority of its dry

weather flow wastewater, the discharge will be different because influent quality will be more influenced by the quality of stormwater reaching the facility, and the frequency, duration, and magnitude of discharges to surface waters will be tied closely to that of each wet weather event. Instead of having an average daily flow to a plant with relatively low variability in quality and quantity (assuming an effective pre-treatment program is in place) the discharge to surface waters in this scenario can be highly variable and much more difficult to manage in the current NPDES permitting paradigm. WRF subscribers and permit writers will need help adequately assessing instream exposure and risk when much of a POTW's effluent is reused and a discharge only occurs under wet weather conditions.

POTWs, as well as municipalities managing stormwater, are currently experiencing significant pressure from regulators and the public to treat discharges to standards that will support designated uses for receiving waters regardless of hydrologic condition, while remaining affordable to the public they serve. For stormwater discharges, this goal can come in conflict with the CWA criteria of "maximum extent practicable" when that effort is not sufficient to meet standards. To attain this goal, more accurate data defining the exposure and risk of the aquatic community under wet weather conditions are needed. Such data and assessments will establish the degree to which designated uses remain attainable or are quickly restored after wet weather events.

This will require new approaches that properly address inter-, and perhaps, intra-seasonal variability in the frequency, magnitude, and duration of wet weather events and corresponding impacts to water quality, including the appropriate frequency, magnitude, and duration of water quality criteria that form the foundation for NPDES permit limits and govern non-permitted nonpoint source discharges. For example, wet weather events occur on a timescale of hours and may deliver the majority of monthly and annual pollutant loadings, while chronic criteria averaging periods, which can range from 4-30 days for toxics and from months to yearly for nutrients, are too long to prevent excessive pollutant delivery. An investment in better understanding environmental goals with current wet weather characteristics in mind is necessary now more than ever in the history of the CWA.
The overall vision is to better integrate wet and dry weather water quality targets and compliance measures: thinking beyond two-dimensional mass balance approaches."

Research Approach
This RFP is intentionally flexible in the research approach to encourage creativity and originality from proposers. The background and rationale section covers an extensive array of challenges, and proposers are encouraged to describe how they will address as many challenges articulated in the background section to meet the project objectives. This project should summarize currently available tools and key findings, evaluating the watershed pollutant loads and receiving water responses under different hydrological conditions and, based on those summary findings, create recommendations for wet weather target setting. The following approach is intended as a starting point.

1. Provide guidance on estimating compliance with water quality standards when discharges are primarily a function of wet weather events including POTWs using a portion of their influent flow for reuse. This needs to include an evaluation of seasonable probability of water quality criteria exceedances for different types of targeted pollutants. The impact of nonpoint source pollution on the quality of receiving waters should also be considered.
2. Identify and define LTCPs or other approaches that will, on a site-specific basis, meet goals for receiving waters. This will likely entail an evaluation of (a) risk and affordability unique to discharges dominated or highly influenced by wet weather events; and (b) how designated use expectations may not be achievable under short-term, transient wet weather conditions.

3. Offer an evaluation of discharges where wastewater and partially treated stormwater are blended prior to discharge relative to designated uses and risks, but based on actual durations, frequencies, and magnitudes of exposure specific to wet weather events. This may include the use of indicators and metrics other than those adopted as water quality standards.

The target audience/end user will be any utility or municipality involved in blending, reuse, expensive upgrades/stringent limits, or LTCPs; or those accountable for meeting CWA goals when wet weather circumstances are a factor.

(Note: It is anticipated that this research activity will engage stakeholders from the onset of project planning to ensure successful outcomes)

Expected Deliverables

While this RFP encourages creativity and originality from proposers, possible deliverables based on past successes could include, but are not limited to:

- A stand-alone synthesis deliverable/report.
- A toolbox of techniques/tools/sustainable approaches and innovative solutions with accompanying fact sheet(s).
- A proposed framework or standardized approach and modifications of control strategies.
- Recommendations for establishing seasonal targets for receiving waters.
- Quarterly webcasts, conference presentations, virtual site-specific focus group meetings, and outreach activities engaging all water quality stakeholders.
- An interactive storyboard, video clips, infographics, etc.

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 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, nor is it a required list for consideration.

- Adler, R. A. 2013. "The Decline and (Possible) Renewal of Aspiration in the Clean Water Act." *Washington Law Review*, 88: 759-812.
- Atlas 14 – NOAA Precipitation Data https://cpo.noaa.gov/News/News-Article/ArtMID/6226/ArticleID/1858/NOAA-Atlas-14-Precipitation-Frequency-Atlas-of-the-United-States.
- Atlas 14- Water Utility Study https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/Water-Resources/Water-Utility-Study.
- GAO (U.S. Government Accountability Office). 2013. "Clean Water Act: Changes Needed if Key EPA Program Is to Help Fulfill the Nation's Water Quality Goals." Report to Congressional Requesters. GAO-14-80. GAO, Washington, DC. https://www.gao.gov/products/gao-14-80.

- EPA (U.S. Environmental Protection Agency). 2016. *A Practitioner's Guide to the Biological Condition Gradient: A Framework to Describe Incremental Change in Aquatic Ecosystems*. EPA-842-R-16-001. U.S. Environmental Protection Agency, Washington, DC.
- WRF project 4849 (ongoing): *Exploring Cost-Benefit Analysis of Post Long-Term Control Plan Approaches to Wet Weather Management*. https://www.waterrf.org/research/projects/exploring-cost-benefit-analysis-post-long-term-control-plan-approaches-wet.
- Zhang, H., and G. Padmanabhan. 2019. "Critical Condition Modeling and Analysis in TMDL Development and Implementation." *Journal of Hydrologic Engineering*, 24 (2).

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.

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/sites/default/files/file/2021-07/WebToolCriteria.pdf.

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 $200,000. 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 $200,000. **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 3:00 pm Mountain Time on Tuesday, September 28, 2021.

The online proposal system allows submission of your documents until the date and time stated in this RFP. Submit your proposal at https://forms.waterrf.org/212005649541854

Please ensure you upload the required documents before the deadline. **Proposals submitted after the deadline will not be accepted.**

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 at (571) 384-2109 or 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 an 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.)**

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