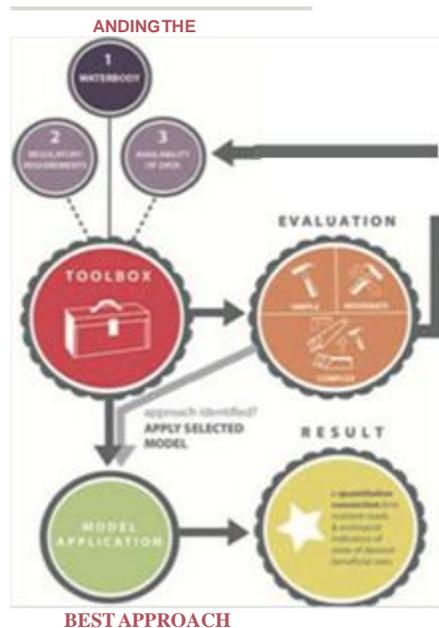


Fresh Science for CWA Section 304(a)(1) Responsibility

WERF PROJECT PROFILE:

Applicability Analysis of Existing Models for Site-Specific Water Quality Criteria to Protect Designated Uses from Nutrient Impacts (LINK1T11) *Principal Investigator: Joseph V DePinto, Ph.D., LimnoTech*

INPUT



* The Water Environment Research Foundation's research on modeling approaches to develop site-specific numeric nutrient water quality criteria is bringing fresh and enhanced science for local use by wastewater utilities and states under the federal Clean Water Act-Section 304(a)(1) responsibilities. The Clean Water Act mandates that water quality criteria be linked to biological indicators in receiving waters. This research creates a process that will provide a quantitative connection between nutrient loads and ecological indicators of water quality standards designated uses. State governments and their water quality agencies are the most immediate beneficiaries of this new research. It is these agencies which have the statutory responsibility to establish water quality standards -designated uses and numeric criteria, total maximum daily load allocations, nonpoint source targets for application of best management practices, and NPDES effluent limitations for local wastewater systems. This research is also centered on scientifically defensible methods for using all forms of scientific water quality data and information reflecting chemical, biological, and physical effects. WERF is working from the proposition that: efforts to derive statewide or regional criteria must recognize that the receiving waters' response to nutrient load often depends on site-specific characteristics such as morphology, turbidity, temperature, etc, all of which vary spatially and temporally. In other words, 'water quality is best judged in the stream'

The principal product of the project is to be a "Nutrient Impact Modeling Toolbox" designed to help local governments, utilities, states, and other stakeholders select modeling approaches based on a variety of factors: 1) types of waterbody; 2) biological, physical and chemical response indicators relevant to waterbody types; 3) data availability; 4) modeling options and limitations; 5) regulatory applications associated with the various modeling options for derivation of water quality standard criteria, total maximum daily load allocations, effluent limits for point sources; 6) targets for nonpoint source best management practices; and 7) data and information for nutrient source trading.

An inventory of nutrient-related ecological response indicators has been completed. All 50 states were surveyed with over 20 different indicators found.

Dissolved oxygen and pH were used by virtually every state. Most states used chlorophyll-a, water clarity, and macroinvertebrate community. The project team has recommended primary and secondary indicators for inclusion into the modeling toolbox. This research will be completed in March 2013 and will include guidance for model selection and data collection, considerations for regulatory application, and at least four case study demonstrations.

Collaborative Research Spotlight

The Targeted Collaborative Research (TCR) program enables WERF subscribers to maximize their investment when WERF engages multiple organizations in the projects. An example of a recent TCR initiative is the above research on modeling approaches to develop site-specific nutrient criteria for the derivation of numeric water quality criteria. Due to the broad applicability of the Modeling Toolbox, not only for treatment plants, but also for regulatory agencies, this project has generated much interest and support from wastewater utilities. To date, 25 organizations have pledged \$205,000 of the \$300,000 needed for this fast-track initiative. This has allowed WERF to complete an inventory of nutrient-related ecological response indicators in all 50 states, to develop the criteria and process for site-specific model selection, and to evaluate and incorporate considerations for regulatory application. Now, WERF is looking for other organizations to fund the remaining phase of this TCR—a demonstration of the process for several case study sites around the country.

How You Can Help

WERF needs an additional \$100,000 to complete the research by March 2013. Interested organizations can contact Jane Knecht at jknecht@werf.org or 571-384-2096.

"Site-specific, numeric water quality criteria for nutrients is an important issue for the Metropolitan Water Reclamation District of Greater Chicago (MWRD). This WERF research project will help by developing standards that will have positive water quality impacts and use unbiased science to inform the regulatory agencies."

**-David St. Pierre, MWRD
executive director**

WERF Crafting Site-Specific Tool To Help Assess Impacts Of Nutrient Loads

Posted: August 24, 2012

The Water Environment Research Federation (WERF), a research group dedicated to wastewater and stormwater issues, is crafting a tool to help state and other local officials select models for determining whether waterbodies are biologically impaired due to excess nutrients, a key issue in deciding whether they are subject to water quality standards.

Some sources say the effort could help set more scientifically and legally defensible site-specific load limits for water treatment facilities than the statewide criteria EPA has been urging states, like Florida, to adopt.

According to WERF materials, the group sent out a request for proposal (RFP) last October and recently awarded the project to environmental consulting firm Limnotech, Inc. WERF hopes to complete the work in March 2013 but according to the Summer 2012 edition of *WERF Progress*, the group is seeking an additional \$100,000 to complete the research by the target deadline.

A WERF spokeswoman did not respond to calls for comment by press time.

The project, titled "Applicability Analysis of Existing Models for Site-Specific Water Quality Criteria to Protect Designated Uses from Nutrient Impacts," is meant to aid states and others in selecting the most appropriate models for determining whether nutrients are causing adverse biological effects in waterbodies. *The RFP is available on InsideEPA.com. (Doc ID: 2408290)*

"Numerous models exist to establish loadings of contaminants, including nutrients in receiving waters. However, linking the loadings to physical, chemical and/or biological indicators of adverse impacts and still further, linking those indicators to designated uses remains a challenge and a need," WERF said in the RFP.

The issue is of critical importance for publicly-owned treatment works (POTWs) and other point source dischargers, which could be facing strict new discharge limits due to EPA's continuing push to require states to craft numeric water quality criteria for nutrients.

Many states and other critics say the agency's push to implement and adopt numeric criteria is overly stringent because the agency considers a waterbody to be impaired when it exceeds numeric criteria even if it is otherwise healthy or if the biological impairment is related to a different factor, such as habitat alteration. "Likewise, more restrictive numeric limits are then required in permits and dischargers will be required to install controls for one nutrient, such as nitrogen, when another nutrient, such as phosphorus, may be the most limiting," states and other critics said in a letter to EPA in 2011.

But acting EPA water chief Nancy Stoner has rejected the concern, saying that waiting until biological harms, such as increased algal growth, are present "ensures that [a waterbody's] designated use is already impaired before action is taken to reduce nitrogen or phosphorous loadings." She has also said that such an approach may be a violation of water act requirements that states ensure adequate effluent limits to prevent impairments.

Development of the tool comes as state regulators are criticizing EPA's recently-issued Nutrient Indicators Dataset -- a project meant to show state progress in developing statewide numeric nutrient criteria -- as failing to adequately take into account progress made in developing site-specific nutrient reduction criteria or biological impairment criteria.

Now WERF is developing a tool to help select models for better assessing biological harms from nutrients.

"The Clean Water Act mandates that water quality criteria be linked to biological indicators in receiving waters," WERF says. "This research creates a process that will provide a quantitative connection between nutrient loads and ecological indicators of water quality standards [and] designated uses."

In the October 2011 RFP, WERF said there are a number of models for establishing nutrient loads, but there remains a disconnect between loading concentrations and the applicable water quality standards and designated uses in a receiving water, which is required under section 304(a) of the CWA. Without that basis, the nutrient loads are legally and scientifically unfounded, and so the project is an attempt at creating a sound mooring for those nutrient loads.

"A significant knowledge gap exists regarding how water quality criteria for [nitrogen] and [phosphorus] should be developed; leaving all stakeholders in a position of unacceptable uncertainty on how to proceed," the WERF RFP says. "Numerous models exist to establish loadings of contaminants, including nutrients, in receiving waters. However, linking the loadings to physical, chemical and/or biological indicators of adverse impacts and still further, linking those indicators to designated uses remains a challenge and a need."

The final product that the WERF project will yield is a "Nutrient Impact Modeling Toolbox" that takes into account a receiving water's morphology, turbidity, temperature and other factors unique to that waterbody, and then produce appropriate methods and models for developing a criteria. The product will not itself yield a numeric criteria for nutrients, but rather provide an appropriate set of models for regulators to use based on certain inputs.

One source familiar with the project says it could potentially upend EPA's longstanding effort to have states develop statewide numeric criteria -- specific numeric limits for nitrogen and phosphorus concentrations that waterbodies have to meet in order to be considered unimpaired. For example, in the case of Florida, where EPA developed numeric criteria for the state as part of a 2009 consent decree with environmentalists, the agency developed numeric limits for

different eco-regions but did not necessarily demonstrate how the limits met the specific water quality standards in each waterbody segment.

"There's no cause and effect -- they skipped that process," the source says. "That's what the WERF project is about."

WERF added in *Progress* that the tool will be most useful to state environmental regulators immediately, and that they will be better able to establish "designated uses and numeric criteria, total maximum daily load allocations, nonpoint source targets for application of best management practices, and [National Pollutant Discharge Elimination System (NPDES)] effluent limitations for local wastewater systems" based on CWA requirements. -- *John Heltman*