WATER ENVIRONMENT RESEARCH FOUNDATION

Waterborne Microbes and Human Health (Pathogen)

Summary

Objective

To provide state-of-the-art methodologies, data, and user-friendly tools to evaluate potential human health risk from waterborne microbes to: inform the development of EPA's new recreational water quality criteria, and provide methods and strategies that address the needs of WERF subscribers.

Description

Water quality criteria for pathogens are commonly used by regulatory agencies to establish baselines for supporting designated uses. Such criteria also tend to drive decisions that underlie regulatory policies, priorities, and requirements that pertain to wastewater and stormwater management programs. Having accurate, quantitative information and robust data sets to support the development of appropriate criteria is important to WERF subscribers and their ratepayers.

It has been over 20 years since the current recreational water quality criteria were published. In the interim there have been substantial advances in the science. In 2007, EPA held a workshop that brought together 43 experts to describe the state of knowledge, identify gaps in the science, and prioritize the research needed to support development of new or revised water quality criteria by 2012. Using this information, EPA has developed and is pursuing a science plan to develop improved methods for detecting and quantifying indicator organisms and pathogens for human health, especially in coastal waters.

WERF's Pathogen Program Issue Area Team has developed a complimentary plan to address those gaps that are of particular importance to WERF subscribers, many of whom operate in non coastal environments. The attached table describes the plan. Key areas of research include robust data sets to support quantitative microbial risk assessment, indicators and exposure pathways in inland waters, and indicators in tropical and subtropical waters. The resulting methods, data, and tools will inform criteria development and support utility management decisions. Timely and useful information will be provided to EPA for use in the process of revising and updating ambient water quality criteria for recreational waters.

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WERF

Pathogen Program Status – January 26, 2009

Objective	Description	Status
A. Advance Quantitative Microbial Risk Assessment (QMRA) methodology and obtain data needed to support water quality criteria and other management decisions.	This study will quantify the risks from waterborne pathogens from a variety of sources. Field and lab studies will obtain existing data and fill in gaps in available information. These data will be used to provide inputs in to QMRA (quantitative microbial risk assessment) models, and other health risk management frameworks.	Ten proposals were received and a contractor has been chosen. Research is anticipated to begin in February 2009.
B. Improve the understanding of relationships among indicator organisms, pathogenic organisms, and human health risks.	This study would identify the best pathogen indicators and appropriate testing methods for waterborne pathogens, including but not limited to culture-based microbial detection/quantification and qPCR (quantitative polymerase chain reaction). The relationships among these different methods would also be assessed.	The direction of this project is under discussion within the advisory committee. A possible option is expansion of the scope of other research under the plan.
C. Address questions concerning secondary contact recreation, indicators, water quality criteria, and human health risks.	WERF has engaged an independent panel of ten experts to provide a technical review and comments on CHEERS: Chicago Health, Environmental Exposure, and Recreation Study. www.cheerschicago.org	The and final year of sampling has been completed and analysis of the data is underway.
D. Answer key questions concerning the relationships among indicator organisms, pathogenic organisms, and human health risks in tropical and subtropical climates.	The anticipated research would examine relationships between qPCR-based and culture-based test results, and identify appropriate pathogens and indicators in subtropical waters. Microbial source tracking using genetic markers, and analysis of predictive modeling of health impacts will be included.	A collaborative research project is in development involving the Florida Stormwater Association, FLDEP, WERF, and a university contractor.
E. Provide an analysis of research priorities to inform the development of water quality criteria for inland waters.	An invitational workshop on inland waters will bring together 25 experts to identify and prioritize research efforts that would support EPA's process of developing new recreational water quality criteria and lead to improve methods for use in characterizing and protecting inland waters.	The workshop is scheduled for February 2009. A survey was given to WERF subscribers and other contacts to solicit input on key workshop issues.
F. Facilitate the communication of WERF and other's research findings to stakeholders and serve as a conduit of information to WERF subscribers and EPA.	Options are being explored for ways to facilitate the sharing of research findings and experiences of researchers' conducting projects concerning microbial monitoring and human health. One possibility is the establishment of a web site to share information, and provide updates on EPA and WERF research results and progress.	Options for this project are under discussion within the advisory committee.