State-of-the-Science: Fecal Source Identification and Associated Risk Assessment Tools

Workshop Agenda
November 28-29, 2012

A workshop to be held at the Southern California Coastal Water Research Project Authority
3535 Harbor Blvd.
Costa Mesa, CA 92626

Workshop Rationale: Development of fecal source identification tools has provided new opportunities for improved beach management, including the ability to prioritize beaches having the greatest health risk based on known differences in pathogenicity among fecal sources. Fecal source identification abilities have also spurred development of new risk evaluation tools, such as quantitative microbial risk assessment (QMRA) and natural source exclusion (NSE), that are becoming part of the regulatory framework. However, the field of source identification is still evolving rapidly and the associated evaluation tools are in their infancy. This workshop is intended to summarize, and encourage audience discussion about, the state of knowledge regarding: 1) How accurate are present techniques for determining whether the fecal signature at a beach is human or non-human in origin, 2) What are the relative health risks associated between human and non-human fecal sources, and 3) What is the level of scientific uncertainty in using this information in a management context. The workshop will also serve to identify the research most needed to enhance the scientific foundation for each of these questions.

Target Audience: This workshop is intended for California's Beach Water Quality Working Group and the California Clean Beach Task Force. Other individuals interested in the science associated with beach management will be welcome on a space-available basis.

Approach: There will be four sessions over the course of two days, each lasting about three hours. The first two sessions address the scientific foundation for determining and interpreting sources of fecal contamination. The remaining two sessions will address scientific uncertainties associated with potential evaluation at beaches with non-human sources. Half the time in each session will be allocated to hearing talks by national experts, who will provide the latest scientific information on the topic. The second half will be devoted to a panel discussion in which the experts address a set of predefined questions (identified in the agenda), as well as those provided by the audience.

Session 1: How accurately can we distinguish between human and non-human fecal sources?

Dr. Charles Hagedorn, Virginia Tech –Current prospects for detecting human sources of fecal pollution

Dr. Ali Boehm, Stanford University - Differentiating between human and non-human sources using source-associated markers

Dr. Patricia Holden, UC Santa Barbara – Human indicator persistence in the environment

Dr. Yiping Cao, SCCWRP – Uncertainty issues relating to detection of human indicators

Five starting questions to stimulate the panel discussion
1) What methods are most reliable for differentiating human/non-human sources of bacteria?
2) How accurate are the best human marker methods?
3) How many samples are appropriate to characterize the extent of human fecal contamination at a site?
4) What are the conditions where source markers are less likely to work effectively?
5) What research is needed to adequately address the questions in this session?

Session 2: What do we know about the pathogenicity of non-human source microbes?

Dr. Nick Ashbolt, USEPA – Characterization of pathogens in non-human fecal matter

Dr. Jody Harwood, University of South Florida – Waterborne pathogens from non-human sources and their public health implications

Dr. Stefan Wuertz, UC Davis – Current status on quantifying sources of microbial contamination

Dr. Orin Shanks, USEPA - Uncertainty issues relating to detection of non-human indicators

Five starting questions to stimulate the panel discussion
1) Are pathogens from animal sources less pathogenic than those from human sources?
2) What is the relative risk associated with pathogens from various non-human sources?
3) Are present laboratory analysis methods sensitive enough to characterize pathogen presence at a site?
4) Which animal source(s) are the most compelling candidates for MST method development?
5) What research is needed to adequately address the questions in this session?

Session 3: How well does present science support the QMRA process?

Jeff Soller, Soller Environmental, LLC – Overview of QMRA

Dr. Stefan Wuertz, UC Davis – QMRA Case Study 1

Dr. John Griffith, SCCWRP – QMRA Case Study: Kiddie Beach

Dr. Nick Ashbolt, USEPA - Uncertainty issues relating to application of QMRA

Five starting questions to stimulate the panel discussion
1) What are the biggest scientific impediments at present to QMRA implementation?
2) How should uncertainty in QMRA calculations be interpreted?

3) How confident are we that eight pathogens are all that are needed to implement QMRA?
4) Are there some beaches that are less conducive to QMRA than others?
5) What research is needed to adequately address the questions in this session?

Session 4: How well does present science support the natural source exclusion process?

Ms. Shari Barash, USEPA – The conceptual basis for natural source exclusion

Dr. Jody Harwood, University of South Florida – Natural source exclusion case study: Reedy Creek, FL

Ms. Janet Hashimoto, EPA Region 9 – Hawaii's use of *Clostridium*: A form of natural source exclusion?

Dr. Mark Gold, UCLA - Is Santa Monica Pier a form of natural source exclusion?

Five starting questions to stimulate the panel discussion
1) What are the biggest scientific impediments at present to natural source exclusion implementation?
2) Are there sufficient case studies in place to serve as guides for source exclusion?
3) Are certain natural sources more amenable to natural source exclusion than others?
4) If NSE is adopted at a beach, what are the best monitoring metrics to ensure conditions haven't changed?
5) What research is needed to adequately address the questions in this session?

Day 2 Wrap-up
Discussion to prioritize research needs for addressing the questions from each session.