Stormwater Runoff Water Quality Science/Engineering Newsletter
Devoted to Urban/Rural Stormwater Runoff
Water Quality Management Issues

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This issue of the Stormwater Runoff Water Quality Science/Engineering Newsletter presents a summary of several aspects of the US EPA **National Beaches Conference**. The US EPA held the National Beaches Conference 2004 in San Diego, CA in mid October, 2004. This 2.5 day conference was primarily devoted to providing information on the current status of implementing the National Beach Quality Act (Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000) and related topics. This act (http://www.epa.gov/ost/beaches/beachbill.pdf) implements a national marine coastal and Great Lakes program designed to improve the sanitary quality of beaches for contact recreation.

This is the second Beach conference. The first was held in 1999. A summary of selected aspects of that conference was presented in NL 2-2. The topics covered at the 2004 Beach conference included,

Topics:

- water quality monitoring and public notification programs
- epidemiological studies
- volunteer monitoring
- education and public outreach
- rapid indicators techniques
- analytical methods for bacteria
- TMDLs for bacteria
- pollution control projects
- regulatory protection
- case studies of successful projects components of a beach program
- updates to new EPA and state research (e.g., rapid methods, etc.)

The 2004 conference proceedings will be of interest to those interested in sanitary quality of urban and rural stormwater runoff as it impacts beach closures. While the focus of the national Beach Quality Act was coastal marine and Great Lakes beach water quality, many of the conference presentations provided information that is applicable to inland fresh water beach sanitary quality. During the period between the two national Beach conferences (1999 to 2004) considerable progress has been made in better understanding the sanitary quality issues of contact recreation.

The 2004 Beach Conference agenda is attached. The proceedings for this conference are being prepared and is expected to be available in a few months. Those interested in obtaining a copy of the proceedings may contact Shannon Prendergast of TetraTech, Inc. at shanndi@tetratech-ffx.com.

A brief summary of some of the presentations made at the conference are presented below.

In 1986 the US EPA presented the results of beach sanitary quality studies that related water pathogen indicator concentration to the incidence of human illness of those using a beach. These studies led to the US EPA adopting a national requirement that states adopt E. coli (fresh water) and enterococci (marine waters) as sanitary quality indicators and to control the concentrations of these organisms to specified limits. These studies also showed that fecal coliforms are not a reliable indicator of the potential for acquiring an enteric (diarrhea) and other disease (upper respiratory, ear and eye infections, skin rashes. etc.) associated with contact recreation in the water.

Several presenters at the conference reported that both E. Coli and enterococci can reproduce in the environment and thereby cause elevated concentrations in some beach waters. However, Dr. Elizabeth Alm of Central Michigan University reported that several of the human enteric pathogens also reproduced in beach sands.

It has also been found that the highest concentrations of these organisms was found in beach water sampling for samples that were taken a ankle depth. Samples taken in deeper waters typically had lower concentrations of pathogen indicators than the samples taken at ankle depth.

It was reported by several investigators that higher concentrations of these organisms are found in samples taken in the morning vs afternoon. This difference is apparently due to UV destruction of pathogen indicators that occurs during the day.

Another comment made by several was the problem associated with an elevated concentrations of pathogen indicators causing a beach posting and closure that subsequently associated with next day resampling shows that the elevated indicators was transitory. However, the beach closure beyond that needed to protect public health has resulted in a significant economic loss to the area. Further the time between when the samples are taken and the laboratory results are available that lead to a beach closure may have exposed beach users to excessive pathogen indicators and the potential for disease. There is need for and current research is developing more rapid analysis of pathogen indicators to get to closer to real time beach posting and closure and removal of posting/closure notices.

Several of the presenters provided information that demonstrated that urbanization of a stream watershed led to increased frequency of pathogen indicator organism sanitary quality water quality standards violations. Often the source of human origin were leaking sanitary sewerage system that was adding raw sewage into the separate storm sewer system.

Denise Keehner, Director of the Standards and Health Protection Division in the Office of Science and Technology in the Office of Water discussed, Beach Act Actions: 2000-2004 and Beyond." This presentation was devoted to the US EPA current and proposed

implementation of the Beach Act requirements where she indicated that the purpose of the US EPA Beach Program is the elimination of beach closures. She indicated that high priority areas are source tracking, need for better integration with water quality standards program, more cooperative efforts with states, and the need for more rapid indicators. She also indicated that more rapid tests would lead to the need to do more testing and source identification. This will lead to more pressure to control sources of fecal contamination.

Dr. Joan Rose, Homer Nowlin Chair in Water Research at Michigan State University presented a plenary lead off on "Waterborne Pathogens and Indicators: A pathway Forward" an overview of the current status of science in investigating waterborne pathogens. Her review will be of interest to many who are concerned with sanitary quality of contact recreation.

Matthew Liebman of the US EPA Region 1 presented "EPA Overview: Current National Requirements, Guidance and Hot Issues." This review provides information on current national beach water quality management requirements.

Dr Gerard N. Stelma Jr. and George Santo Domingo of the US EPA presented a review of the US EPA Guidance Manual on Source Identification. This manual is under development and is expected to be available by the end of 2004, it will be posted on the US EPA website. As part of controlling the sanitary quality of a water it is often important to identify the source of the fecal pollution such as human vs animal and the type of animal. Today there are a variety of methods to help identify the source of fecal indicators organisms that cause violations of sanitary quality water quality standards violations. This manual provides information on many of the methods and the methods applicability. The information is based on a collaborative efforts of many of the experts in this field.

A session of the conference was devoted to pathogen indicator organism (E. coli and enterococci) source identification where several source identification studies were reported. There is a tendency for some to claim that the violations of sanitary quality standards is due to birds or wild and or domestic animals. While this is the situation at some locations, source studies have shown often human fecal organisms are contributing to the violation. In general with few exceptions if there is a violation of the US EPA pathogen indicator organisms recommended standards, it is likely that human fecal wastes are a contributor to the violations. There is growing consensus that associated with a violation of pathogen indicator organism standards should lead to a sanitary survey and upstream sampling to define the potential/existing sources of pathogen indicator organisms. Only through comprehensive studies is it possible to conclude the violations of the pathogen indicator organism water quality standards violations are of no or limited human health significance.

Stephen Schaub of US EPA discussed "Criteria Development: Beach Act Requirements and Schedule," The Year 2000 Beach Act Amendments to the Clean Water Act requires the US EPA to prepare new or revised 304(a) Ambient Water Quality Criteria for

Recreational Waters by October 2005. This effort is to develop revised analytical methods focusing on rapid (<2 hour) analysis. Revised criteria are being developed for freshwater based on the results of the new studies. The results will be made available for public review prior to adoption. States will have three years to adopt these criteria into state standards. Marine criteria revisions are many years away. US EPA is developing an updated approach for developing human health criteria.

It was acknowledged that there is need to expand Beach Program to address viral and enteric protozoan caused diseases since these types of organisms are also causing human disease through contact recreation.

Shannon Briggs of the State of Michigan provided information on the state of Michigan beach closure management program. She discussed the email server list system that the state has developed as being effective for communication on beach closures. She also discussed the States data management system for beach closures. Ms Briggs indicated the need to better understand the risk of water quality standards violations that are caused by animals.

Dr. Mark Gold of Heal the Bay Santa Monica, CA discussed the need for consistency in Beach program implementation. He indicated a need for monitoring at least weekly, and daily in high use and high risk areas. He expressed the view that closing of beaches should occur after a sewage spill that could impact a beach. He further stressed the need to greatly expand funding for work on sanitary quality of beaches.

Dr. Rachael Noble of the University of North Carolina, Chapel Hill echoed the need for additional funding and the need to coordinate shellfish sanitary quality and beach water quality. She indicated the need to do epidemiological studies with certain groups of high risk individuals such as surfers.

Monica Mazur Orange County Environmental Health, CA discussed the problem that local health department have in managing/using large amounts of sanitary quality data. She questioned whether having faster analytical methods would be useful at the local operating health department level. This data could lead to more beach postings and closures.

John Norton of the CA Water Resources Control Board discussed the need to level the playing field so that all states/areas are conducting the same monitoring and posting program. He indicated that those agencies that do a good job are penalized by gaining a reputation as having polluted beaches. He stated the current US EPA approach for monitoring is deficient in that there is need to add distance to beach closure listings to give information on magnitude of listing. Mr. Norton said that there is need for better reporting of sewage caused beach closures to help to get better control of sewerage systems integrity.

There was a discussion about the situation where some city officials do not want to know what's in the water since beach closures result in lost tourist revenue.

Robecca Caldren of US EPA Beach Program research pointed out that the National Beach Act is an unfunded mandate where the Agency has gained additional responsibility for research without any additional funding.

AGENDA
National Beaches Conference
October 13-15, 2004
San Diego, California

Tuesday, October 12, 2004

5:00 – 7:00 **Early Bird Registration**
Hotel Lobby

Wednesday, October 13, 2004

7:30 – 5:00 **Registration**
Grand Ballroom Lobby

8:00 **Registration**
Grand Ballroom Lobby

8:30 – 9:50 **Session I: Welcome & Plenary Speakers**
Moderator – Beth LeaMond, U.S. Environmental Protection Agency
Salon D&E

8:30 – 8:45 San Diego Welcome
Donna Frye, City Councilmember, City of San Diego

8:45 – 9:00 EPA welcome
Wayne Nastri, U.S. Environmental Protection Agency

9:00 – 9:25 Plenary Speaker - Beach Act Actions: 2000–2004 and Beyond
Denise Keehner, U.S. Environmental Protection Agency, Office of Science and Technology

9:25 – 9:50 Plenary Speaker: Waterborne Pathogens and Indicators: A Pathway Forward
Joan Rose, Michigan State University

9:50 – 10:20 **Break**

10:20 – 12:00 **Session II: State and Local Experiences In Implementing Beach Monitoring & Notification Programs**
Moderator - Janet Hashimoto, U.S. Environmental Protection Agency
Salon D&E

10:20 – 10:40 Hawaii Watershed Initiative and Clean Beaches
Carl Berg, Hanalei Watershed Hui

10:40 – 11:00 Florida's Healthy Beaches Monitoring Program
Bart Bibler, Florida Department of Health

11:00 – 11:20 Surf and Turf: Developing Partnerships for Maine's Beaches
Esperanza Stancioff, University of Maine Cooperative Extension/ Sea Grant

11:20 – 11:40 Incorporating the Bacterial Indicator Enterococci in Marine Beach Water Quality Monitoring Programs
Clay Clifton, County of San Diego

11:40 – 12:00 Washington State's Beach Environmental Assessment, Communication, and Health {BEACH} Program
Lynn Schneider, Washington State Department of Ecology

12:00 – 1:20 Lunch
On Own

1:20 – 2:50 Session III: Design of Beach Monitoring Programs
Moderator - Matthew Liebman, U.S. Environmental Protection Agency
Salon D&E

1:20 – 1:30 EPA Overview: Current National Requirements, Guidance And Hot Issues
Matthew Liebman, U.S. Environmental Protection Agency

1:30 – 1:50 Public Health Protection at Marine Beaches: A Model Program for Water Quality Monitoring and Public Notification
Mitzy Taggart, Heal the Bay

1:50 – 2:10 Comparison And Verification Of Bacterial Water Quality Indicator Measurement Methods Using Ambient Coastal Water Samples
John Griffith, Southern California Coastal Water Research Project

2:10 – 2:30 Composite Sampling as an Alternative Technique for the Determination of Bacterial Indicators in Recreational Waters
Julie Kinzelman, City of Racine

2:30 – 2:50 How Often and Where To Monitor: Outcome Of The EMPACT Study
Larry Wymer, U.S. Environmental Protection Agency

2:50 – 3:20 Break

3:20 – 5:00 Session IV: The Public Notice Decision Process and Public Perception
Moderator - Robin McCraw, California State Water Resources Control Board
Salon D&E

3:20 – 3:40 Source Unknown: Questionable Geometric Mean Exceedances at Two Pristine North Carolina Beaches
J.D. Potts, North Carolina Department of Environment and Natural Resources

3:40 – 4:00 Misinformation in Beach Warning Systems
Stanley Grant, University of California at Irvine

4:00 – 4:20 The Cost of Beach Water Monitoring Errors in Southern California
Linwood Pendleton, University of California at Los Angeles

4:20 – 4:40 Communication: Increasing Public Awareness about Beaches
Harry Simmons, American Shore and Beach Preservation Association

4:40 - 5:00 Question & Answers: How can we improve the beach warning decision process?

6:00 – 8:00 Poster Session
Sponsored by American Shore & Beach Preservation Association
Ballroom Foyer & Sierra 5/6
Conference participants are invited to convene for light refreshments and discussion. Over thirty displays prepared by scientists and industry experts will be presented. Light refreshments and a cash bar will be available.

Thursday, October 14, 2004

Concurrent Track I: Identifying and Solving Beach Water Quality Problems

7:30 – 5:00 **Registration**
Grand Ballroom Lobby

8:00 **Registration**
Grand Ballroom Lobby

8:00 – 9:40 **Session V: Source Identification**
Moderator – Don Killenger, Cuyahoga County Board of Health
Salon A/B/C

8:00 – 8:20 EPA Guidance Manual on Source Identification
Gerard Stelma, U.S. Environmental Protection Agency

8:20 – 8:40 Tiered Approach for Identification of a Human Fecal Pollution Source at a Recreational Beach: Case Study at Avalon Bay, Catalina Island, California
Alexandria Boehm, Stanford University

8:40 – 9:00 Fecal Source Identification with Bacteroidetes Molecular Markers
Katharine Field, Oregon State University

9:00 – 9:20 Using Microbial Source Tracking in New Hampshire: Applications, Results and Challenges
Stephen Jones, University of New Hampshire

9:20 – 9:40 Replication of *E. coli* in Sand at a Temperate Freshwater Beach
Elizabeth Alm, Central Michigan University

9:40 – 10:20 **Break**

10:20 – 12:00 **Session VI: TMDLs**
Moderator - Jim Pendergast, U.S. Environmental Protection Agency
Salon A/B/C

10:20 – 10:40 A Watershed Scale Approach for Developing a Bacterial TMDL in an Urbanizing Puget Sound Embayment
Christopher May, Battelle Marine Science Laboratory

10:40 – 11:00 Improving Beach Water Quality through TMDLs: A Case Study of Santa Monica Bay Beaches
Renee DeShazo, Los Angeles Regional Water Quality Control Board

11:00 – 11:20 Delisting of Recreational Beaches on the 303(d) List for Exceedances of Bacterial Water Quality Standards
Lisa Kay, MEC-Weston Solutions, Inc.

11:20 – 12:00 Question & Answer: How can we improve the remediation process?

12:00 – 1:20 **LUNCH**
Pavillion
Linking the Oceans and Human Health: Perspectives from the U.S. Commission on Ocean Policy and the new NOAA OHH Initiative

Paul Sandifer, National Oceanic and Atmospheric Administration

Sponsored by Idexx Laboratories

1:20 – 3:00 Session VII: Remediation Approaches
Moderator: Holly Wirick, U.S. Environmental Protection Agency
Salon A/B/C

1:20 – 1:40 California's Clean Beach Initiative
Mark Gold, Heal the Bay

1:40 – 2:00 EPA's Clean New England Beaches Initiative and Flagship Beaches
Matthew Liebman, U.S. Environmental Protection Agency

2:00 – 2:20 The Effectiveness of Spatial Distribution Studies in the Development of Successful, Cost-Effective, Targeted Remediation Efforts
Julie Kinzelman, City of Racine

2:20 – 2:40 Utilizing Storm Water Monitoring To Assess Beach Water Quality
Jill Lis, Cuyahoga County Board of Health

2:40 – 3:00 Diversion is the Solution to Pollution, So Far
Cathy Chang, Santa Monica Bay Restoration Commission

3:00 – 3:20 BREAK

3:20 – 5:00 Session XI: Plenary Panel Discussion
Introduction from Terry Tamminen, Secretary for Environmental Protection, Cal/EPA
Moderator - Steve Weisberg, Southern California Coastal Water Research Project
Salon D/E

Panel
- Jim Pendergast or Denise Keehner, U.S. Environmental Protection Agency
- Shannon Briggs, Michigan Department of Environmental Quality
- Rachel Noble, University of North Carolina at Chapel Hill
- Mark Gold, Heal the Bay
- Monica Mazur, Orange County Environmental Health

Thursday, October 14, 2004

Concurrent Track II: Changes on the Horizon

7:30 – 5:00 **Registration**
Grand Ballroom Lobby

8:00 **Registration**
Grand Ballroom Lobby

8:00 – 9:40 **Session VIII: Making Warning Systems More Rapid: Modeling and Rapid Methods**
Moderator - Steve Weisberg, Southern California Coastal Water Research Project
Salon D/E

8:00 – 8:20 A Regional Nowcast Model for Southern Lake Michigan Using Data Readily Available to Beach Managers
Richard Whitman, U.S. Geological Survey

8:20 – 8:40 Predicting the Need for Beach Closures in Real Time: Statistical Approaches and their Applicability to the Lake Michigan Shoreline
Greg Olyphant, Indiana University

8:40 – 9:00 High Frequency Radar Provides Real Time Data for Enhancing Beach Monitoring Programs
Eric Terrill, Scripps Institution of Oceanography

9:00 – 9:20 Rapid Measurement of Bacterial Fecal Pollution Indicators at Recreational Beaches by Quantitative Polymerase Chain Reaction
Richard Haugland, U.S. Environmental Protection Agency

9:20 – 9:40 Recreational Water Testing by Rapid, High-Throughput Real Time Quantitative PCR (QPCR) for Fecal Indicators
Jack Paar and Mark Doolittle, US Environmental Protection Agency

9:40 – 10:20 **Break**

10:20 – 12:00 **Session IX: New Health Risk Indicators**
Moderator - Rebecca Calderon, U.S. Environmental Protection Agency
Salon D/E

10:20 – 10:40 Comparative Testing of Rapid Microbiological Indicator Methods for Marine Recreational Water Monitoring
Stephen Weisberg, Southern California Coastal Water Research Project

10:40 – 11:00 Assay and Remote Sensor Development for Molecular Biological Water Quality Monitoring
Kelly Goodwin, National Oceanic and Atmospheric Administration (NOAA)

11:00 – 11:20 Quantification of Enterovirus in Seawater at Imperial Beach, CA using real-time RT-PCR
Rick Gersberg, San Diego State University, School of Public Health

11:20 – 11:40 Rapid Detection of Enteroviruses in Environmental Samples using Real-time Quantitative Reverse Transcriptase PCR
Rachel Noble, University of North Carolina at Chapel Hill

11:40 – 12:00 Male-Specific Coliphages as Indicators of Fecal Pollution in Coastal Recreational Waters
Greg Lovelace, University of North Carolina at Chapel Hill

12:00 – 1:20 LUNCH
Pavillion
Linking the Oceans and Human Health: Perspectives from the U.S. Commission on Ocean Policy and the new NOAA OHH Initiative
Paul Sandifer, National Oceanic and Atmospheric Administration

Sponsored by Idexx Laboratories

1:20 – 3:00 Session X: Quantifying Swimmer Risk
Moderator - Al Dufour, U.S. Environmental Protection Agency
Salon D/E

1:20 – 1:40 EPA national Epidemiology Study
Timothy Wade, U.S. Environmental Protection Agency

1:40 – 2:00 Mission Bay Epidemiology Study
Jack Colford, University of California at Berkeley

2:00 – 2:20 Risk Perception Bias and Self Reported Symptoms
Jay Fleischer, NOVA Southern University

2:20 – 2:40 Criteria Development: Beach Act Requirements and Schedule
Stephen Schaub, U.S. Environmental Protection Agency

2:40 – 3:00 Question & Answer

3:00 – 3:20 Break

3:20 – 5:00 Session XI: Plenary Panel Discussion
Introduction from Terry Tamminen, Secretary for Environmental Protection, Cal/EPA
Moderator - Steve Weisberg, Southern California Coastal Water Research Project
Salon D/E

Panel
- Jim Pendergast or Denise Keehner, U.S. Environmental Protection Agency
- Shannon Briggs, Michigan Department of Environmental Quality
- Rachel Noble, University of North Carolina at Chapel Hill
- Mark Gold, Heal the Bay
- Monica Mazur, Orange County Environmental Health

Friday

7:30 – 12:00 **Registration**
Grand Ballroom Lobby

8:00 **Registration**
Grand Ballroom Lobby

8:10 – 9:50 **Session XII: Data Management and Communication**
Moderator – Charles Kovatch, U.S. Environmental Protection Agency
Salon D/E

8:10 – 8:30 eBeaches
Charles Kovatch, U.S. Environmental Protection Agency

8:30 – 8:50 Managing, Storing and Sharing Beach Monitoring Data
Bill Geake, Windsor Solutions

8:50 – 9:10 Leveraging Technology for Effective Beach Management
Eric Sacon, Rhode Island Department of Health

9:10 – 9:30 Experience of Delaware
Dennis Murphy, Delaware Department of Natural Resources & Environmental Control

9:30 – 9:50 Experience of Massachusetts
Tom Hinchliffe, Massachusetts Department of Public Health

9:50 – 10:20 **Break**

10:20 – 11:40 **Session XIII: Communicating Beach Condition to the Public**
Moderator: Toni Glymph, Wisconsin Department of Natural Resources
Salon D/E

10:20 – 10:40 Heal the Bay's Beach Report Card®: Communicating Complex Water Quality Issues and Improving Public Health
James Alamillo, Heal the Bay

10:40 – 11:00 Methods for Assessing Beach Management Policy Effectiveness
Sharyl Rabinovici, U.S. Geological Survey

11:00 – 11:20 NRDC
Mark Dorfman, Environmental Research and Education

11:20 – 11:40 So Many Report Cards, So Little Information
Steve Aceti, California Coastal Coalition

11:40 – 12:00 **Session XIV: Conference Wrap Up**
Salon D/E
Workshop Summary and Future directions of the EPA BEACH Program
Denise Keehner, U.S. Environmental Protection Agency, Office of Science and Technology