



# BEACH

# Currents

State and Local Beach Health Innovations and Success Stories

Summer 2006

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Beach Currents is designed to promote communication among state, tribal, and local public health officials about beach protection activities. This third edition features Connecticut's and Washington's beach programs. We encourage all beach management professionals to submit articles sharing their successes and challenges. To submit an article or to get more information about the EPA Beaches Program, call 202-566-0444 or send an e-mail to [ost-beaches@epa.gov](mailto:ost-beaches@epa.gov).

## Connecticut Implements the Beach Grant

When the BEACH Act Grant arrived at the Connecticut Department of Public Health (CT DPH), we rediscovered the old truth that the best way to escape a problem is to knuckle down and solve it. Before we could power up the GPS units, we had to answer the one question that is still kicking sand in everyone's face, "What's a beach?" The answer was right at hand: identify where most people swim in Long Island Sound. We track 63 marine public bathing areas that are regulated and monitored by 21 local health departments along our shoreline, as well as four state park marine beaches overseen by the Connecticut Department of Environmental Protection (CT DEP). Each of these beaches (comprising 144 sampling stations) is regulated under a published set of guidelines that spell out how they should be monitored and when they should be closed.

Because the grant draws a sharp distinction between supposing and knowing, we knew



Ocean Beach Park, New London, Connecticut.

that we couldn't wait for success to catch up with us while we plunged ahead in the early months—and it did require months to figure out our larger game plan. To get started, we needed to touch base with the local recreation and health departments along the shoreline, because they knew where the beach end points were. Soon we had our baseline location data for the beaches and sampling stations. But that was just the beginning.

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Niantic boardwalk.

We work with 24 municipalities, another state agency, and our state laboratory to implement the grant. Our meetings for shoreline public health officials are an integral part of the overall program as we gather everyone under one roof twice a year to answer questions and explain the grant as it evolves. These meetings are tied directly to a steady improvement in data quality over the past 3 years. For instance, we review the mechanics and intent of our annual EPA Beach Survey, which collects notification data. We also cover the role of our state laboratory and its essential courier service that handles marine water sample collection and testing.

Our laboratory sends us monitoring data as text files directly from its Laboratory

## Region 10 Dive Team

EPA's Region 10 Dive Team provides scientific, polluted-water diving services to the Region through inspections, sampling, surveys, contract oversight, and long-term monitoring. More than 30 years ago at the Federal Water Pollution Control Administration, several divers developed a team to support their agency's need for scientific diving expertise in contaminated water. Now EPA has a dive team supporting Superfund work,

Information Management (LIM) system. We use software embedded in a custom database application developed in-house to extract the monitoring results of interest to EPA for the grant. Shortly after we process the monitoring data for local storage, we start receiving the completed EPA Beach Surveys from the local health departments and CT DEP. We store this notification data with the monitoring data. We use our own software for its flexibility and because it allows us to quickly build datasets in response to occasional requests for beach data from other state agencies, nongovernmental organizations, and individuals. We can also use GIS to display monitoring and notification data graphically.

The final steps for our data in their journey from Connecticut to EPA have been the most challenging. This is where we waited the longest for success to catch up with us. Here I am referring to forwarding the notification and monitoring data to EPA's two archive databases, PRAWN and STORET. It takes a unique blend of patience, work, and skill sets to play this last inning of the data game. When we did finally succeed, I was reminded of something Mark Twain wrote, "Apparently there is nothing that cannot happen."

*Jon Dinneen, Connecticut Department of Public Health*

Clean Water Act work, and other related EPA offices, agencies, and governments.

The dive team works on a variety of projects, including surveys of contaminated sediment capping, criminal investigations of illegal dumping or discharge sites, outfall surveys, and biological surveys. EPA's Region 7 called on the Region 10 Dive Team to help recover parts of the Columbia Space Shuttle, which

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disintegrated upon re-entry in February 2003. The divers searched the bottom of the Toledo-Bend Reservoir near Jasper, Texas, in low- or zero-visibility conditions by sweeping the bottom with their legs and arms to locate suspicious objects. The reservoir hides a submerged forest, so divers had to be careful of the threat of entanglement with trees, horizontal logs, and stumps.

Divers are increasingly aware of problems of diving in contaminated water, and most commercial diving companies now recognize the need to protect their divers. There have been links of diver exposure to illness. Stories have even been reported of divers getting cancer (San Diego Harbor Patrol, Michigan Police, Israeli Navy). The waters contain things like Pfiesteria, swimmer's itch, Acanthamoeba Keratitis, Trbutyltins, PCBs, and drug wastes. In addition, pollution is usually more concentrated in areas where EPA divers go because of outfalls, unregulated discharges, and direct discharges from ships, docks, and industrial facilities. Because of these health risks, the Region 10 Dive Team has developed several important standard operating procedures (SOPs) to protect its divers.

## Rapidly Measured Indicators of Recreational Water Quality Are Predictive of Swimming-Associated Gastrointestinal Illness

The BEACH Act requires EPA to conduct research to provide the support of new criteria for recreational waters. Standard methods that measure recreational water quality require at least 24 hours before results are available, making it impossible to assess the quality of water within a single day. Timothy Wade, Rebecca Calderon, Elizabeth Sams, and Ann Williams of the National Health and Environmental Effects Research Laboratory, Human Studies Division, EPA; Michael Beach of Parasitic Diseases, Centers for Disease Control and Prevention; and



Decon of diver; at McCormick and Baxter—part of Portland Harbor SF clean-up project, Oregon.

One of the key SOPs is for decontamination (called decon). The Region 10 dive team has different SOPs for decon after exposure to biological hazards versus chemical exposure. Some elements of these SOPs include always rinsing with clean freshwater before removing gear, disposing of drygloves after each dive, establishing hot and clean zones on the dive platform, washing clothes separately that have been on the dive platform, and not taking work-related, dive gear home. For more information on EPA's diving SOPs and the Region 10 Dive Team, see [yosemite.epa.gov/R10/OEA.NSF/webpage/Dive+Team](http://yosemite.epa.gov/R10/OEA.NSF/webpage/Dive+Team).

Kristen Brenner and Alfred Dufour of the National Exposure Research Laboratory, EPA have been developing rapid methods to measure microorganisms. Santo Domingo et al. in 2003 developed a modified version of polymerase chain reaction (PCR), called Quantitative TaqMan PCR (QPCR—Applied Biosystems, Foster City, CA), to quantify indicator bacteria in recreational waters in 2 hours or less. Because these methods provide a faster assessment of water quality, they have the potential to significantly reduce ill-

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nesses resulting from exposure to recreational waters and to reduce errors in beach closings or public notifications.

By using these rapid methods, officials could give considerably more accurate and timely assessments of recreational water quality. The authors conducted a prospective cohort study of beachgoers at two beaches in the Great Lakes region. One beach was in the Indiana Dunes National Lakeshore, in Indiana on Lake Michigan, and the second was near Cleveland, Ohio, on Lake Erie. The study consisted of a health survey of beachgoers and water-quality evaluation. The beaches were selected specifically because they were affected by discharges from waste treatment plants. The purpose of the study was to examine the association between recreational water quality, obtained using rapid methods, and gastrointestinal (GI) illness after swimming. Beachgoers were asked about swimming and other beach activities and 10–12 days later were asked about the occurrence of GI symptoms. GI illness was defined as any of the following: diarrhea (three or more loose stools in a 24-hr. period),

vomiting, nausea and stomachache, and nausea or stomachache that affect regular activity (inability to perform regular daily activities).

The authors tested water samples for *Enterococcus* and *Bacteroides* species using the PCR method. They observed significant trends between increased GI illness and *Enterococcus* at the Lake Michigan beach and a positive trend for *Enterococcus* at the Lake Erie beach. The association remained significant for *Enterococcus* when the two beaches were combined. They observed a positive trend for *Bacteroides* at the Lake Erie beach, but no trend was observed at the Lake Michigan beach. *Enterococcus* samples collected at 8:00 a.m. were predictive of GI illness that day. The association between *Enterococcus* and illness strengthened as time spent swimming in the water increased. This is the first study to show that water quality measured by rapid methods can predict swimming-associated health effects. The full article can be found in *Environmental Health Perspective* 114:24–28 (2006). DOI:10.1289/ehp.8273 available via <http://dx.doi.org/>.

## Floating on a Wave

The noise of the ocean becomes muffled as I pull the hood of my wetsuit over my head. Picking up my board, I run for the surf. “It’s now or never,” I tell myself as I try to pick the perfect moment to paddle out. Stroking hard, I dive under the crest of the first breaking wave. “It’s got more power than it looks,” my buddy shouts from the line up. As if I need a reminder. Stroking harder, I barley make it over the second and third waves. I’m out. I’m scared.

Just a few hundred yards from the chaotic mess of the North Pacific, the Cove, as most call it, is a slightly protected beach that sits just inside the mouth of Grey’s Harbor, Washington. It’s an interesting wave—commonly referred to as



a shore-break—where it crashes abruptly on the shore. When it’s big, it’s hollow, cold and has no mercy.

“See, the paddle’s not that bad,” my buddy shouts at me trying to ease my nerves. “It’s never that bad!” I shout back, reminding him,

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and myself, what this place is capable of. The Cove and I have an interesting relationship. This is the place I broke my first board, and this is the place that is responsible for the scar on my left cheek. The sound of a thunderous breaking wave in the background sends a slight chill creeping across my back.

There's a lot that surfers at the Cove have to worry about. With more and more people from Seattle making the 2.5-hour drive, this place can get crowded. Inexperienced surfers often paddle out without knowing how dangerous it is and make it even more dangerous for others. Localism here is some of the fiercest on the west coast. It's not uncommon to get intentionally "stuffed" on a big wave by an angry local. If that isn't enough to worry about, the Cove is also home to Westport's wastewater treatment plant outfall. The plant is an old one that has had trouble in the past. It has already undergone upgrades and is scheduled for more soon. Knowing that improvements at the plant have already occurred helps me feel better.

"Outside!" someone suddenly yells as everyone starts paddling out to sea with hopes of not being crushed under the massive approaching waves. With the waves stacked on the horizon like enormous freight trains, my stomach bottoms out. Paddling as hard as I can, my heart is beating in my throat. Going up the first wave, I'm safe; it's now the second one I'm worried about. Looking behind me, the first wave breaks, takes out half the surfers in the water, and lets out a deep thunder

that even people on the beach can feel. The second wave approaches. There's a moment of silence as we all watch the second wave grow. It keeps growing as it gets closer.

*Feeling like I just scored the winning goal at a World Cup game, I am congratulated on my accomplishment. The wave of the day and all my other worries are temporarily nonexistent.*

"Its all yours!" my buddy yells as he and everyone else realizes that I'm the only one out there in perfect position to catch it. "YEAH! GO! GO!" everyone else starts yelling at me. In moments like these, you don't have a lot of time to think. I spin my board toward shore, take a deep breath and start paddling. The wave lifts me skyward; I close my eyes, push away from my board, and attempt to stand on my feet. I'm momentarily airborne, and my feet somehow manage to place themselves perfectly under the board. I'm up!



The bottom of the wave looks so far away. I feel the mountain of water begin the chase. Pushing hard with both legs at the trough of the wave, I duck my head to miss the curtain of the toppling mountain. Silence. Tunnel vision sets in. "It's all over," I think to myself. A hallway of flowing water now surrounds me.

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The light begins to grow, getting brighter and brighter. Gaining speed and with water going everywhere, the wave shoots me out from its belly. I launch my board into the air behind the back of the closing wave and give out a shout of pure joy. Hoots and hollers come from a few fellow surfers who saw what I had just done.

Feeling like I just scored the winning goal at a World Cup game, I am congratulated on my accomplishment. The wave of the day and all

my other worries disappear. It was a 5-second ride at most, and suddenly the 5 hours in the car, dodging beginners, avoiding the locals, and fears of the pollution become worth every second. At moments like these, I am reminded of why I do what I do. Floating on a cloud is often the metaphor used to describe pure happiness.

I say floating on a wave is better.

*Ryan McEliece, Department of Health and Ecology, Washington state.*

**T**he Cove is known for its easy drive-up access and free parking, making it a popular beach year-round. Surfers especially love the beach for its fast and powerful waves. In the summer months, 200 to 500 visitors arrive each week. Winter months might see as many as 200 surfers in the water on a week with good waves, plus many more visitors on the beach.

In 2005, the BEACH Program sampled this beach from mid-May to mid-September and again November to December. Surfers visit the BEACH Program Web site ([www.doh.wa.gov/beach](http://www.doh.wa.gov/beach)) to make sure the beach is open before driving the 2.5 hours from Seattle. Their slogan is, "Surf before you surf!" The Washington State Department of Health and Ecology runs this collaborative effort. Its BEACH Program pulls together county, tribal governments and dedicated volunteers to actively monitor water quality of beaches throughout the state.



## Calendar of Events

October 11–13, 2006

### National Beaches Conference

Niagara Falls, NY

The National Beaches Conference is being co-sponsored by EPA and the Great Lakes Beach Association (GLBA). For additional information, visit the conference Web site at [www.tetrattech-ffx.com/beach\\_conf2006](http://www.tetrattech-ffx.com/beach_conf2006).

October 21–26, 2006

### Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2006

Dallas, TX

WEFTEC 2006 will bring together thousands of water quality professionals from around the globe to build relationships, exchange ideas, and swap everyday solutions with professionals who share in their commitment for safe water. Typically, there are 80–100 sessions and 15–25 workshops in addition to the exhibition. The conference will address timely issues in water and wastewater, including collection systems, membrane technology, plant operation and treatment, regulations, research, residuals and biosolids, utility management, water reuse and recycling, and water quality and watershed management. For additional information, visit the conference Web site at [www.weftec.com](http://www.weftec.com).

November 3–9, 2006

### SETAC 2006 North America 27th Annual Meeting

Montreal, Canada

The Society of Environmental Toxicology and Chemistry (SETAC) is a nonprofit, worldwide professional society composed of individuals and institutions engaged in the study, analysis, and solution of environmental problems, the management and regulation of natural resources, environmental education, and research and development. This year's meeting theme is global environment and sustainability: sound science in a world of diversity. The meeting will be held at the Palais de Congres. For additional information, visit the conference Web site at <http://www.setac.org/montreal>.

November 6–9, 2006

### American Water Resources Association 2006 Annual Conference

Baltimore, MD

The conference presents a unique opportunity for water resource practitioners from diverse disciplines to gather and interact together. In addition to offering a broad range of technical, social and legal topics, a number of sessions will focus on topics of current interest, including infrastructure asset management, water (Homeland) security, watershed management, dam rehabilitation or removal, sustainability of drinking water supplies, impacts/solutions of urbanization on water resources, drought and flood management, and ecological restoration of wetlands and stream corridors. This conference will feature cutting edge water resource related research and project case studies from all over the country and the world, offering interesting and profitable learning opportunities to all attendees. For additional information, visit the conference Web site at [www.awra.org/meetings/Baltimore2006](http://www.awra.org/meetings/Baltimore2006).

November 21–22, 2006

### 4th Joint Agencies Bathing Waters Conference

Newcastle, County Down, Northern Ireland

The theme of this UK symposium will be the challenges of introducing the new Bathing Waters Directive (now approved by both the European Commission and the European Parliament) and the measures needed to ensure that overall compliance does not fall despite the more stringent standards. The conference will be a joint event among the Environment Agency, the Environment and Heritage Service (Northern Ireland) and the Scottish Environment Protection Agency with support from DEFRA, the Scottish Executive and Environmental Policy Group (DOE NI). The symposium will be held at the Slieve Donard Resort & Spa ([www.hastingshotels.com](http://www.hastingshotels.com)). For more information, contact [lynn.mcfarland@doeni.gov.uk](mailto:lynn.mcfarland@doeni.gov.uk), [ruth.stidson@sepa.org.uk](mailto:ruth.stidson@sepa.org.uk), [roslyn.stewart@doeni.gov.uk](mailto:roslyn.stewart@doeni.gov.uk), or [andrew.wither@environment-agency.gov.uk](mailto:andrew.wither@environment-agency.gov.uk).



## News from EPA Regions and HQ's Beach Program

### 2006 Beach Grants Announcements

EPA made almost \$10 million in grants available in spring 2006 to eligible states to protect public health at the nation's beaches. These grants are to help coastal and Great Lakes states to implement programs for monitoring water quality at the beach and notifying the public when water quality problems exist. For more information, visit [www.epa.gov/waterscience/beaches/grants/fy06fs.htm](http://www.epa.gov/waterscience/beaches/grants/fy06fs.htm).

### Public Health Risks: Coastal Observations for Decision Making

This workshop was held in St. Petersburg, Florida on January 23–25, 2006. It was sponsored by NOAA, EPA, USGS, CDC, NASA, the National Science Foundation–Geosciences Directorate, and the Alliance for Coastal Technologies. The workshop was designed to bring together managers, coastal public health officials, and scientists to identify observations and environmental information needed for ecosystem-based decision making for public health issues related to coastal waters. The meeting had a strong focus on beach public health issues and included discussions on shellfish and harmful algal blooms. One key goal of this workshop was to develop a blueprint for building an integrated global ocean observation and disease surveillance system that can deliver useful and timely information about ocean and coastal public health risks to managers and deci-

sion makers. A report from this meeting is being produced for beach and coastal public health managers and for use in the planning process of the Integrated Ocean Observing System (IOOS).

### BEACON

EPA developed BEACON, or BEach Advisory and Closing Online Notification system, to make state beach advisory and closing data available to the public. The Beaches Environmental Assessment and Coastal Health (BEACH) Act (section 406(e)) requires EPA to create a national coastal recreation water pollution occurrence database, which contains state reported beach monitoring and notification data, and allow the public to access it by electronic means.

In BEACON, each beach is displayed on a map that links the beach to data. Users select a beach and view the available data for that beach by either choosing a state and county or typing the beach name. See [http://oaspub.epa.gov/beacon/beacon\\_national\\_page.main](http://oaspub.epa.gov/beacon/beacon_national_page.main).

BEACON pulls data from 2 EPA databases—PRAWN and RAD. PRAWN is the PRogram tracking, beach Advisories, Water quality standards, and Nutrients database. PRAWN stores beach advisory and closing data. RAD is the Reach Address Database. The beach location data is stored in RAD and displayed in BEACON as a map.





# SURE Zone

## Resources for Local Beach Health Information

*The following resources are just a few that report local beach water quality conditions. Several resources will be highlighted in each issue.*



### EPA New England Beach Initiative

The goal of EPA's Beach Initiative is to protect public health by reducing beach closures in New England. To meet this goal, the number of beach closures must be reduced, using a monitoring, assessment and public notification program consistent with EPA's tiered monitoring guidance. EPA will work closely with state environmental and public health agencies to develop and implement the new beach initiative. EPA will focus its efforts on providing technical assistance to state and local environmental and public health agen-

cies for assessment and monitoring as needed and as funds allow, and will back up its assistance efforts with regulatory and enforcement tools where appropriate. For more information and for links to state monitoring Web sites in New England, visit [www.epa.gov/ne/eco/beaches/index.html](http://www.epa.gov/ne/eco/beaches/index.html).

## Evaluation of New, Rapid Microbiological Measurement Methods for Recreational Water Quality

EPA-approved methods for quantifying bacteria concentration require an 18- to 96-hour incubation period. This time lag can result in contaminated beaches being open during the incubation period and becoming clean before public health warnings can be issued. To address this problem, the state of California requested that the Southern California Coastal Water Research Project (SCCWRP) facilitate development of tests that measure bacteria levels rapidly enough to make possible same-day health risk warnings. Following proof of concept and development phases, SCCWRP has conducted evaluative testing of several new rapid methods.

Two levels of testing have been conducted, evaluating six types of technologies being developed by nine different research teams. The first of these tests was conducted in June 2004 with encouraging results. A second evaluation test was conducted in June 2005. The results from the second test were even more encouraging, with two methods (Quantitative Polymerase Chain Reaction and Transcription Mediated Amplification) proving to be more than 80 percent accurate with respect to the state's standard for *Enterococci*.

Copies of these reports are available at: [www.sccwrp.org](http://www.sccwrp.org)

## Co-Regulator Pathogens Workshop: Bacteria Criteria for Inland Waters

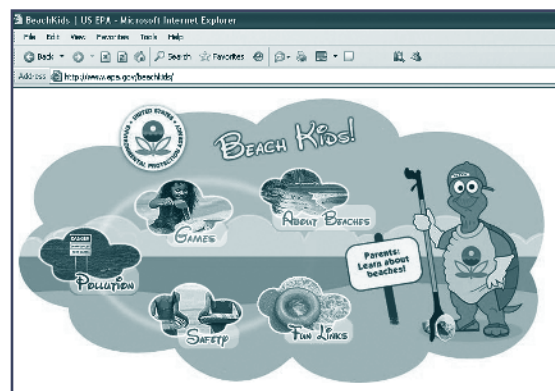
Three workshops were held in 2005 and 2006 for EPA and its co-regulators (states and tribes). The objective of these meetings was threefold: (1) to provide a clear understanding of EPA's progress and challenges related to issuing new bacteria criteria; (2) to articulate and prioritize implementation challenges associated with the 1986 criteria; and (3) to develop options for moving forward with

adoption and implementation of the 1986 criteria. Participants also discussed how to use and interpret the 1986 bacteria criteria for inland waters in light of the most recent EPA policy as articulated at 40 CFR Part 131 titled Water Quality Standards for Coastal and Great Lakes Recreation Waters; Final Rule, promulgated in the Federal Register (69 FR 67218, November 16, 2004).

The audience included representatives from state, tribal and EPA regional water quality standards programs, permits programs, assessment programs, TMDL programs, as well as others. If you have any questions about these workshops, contact Shari Barash at 202-566-0996, or by e-mail at [barash.shari@epa.gov](mailto:barash.shari@epa.gov).

## EPA Launches New Beaches Web Site for Kids

In June 2006 EPA launched a beach Web site for children. The site, for kids through sixth grade, contains information about the causes and effects of pollution at beaches and things kids can do to protect themselves and their beach. It teaches them about what to look for to find out if conditions are not good for water contact and what to ask of local beach managers. The Beach Kids Web site educates and entertains. Kids will find games, puzzles, and interactive stories that both challenge and amuse as they teach. The site is at [www.epa.gov/beachkids](http://www.epa.gov/beachkids).



Tidy Turtle helps kids learn about beaches.

FOR YOUR

## Beach Bag

New Publications and Resources

*Association of Metropolitan Sewerage Agencies' January 2005 Action Plan* (in response to the Report to Congress).

Beach Advisories, Posting and Closures SOLEC indicator # 4200 in *State of the Great Lakes 2005*.

Kinzelman, J. and J. Hiller. 2005. Incorporating Education and Outreach in the Re-Engineering of a Storm Water Outfall Impacting Recreational Water Quality at Two Public Bathing Beaches on Lake Michigan. Current: *The Journal of Marine Education*. Submitted for publication.

Kleinheinz, G. and E. Englebert. 2005. *Cladophora and the beach: Implications for Public Health*. In-press: Technical Report, UW-Milwaukee WATER Institute.

Olyphant, Greg A. 2005. Statistical basis for predicting the need for bacterially induced beach closures: Emergence of a paradigm? *Water Research* 39 (20): 4953–4960.

Sampson, R., S. Swiatnicki, C. McDermott and G. Kleinheinz. 2005. *E.coli at Lake Superior*.

Recreational Beaches. *Journal of Great Lakes Research*. In-press.

Scott, T. M., T.M. Jenkins, J. Lukasik and J.B. Rose. 2005. Potential Use of a Host Associated Molecular Marker in *Enterococcus faecium* as an Index of Human Fecal Pollution; *Environmental Science & Technology*. 39 (1): 283–287.



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## Announcements

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### ***EPA's 2006 National Beach Conference, October 11-13, 2006***

This 3-day conference is sponsored by EPA in collaboration with the Great Lakes Beach Association. It will provide a national framework for discussion of beach water quality issues, exchange of information, and coordination of efforts in research and decision making. The conference format will consist of presentations and panel discussions. Posters will also be presented. This conference will be similar to the 2004 National Beach Conference that was held in San Diego, California.

The expected audience includes beach water quality managers, public health and environmental groups, researchers, and the public. EPA invites participants from federal, state, and local governments, public health, environmental, and nongovernmental organizations, Indian Tribes, academia, and concerned citizens. For more information or to register, visit the conference Web site [www.tetrattech-ffx.com/beach\\_conf2006/](http://www.tetrattech-ffx.com/beach_conf2006/).



The material in this document has been subjected to Agency technical and policy review and approved for publication as an EPA report. The views expressed by individual authors, however, are their own and do not necessarily reflect those of the U.S. Environmental Protection Agency.