



## *Science Needs Assessment*

# Beach Microbial Contamination

### Conservation Issue

The ability of managers to adequately protect Monterey Bay National Marine Sanctuary (MBNMS) beach visitors from exposure to waterborne pathogens is hindered by slow methods for enumerating indicator bacteria.

### Description

Current methods used to monitor beaches and post closures are insufficient to accurately detect contamination and warn the public accordingly. Indicator bacteria assays take 18 to 36 hours to complete, and during this time, beachgoers may be exposed to harmful pathogens. The lag time between sample collection and indication of high contamination levels makes it difficult to track sources of microbiological contamination. Furthermore, temporal and spatial changes in indicator bacterial levels in beach water occur more rapidly than can be assessed by current methods. So, beaches may be clean but posted as contaminated. Research is needed to develop new methods of rapid indicator bioassessment, investigate the use of indicator compounds other than coliform bacteria (e.g., fecal sterols, caffeine, long-chain alkylbenzenes), and determine ways to distinguish between animal and anthropogenic sources of contamination (e.g., RNA ribotyping).

### Data and Analysis Needs

1. Status of research on rapid or real-time indicator analysis and whether the science better informs risk
2. Information on whether compounds other than coliform bacteria (e.g., fecal sterols, caffeine, long-chain alkylbenzenes) can be detected in real time and whether they accurately indicate the presence of pathogens
3. Information on whether new methods can be integrated so that historical long-term trend results are still meaningful
4. Information on whether disease-causing pathogens or indicators can be assessed through the use of predictive models, surveillance tools, or other techniques and whether these new methods can be broadly applied
5. Updated inventory of websites, listservs, and signage that are available to present real-time information on beach status to the public
6. Updated inventory of pollutants associated with indicator bacteria, such as endocrine disruptors and other pharmaceuticals, and their effects on nearshore organisms

### Potential Products

- Updated evaluation of potential alternatives to coliform bacteria for monitoring water quality
- Improved predictions of temporal and spatial changes in indicator bacterial levels
- Inventory of observing data available to the public through the internet

## Suggested Scientific Approach and Actions

- Develop alternatives to coliform bacteria monitoring for tracking microbiological contamination and ways to distinguish between animal and anthropogenic sources of contamination
- Evaluate temporal and spatial scales of contamination
- Develop observatory systems to effectively share information
- Use more efficient detection methods to track sources of microbiological contamination
- Enhance existing notification systems to increase public access to water quality information prior to beach visits
- Work with local jurisdictions to reduce private and public sources of bacterial contamination

## Key Partners

Public works agencies, Southern California Coastal Watershed Research Project, State Water Resources Control Board's Beach Water Quality Workgroup, Monterey Bay Aquarium Research Institute, Moss Landing Marine Labs, Water Environment Research Foundation, University of California Davis, Monterey County Department of Environmental Health, Central Coast Long-term Environmental Assessment Network, Sanctuary Citizens Watershed Monitoring Network, state and county parks, California Coastal Commission, Surfrider Foundation, regional dive and surf shops, Monterey One Water, U.S. Environmental Protection Agency, Central and Northern California Ocean Observing System



Del Monte beach in Monterey, California. Photo: Bridget Hoover/NOAA

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