Monterey Bay National Marine Sanctuary

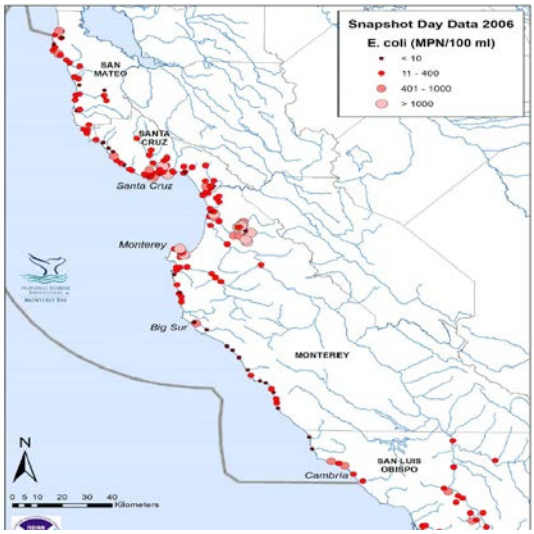
Beach Closures

Management Issue

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

Description

The current methods used to monitor beaches and post closures are insufficient to accurately detect contamination and warn the public accordingly. Indicator bacteria assays take eighteen to thirty-six 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 bio-assessment, to investigate the use of indicator compounds other than coliform bacteria (e.g., fecal sterols, caffeine, long-chain alkylbenzenes), and to determine ways to distinguish between animal and anthropogenic sources of contamination (e.g., RNA ribotyping).



Distribution of E. coli *bacteria along the Sanctuary's shores (2006). Map credit: MBNMS.*

Questions and Information Needs

1) What is the status of research on rapid indicator bioassessment? Does this method have the speed to meet recreational users' needs, and the specificity to meet state water quality standards?

2) Can compounds other than coliform bacteria (e.g., fecal sterols, caffeine, long-chain alkylbenzenes) be detected rapidly, and do they accurately indicate the presence of pathogens?

3) Can disease-causing pathogens be directly tested as an alternative to using indicators?

4) What systems are available to present real-time information on beach status to the public?

5) Are there other pollutants associated with indicator bacteria such as endocrine disruptors and other pharmaceuticals, and what are their effects to nearshore organisms?

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

Potential Key Partners and Information Sources

Publics 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, UC Davis, County's Department of Environmental Health, Central Coast Long-term Environmental Assessment Network, Sanctuary Citizens

Potential Key Partners and Information Sources *(continued)*

Watershed Monitoring Network, State and County parks, Coastal Commission, Surfrider Foundation, regional dive and surf shops, Monterey Regional Water Pollution Control Agency, Environmental Protection Agency, Central and Northern California Ocean Observing System

Carmel Beach, California. Photo credit: MBNMS.

Management Support Products

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

Planned Use of Products and Actions

- 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

Program References

MBNMS Management Plan

- Beach Closures and Microbial Contamination Action Plan, Strategy BC-2, BC-3, BC-4

MBNMS Condition Report

- Are specific or multiple stressors, including changing oceanographic and atmospheric conditions, affecting water quality? (Nearshore Environment - Question 1)
- Do sanctuary waters pose risks to human health? (Nearshore Environment – Question 3)

ONMS Performance Measures

- Eliminate beach closures and reduce the number of beach postings due to anthropogenic microbial contamination in the MBNMS
- Number of sites in which water quality, based on long-term monitoring data, is being maintained or improved