

C-20

Malibu Lagoon Bacteria Study

Synopsis

Richard F. Ambrose
Jenny A. Jay
University of California, Los Angeles

The purpose of the current study in Malibu Lagoon is generally to increase our understanding of the dynamics of bacteria in Malibu Lagoon and the adjacent ocean waters. We are interested in spatial and temporal patterns of bacteria concentrations as well as the bacteria sources. For this study, we are focusing on water samples only (not sediments).

To understand the spatial pattern of bacteria concentrations, samples are being collected from 15 sites in and around the Lagoon, including one site upstream of all development in Serra Retreat and five sites along the beach in or near the mouth of the Lagoon. The upstream-most site provides information about bacteria entering the Lagoon from the upstream Malibu Creek watershed. The Lagoon samples include samples on the east and west banks of the main lagoon as well as samples from the restored wetland area (taken near outlets draining into that area). The beach samples include a sample where the lagoon water meets the ocean (when the lagoon is open) and two samples east and two samples west of this location. These samples represent exposure to ocean users. In addition to collecting water samples for bacteria, we are measuring other water quality parameters, particularly conductivity (salinity), which provides a useful indicator of how much mixing there has been between freshwater and ocean water at each site when we sample it.

To understand the temporal pattern of bacteria concentrations, samples are being collected at times that represent different important phases of Lagoon dynamics. Our first sample was during a major rainstorm (February 16, 2009) when the Lagoon was open to the ocean and dominated by fluvial (stream) processes. Our second sample (March 20, 2009) occurred while the lagoon was still open, but more than three weeks after a significant rain. We also plan on sampling at least one more time, when the Lagoon is closed.

To understand the sources of bacteria in the Lagoon, we are analyzing our samples for human-specific and universal bacteroides as well as the traditional fecal indicator bacteria. The results of these analyses will provide an indication of how much of the indicator bacteria may be due to human sources. We will also look at markers for other sources (e.g. birds, dogs) if feasible.



Figure 1. Location of Malibu Lagoon sampling sites. The farthest upstream site and the easternmost and westernmost beach samples were not included in the first sampling period.