



# Morro Bay Volunteer Monitoring Program

## Bacteria Monitoring Update

Spring 2005

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### Background

The Morro Bay Volunteer Monitoring Program (VMP) has been monitoring bacteria in local creeks and in the bay on a monthly basis since the summer of 2002.

Volunteers collect samples and then use IDEXX's Colilert-18 test kits to measure *E. coli* and total coliform levels from creek samples and *E. coli* from bay samples. Volunteers use IDEXX's Enterolert to monitor enterococcus, an indicator bacteria that is less sensitive to salt water. The lab work is conducted at the Morro Bay-Cayucos Wastewater Treatment Plant lab.

Each month the results are shared with various organizations and agencies including the Central Coast Regional Water Quality Control Board (CCRWQCB), the County Public Health Department, the City of Morro Bay, the California Department of Health Services and others.

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### How are the data used?

The data will be incorporated into the monitoring program for the pathogen Total Maximum Daily Load (TMDL) regulation that is currently under review by the State Water Resources Control Board and EPA. Our program worked with CCRWQCB staff to identify the optimal monitoring methodology and sites to supplement TMDL monitoring.

A TMDL regulation identifies the sources of the pollutants, determines how much pollutant can enter a waterbody without negatively impacting the beneficial uses, and assigns proportional responsibility for controlling the pollutants. Some of the goals for Morro Bay and Chorro and Los

### What do the data mean?

Our bacteria results are compared to standards outlined in state Assembly Bill 411, which requires weekly monitoring of state beaches with more than 50,000 visitors per year. The standards for safe recreational contact for a single sample are:

- 10,000 MPN/100 mL for total coliform
- 400 MPN/100 mL for *E. coli*
- 104 MPN/100 mL for enterococcus

If bacteria levels exceed these standards, there is a higher likelihood that contact with these waters could lead to illness.

Although our results are for *E. coli* rather than for fecal coliform, we compare our results to the fecal coliform standard of 400 MPN/100 mL. Fecal coliform is primarily composed of *E. coli*, although an exact ratio is not known.

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Osos Creeks are to protect shellfish harvesting in the bay and safe recreational contact.

Additionally, the data are shared with entities such as the City of Morro Bay, the SLO County Public Health Department, the Los Osos Community Services District and various land owners. These are organizations or individuals who might be interested in the data but do not currently conduct any monitoring themselves at the VMP sites.

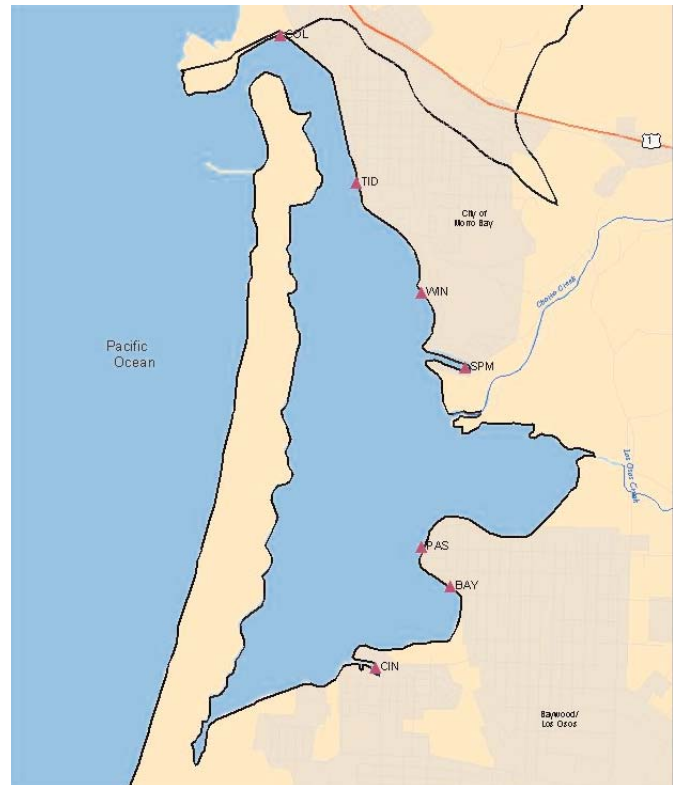
Each month, we issue a memo to the various agencies and organizations that might be interested in our data. The memo includes the sites with an *E. coli* level that exceeded 400 MPN/100 mL during the previous month.

# VMP Monitoring of Morro Bay

## Monitoring Sites

The following bay sites are monitored on a monthly basis: Coleman Beach (COL), State Park Marina (SPM), Tidelands Park (TID), Windy Cove (WIN), Baywood Park (BAY), Cuesta Inlet (CIN), and Pasadena Point (PAS). The bay sites were chosen for their high potential for recreational contact, as these are areas commonly used by kayakers, windsurfers, surfers and others.

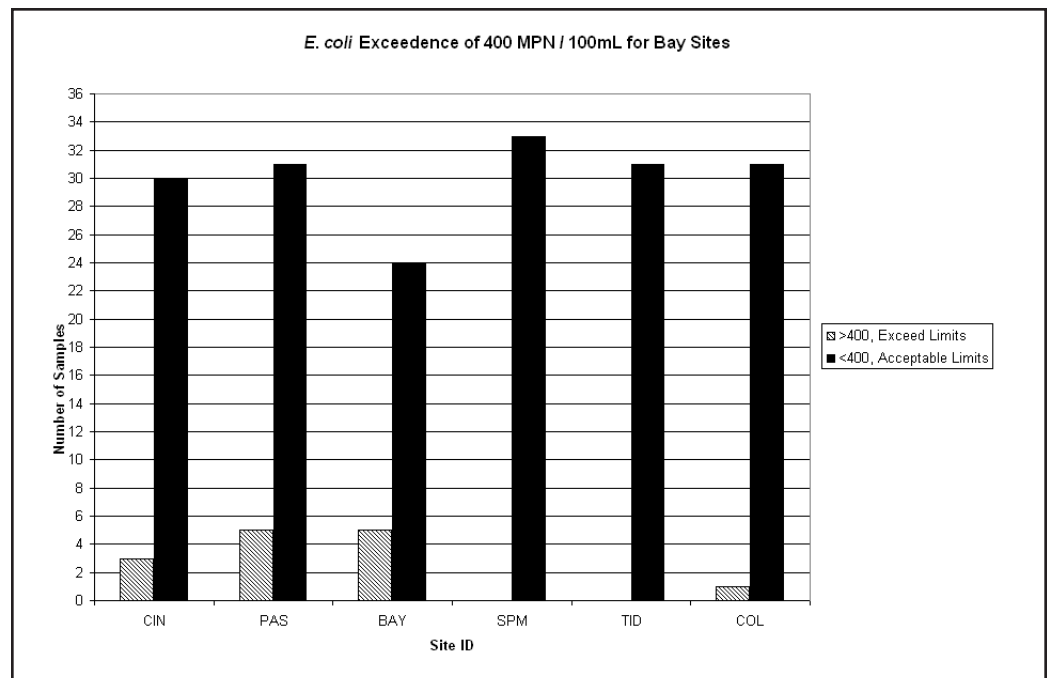
Volunteers sample from the shoreline on an outgoing tide. Samples are collected in sterile containers, stored on ice and then immediately transported to the lab. Volunteers try to analyze the samples within six hours of collection to maintain sample integrity. The IDEXX Colilert-18 test kits generate results for *E. coli* and Enterolert generates results for enterococcus.



## Monitoring Results

Due to its high level of variability, bacteria data can be challenging to analyze.

One way to assess the data is to track the number of samples that exceed the standard. In this chart, the solid bars show the total number of samples that were below the 400 MPN/100 mL fecal coliform standard for safe recreational contact. The grey bars are the number of samples that exceeded safe levels. The data shows that the majority of the exceedances were at Baywood Pier and Pasadena Point. The source of fecal contamination cannot be determined without conducting a DNA study. Cal Poly and the



CCRWQCB recently conducted a DNA study on the bay to identify the sources of *E. coli*. Their study concluded that the majority of bacteria in the bay was from birds, the majority in creeks was from cattle, and the majority in the seeps was from human sources.

# VMP Monitoring of the Morro Bay Watershed

## Monitoring Sites

The following creek sites are monitored on a monthly basis: Chorro Creek at Canet Rd. (CAN), Chorro Creek at Chorro Ecological Reserve (CER), San Luisito Creek (SLU), San Bernardo Creek (SBE), Pennington Creek (PEN), Dairy Creek (DAL, DAM), Los Osos Creek (SYB), Warden Creek (TUR) and Chumash Creek (CHU).

The VMP's bacteria monitoring volunteers collect monthly data on total coliform and *E. coli* levels for 10 creek sites throughout the watershed.

The sites were chosen for their broad distribution throughout the watershed and to build on historic sampling data.

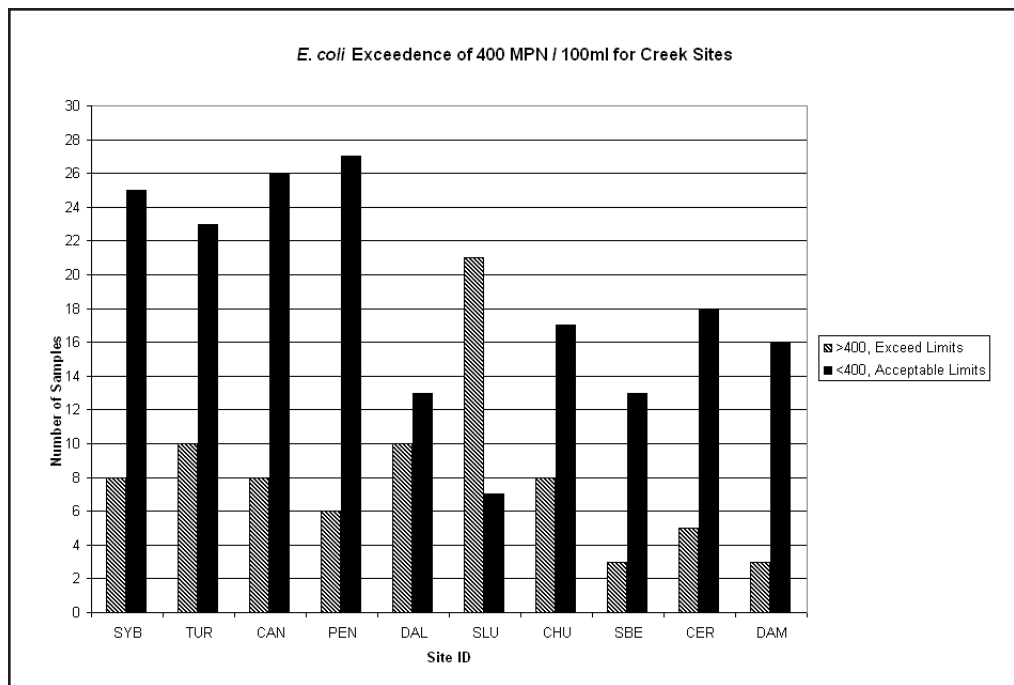


## Monitoring Results

Although bacterial indicators are monitored, the exact source of the bacteria is not determined by this method. Only a DNA study can pinpoint the sources of the bacteria.

The total number of samples analyzed are shown on the bar chart, with the grey color showing the number of samples that exceeded the fecal coliform standard for safe recreational contact (400 MPN/100 mL) and the solid black bars showing the number of samples within safe recreational contact levels.

Many of the exceedances are at sites with a potential for recreational contact. Chorro, Dairy, San Luisito, San Bernardo and Los Osos Creeks



all have recreational contact listed as one of their beneficial uses by the CCRWQCB. In order to protect these uses, the bacteria levels need to remain below 400 MPN/100 mL for fecal coliform.

# VMP Bacteria Monitoring Program Update

In March of 2005 we added enterococcus bacterial monitoring to our program. This group of bacteria is present in the intestinal tract of warm-blooded animals and indicates that fecal contamination has likely occurred. However, this bacteria much more salt tolerant than *E. coli* and can survive longer in marine environments. Thus, it is considered a better indicator for water safety in marine environments.

With the addition of this new, more sensitive indicator bacteria, we expected to see more exceedances of the safe recreational contact standard. Since the enterococcus monitoring began in March, we have had four occurrences where a site did not exceed the fecal coliform contact standard but did exceed the enterococcus standard. This means that while the fecal coliform data indicated that the water was likely safe for swimming, the enterococcus levels showed that it was potentially unsafe. The sites where this occurred were Windy Cove

(twice), Pasadena Point and Baywood Pier. There were no incidents of the opposite scenario where the enterococcus levels exceeded the standard but the *E. coli* levels did not.

And last, but not least, we are seeking a new bacteria volunteer to participate in the monthly monitoring effort. This involves going out to three or four creek sites each month to collect samples and then bringing them to the Waste Water Treatment Plant lab in Morro Bay to analyze and incubate the samples. The volunteer must return to the lab 18 to 22 hours later to read the sample results. Sample collection and analysis typically requires about two hours and reading the samples the following day typically requires about 15 minutes. Volunteers need be comfortable going to creek sites to collect samples and capable of conducting lab work using sterile techniques. If you are interested in joining this monitoring team, please contact VMP staff!

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## Special Thanks to Our 'Bac Attacker' Volunteers

We'd like to thank the dedicated volunteers who have contributed to our bacteria monitoring effort throughout 2005:

Kristen Brewer  
Bob Croyle  
Mimi Kimball  
Rikki Porter  
George Wright

These volunteers collect samples using sterile technique and then process the samples in the

lab. They return the next day after 18 to 24 hours of incubation to read the results.

And also, a special thanks to the Morro Bay-Cayucos WWTP staff for the both the use of their lab and their technical support! Since our program does not have a wet lab of its own, their generous contribution of some of their limited lab space is what makes this monitoring effort possible.