



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Swati Yanamadala</b>	<b>Project Number</b> <b>S0616</b>
<b>Project Title</b> <b>Changes in Densities of Fecal Indicator Bacteria (FIB) over Differing Tidal Flows in the Ballona Wetlands, Los Angeles</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> There are two main objectives of this experiment: to create a mathematical model showing the relationship between turbidity, dissolved oxygen, pH, salinity, time from high tide, and levels of indicator bacteria for fecal contamination, which are E. Coli, Enterococci, and Total Coliform bacteria, and to assess the impact of the Ballona Wetlands on coastal ocean waters.</p> <p><b>Methods/Materials</b> In the field samples were collected on three different days over twelve hour periods every half an hour for temperature, dissolved oxygen, salinity, and pH levels using the YSI 600R Sonde Electronic Probe. Further testing was done in the lab using the HACH 2100N Turbidimeter for turbidity levels and the IDEXX Quantitray 2000 System with the MPN method for levels of indicator bacteria. Finally, on a fourth sampling day, three sets of ten samples were collected. The first two were taken normally, and then the sediments were stirred to increase turbidity levels. The following eight samples were taken with the increased turbidity.</p> <p><b>Results</b> Results indicated that bacterial levels were higher with decreased dissolved oxygen, decreased salinity, increased turbidity, and a neutral pH. Bacterial levels were also higher at and around high tide. Based on these results, a mathematical model was created for bacterial contaminant determination.</p> <p><b>Conclusions/Discussion</b> Coastal pollution and beach water quality are a result of the interaction of a myriad of human and naturally occurring factors. This study clearly demonstrates that there is contamination in the Ballona Wetlands, which is carried into the ocean by tidal flows. The two possible explanations for this are primary contamination from wildlife in the Ballona Wetlands or secondary contamination from the Ballona Watershed. As bacterial levels increase, they deplete dissolved oxygen and salinity reserves in the wetlands. The bacteria also thrive at a neutral pH of 7. Turbidity levels increase as sediments are drawn off of the banks of the water column and resuspended from the bed of the creek, and Enterobacteriaceae are able to attach to these sediment particles. Thus, they are drawn into the water as well. This study also shows that sophisticated mathematical models can be constructed to greatly simplify the current testing procedures and be more cost effective. These types of models are critical from an economic point of view and for beach safety considerations.</p>	
<b>Summary Statement</b> The purpose of this project is to understand the role of the Ballona Wetlands on coastal water quality and to construct a mathematical model for bacterial contaminant determination.	
<b>Help Received</b> Used lab equipment at Loyola Marymount University under the supervision of Dr. John Dorsey	