



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jonathan W. Winslow</b>	<b>Project Number</b> <b>J0937</b>
<b>Project Title</b> <b>Are Our Coastal Streams Safe?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my project was to determine whether there are safe levels of total coliform and fecal coliform (E. coli) bacteria in coastal creeks and lagoons of San Mateo County, using State and County standards, and what variables may affect them.</p> <p><b>Methods/Materials</b> Five creeks at San Mateo County and State beaches were tested. Urban and rural locations are the independent variables. Water samples were collected from 2 sites at the five creeks, once per week for 7 weeks. The measured dependent variables are total coliform bacteria, E.coli bacteria, water temperature, and rainfall. Bacterial levels were measured in incubated test plates with specific culture medium, and have a sensitivity of 3-5 minimal probable number of colony forming units per 100 ml (MPN of CFU/100ml. Titrers were determined by dilution series, and MPN tables. Blue wells (galactosidase+) were scored for total coliform bacteria, and UV fluorescent wells (glucoronidase+) indicated E. coli as a measure of fecal coliform. The bacteria levels were graphed for each site per week, and as a function of the dependent variables, and compared to County safe levels.</p> <p><b>Results</b> All 5 creeks had some weeks of unsafe levels of total coliform and/or E.coli. The unsafe levels correlated best with the independent variable of location of the creek: urban areas had more unsafe weekly readings (66% total coliform &gt;10,000 MPN of CFU/100ml and 57% E. coli &gt;400 of all measurements) than creeks in more rural areas (0% total coliform and 14% E.coli). These results supported part of my hypothesis. The results did not support my hypothesis that bacterial levels would correlate with the higher water temperatures and weekly rainfall. amounts.</p> <p><b>Conclusions/Discussion</b> Although one of the urban creeks has been posted as unsafe (San Pedro Creek, Pacifica, CA)the levels in 2 other urban creeks were suprising. Articles suggest San Pedro Creek may be contaminated from leaking sewage collateral lines which connect houses with the main sewer lines. Possible sources for high levels in 2 other major creeks in the Half Moon Bay area have not been identified but may also be from leaking sewage lines or horse stables. Initial heavy rains may have caused a surge increase in bacterial levels but did not correlate later in the study. Cleaning up our creeks is a good idea because they are in State and County beaches which are heavily visited by the public.</p>	
<b>Summary Statement</b> My project determined over a 2 month period whether there are safe levels of total and fecal coliform bacteria in San Mateo County coastal creeks.	
<b>Help Received</b> I had the idea but discussed details of project with my science teacher and parents. My parents drove me to the test creeks every week. I used a heated incubator at my dad's work to grow the bacteria, and a UV light box to measure E.coli. I collected and analyzed all the data. My parent helped me assemble my	