



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Nigella M. Baur	Project Number J1102
Project Title Can the Number of Birds Be a Predictor of Coliform Levels in the Arcata Marsh?	
<div>Objectives/Goals<p>The world famous Arcata Marsh and Wildlife Sanctuary is an important part of Arcata's Wastewater Treatment Plant and is temporary refuge to over 270 species birds year round. To protect the visiting public, the water is chlorinated before going into the marshes. But when the water leaves the marsh it is contaminated with coliform and needs to be rechlorinated. It has been theorized that the birds are the cause of the contamination, but no one has actually investigated if the number of birds using the marsh affects coliform levels. The purpose of this experiment was to see if the number of birds observed in the marsh effects or could be used as a predictor of the level of coliform leaving the marsh. My hypothesis was that there would be a higher coliform concentration when there were more birds in the marsh.</p></div> <div>Abstract<p>I counted birds at each of the three marshes that make up the Arcata Marsh and Wildlife Sanctuary and collected water samples at the outlet of each marsh at three different times. To try to get a variation in the number of birds I performed the experiment on different days and at different tide levels (in the adjacent Humboldt Bay). At home I used the multiple-tube method to find the most probable number (MPN) of coliform concentrations in each of the samples. The test tubes filled with lactose broth and pipets required for the test were supplied by the Humboldt State University biology department laboratory. Then I compared the bird counts to the coliform concentration found in each sample.</p></div> <div>Methods/Materials<p>I counted birds at each of the three marshes that make up the Arcata Marsh and Wildlife Sanctuary and collected water samples at the outlet of each marsh at three different times. To try to get a variation in the number of birds I performed the experiment on different days and at different tide levels (in the adjacent Humboldt Bay). At home I used the multiple-tube method to find the most probable number (MPN) of coliform concentrations in each of the samples. The test tubes filled with lactose broth and pipets required for the test were supplied by the Humboldt State University biology department laboratory. Then I compared the bird counts to the coliform concentration found in each sample.</p></div> <div>Results<p>The results of this experiment showed a great deal of variability in the coliform levels leaving each of the marshes. The bird counts for each marsh as well as the total for all the marshes had no significant relationship to the correlating coliform concentrations. This proved my hypothesis false.</p></div> <div>Conclusions/Discussion<p>In conclusion, a visitor to the Arcata Marsh cannot claim that the absence of birds means that the water is more safe (or less contaminated) then if they were seeing a lot of birds. It also means that the birds may not necessarily be the cause of the need to rechlorinate the water that leaves the marshes before it enters the Humboldt Bay.</p></div>	
Summary Statement <p>The purpose of this experiment was to find out if the number of birds observed in the Arcata Marsh and Wildlife Sanctuary (at Arcata's wastewater treatment plant) could be used as a predictor of the level of coliform leaving the marsh.</p>	
Help Received <p>Andrea Yip, Microbiology Lab Supervisor at HSU set up the broth filled test tubes and loaned me the pipets from the biology lab. Dr. Robert Gearheart met me at his office at the marsh and helped me brainstorm ideas for an interesting subject to research. My dad drove me around and carried my stuff.</p>	