



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Daniel S. Bruce</b>	<b>Project Number</b>  33579
<b>Project Title</b> <b>Urban Noise: Effects on Lagoon Bird Density and Species Diversity</b>	
<b>Objectives/Goals</b> While observing wildlife in San Diego County, it became apparent that some natural habitats are surrounded by noise from busy highways, railroads and flying aircraft. I wondered how urban noise might impact birds in the wild. The goal of this project was to document the levels of urban noise surrounding the Penasquitos Lagoon Natural Preserve and investigate how noise may be affecting birds in this area. My hypothesis was that areas with higher levels of urban noise would have fewer numbers of birds. <b>Abstract</b> <b>Methods/Materials</b> Five sites of observation at the Penasquitos Lagoon were chosen along the trail that runs parallel to Interstate 5 Highway. Observations of birds in each area, along with serial measurements of sound levels related to the highway traffic, passing trains and aircraft, were documented during more than 32 field-hours distributed over 8 days during the Winter of 2012-2013. <b>Results</b> The range of noise at the observation sites was 54 to 80 dB of continuous noise from the highway traffic, and 66 to 83 dB of intermittent noise from trains and aircraft. Two sites had average continuous noise levels above 65dB, another averaged 61dB, and two averaged less than 60dB. The two sites with the highest baseline noise were almost devoid of birds, and sites with noise levels at or below 61dB had a greater density of birds and more bird species. An average difference of 6 dB correlates to a difference of twice the volume, so an average difference of 4 dB or more is significant. <b>Conclusions/Discussion</b> According to my findings, urban noise above 61 dB was associated with fewer numbers of birds and lower species diversity in the Lagoon Preserve. To protect this habitat, which includes endangered and threatened bird species, further evaluation of the noise effects on birds, including during nesting and breeding seasons, should be performed, and perhaps urban noise control measures should be considered.	
<b>Summary Statement</b> Determining the effects of various urban noise sources on bird density and species diversity in one of the few Lagoon habitats remaining in California.	
<b>Help Received</b> My parents helped accompanying me during my field explorations. My science teacher provided guidance in the field and lent me needed equipment. Audubon Society volunteers and Mr. Philip Unitt from the Natural History Museum guided me in how to identify birds while preparing for this project.	