



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Candice Bentley; Emily Dolson	Project Number S1402
Project Title Anthropogenic Influences of the California Sea Otter (<i>Enhydra lutris nereis</i>)	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The California sea otter (<i>Enhydra lutris nereis</i>) has been highly endangered since being nearly hunted to extinction one hundred years ago by fur traders. The population is taking far longer to recover than predicted. As the sea otter is a keystone species in the kelp forest ecosystem, it is crucial to understand what factors are inhibiting its growth. Human impacts, though widely suspected, have not been closely examined. The purpose of this project was to determine what effects, if any, humans have on sea otter well-being. What behavioral changes occur in sea otters when humans approach them? The hypothesis was that, if approached, sea otters would dive and swim away, thus inhibiting the thermoregulative abilities which are essential for survival. In Phase I of this project it was established that otter behavior is significantly different in the presence of humans. Phase II goes on to examine whether or not this poses a risk to the otters by attempting to determine exact caloric costs of human encounters. Additionally, it attempts to generalize prior results by expanding the range of study.</p> <p>Methods/Materials Sea otters in various locations along California's coast were observed over a duration of fourteen months, using a time-budget methodology to insure that results were statistically comparable. Every ten minutes, the location and activity levels of all otters were recorded, along with a variety of other factors that could affect sea otter behavior. Human interactions were noted as new entries, allowing comparison of alterations in group dynamics.</p> <p>Results Pre-existing estimates of the caloric costs of various activities were used to establish average daily caloric expenditure projections for otters in close proximity to humans, otters over 100 yards away from humans, and otters with no humans present. Additionally, a chi-square test was used to compare the differences between the time budgets of otters living in an area with much human disturbance and those of otters living in an area with little human disturbance.</p> <p>Conclusions/Discussion The data support the hypothesis that human interaction could potentially have a significant impact on otter survival. Worst case estimations suggest that human-induced energy expenditure could necessitate that each otter consume the equivalent of an additional abalone per week. In a food-limited environment, this is a serious concern.</p>	
Summary Statement This project seeks to determine whether or not human-induced behavior changes are having a significant effect on the survival of the California sea otter population.	
Help Received Marissa Veins of Monterey Bay Aquarium oversaw project design, Jane Orbuch (teacher) provided further guidance	