



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Eli Erlick</b>	<b>Project Number</b> <b>S1708</b>
<b>Project Title</b> <b>The Effects of 17 B-Estradiol on Embryonic Danio rerio Hatching Rates under Elevated Temperatures</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this experiment was to determine if rising temperatures in waterways due to climate change could impact fish egg viability when exposed to estrogen, a contaminant of many waterways around the world. <b>Methods/Materials</b> 20 zebrafish were obtained and bred. 200 eggs were collected and 50 eggs were put into 2 liters of water at 26.7 C, 50 eggs were put into 2 liters of water at 29.4 C, 50 eggs were put into 2 liters of water at 26.7 C and 10 Aµg/liter of estradiol, and 50 eggs were put into 2 liters of water at 29.4 C at 10 Aµg/liter of estradiol. The eggs were incubated for 4 days and hatching rates were determined. This was repeated two times for a total of three trials. <b>Results</b> The eggs that were exposed to estrogen at 29.4 C had a decreased hatching rate as compared to eggs that were exposed to estrogen at 26.6 C. This difference was greater than the decrease of hatching rate of eggs unexposed to estrogen to 29.4 C compared to eggs that were unexposed to estrogen at 26.6 C. This indicates that estrogen may increase the sensitivity of the eggs to the effects of heat. In both trials, the eggs that were exposed to both the higher temperature and estradiol had a lower hatching rate. This rate was statistically significant. <b>Conclusions/Discussion</b> The potential for synergism between environmental stressors is an important area of study if we are to save the earth's ecosystems. This experiment supports a concern regarding fish egg viability in estrogen exposed eggs when incubated at elevated temperatures. This study examines the potential for estrogen, a known pollutant, and warming waterways to affect fish egg viability.	
<b>Summary Statement</b> The effects of climate change and environmental pollutants were evaluated by incubating zebrafish eggs at two different temperatures with and without exposure to estradiol to determine hatching rates.	
<b>Help Received</b> Dr. Carla Longchamp helped obtain estradiol powder.	