



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Brian C. Ladd	Project Number S0813
Project Title The Comparative Study of Erucic Acid Rapeseed Oil in Varying Aquatic Environments	
Abstract Objectives/Goals Crude oil is found in natural deposits and seeps all around the world. Crude oils are toxic and will affect the nervous system of animals that come in contact with it. I wanted to understand how nature eliminates crude oil that has been spilled. I substituted low erucic acid rapeseed oil (canola oil) for crude oil so that the hazard of my experiment would be set at a minimum. Canola oil is not a petroleum oil, but it is a light oil so it is still an accurate substitution. My hypothesis was that the naturally occurring microorganisms in bay and creek water would biodegrade the oil. I thought the creek water would support the most bioremediation because it would have the most microorganisms in it. I thought that the less concentrated the water was with oil, the more remediation would occur. Distilled water should have no microorganisms therefore no bioremediation will occur, and it serves as a control. To avoid needing to ensure a homogeneous mixture in a large tank to take samples, I designed my setup to use multiple small containers. Each test used the entire contents of the container. I developed the method for measuring the amount of oil in a sample and calibrated it to make sure that it would work. Boiling the water while leaving the canola oil is possible because of canola oil's high flash point (275-290 Celsius)	
Methods/Materials To run my experiment, gather samples of bay and creek water. Set up 20 sample containers each with 400mL of bay, creek and distilled waters. Add 4mL of canola oil to half the samples and 20mL to the other half. Measure the amount of oil in two of each type of sample weekly for five weeks to measure progress in the bioremediation using the #Procedure for Measuring the Weight of Oil Remaining#.	
Results The results of my experiment were the distilled water had very little bioremediation, the creek water bioremediated two or three grams of oil, while the bay water samples degraded one or two grams. This shows that bioremediation will occur whenever there are microorganisms present, and the type of water did not affect the degradation. Both the 20mL of oil and the 4mL of oil biodegraded about the same, allowing me to conclude that the amount of oil doesn't affect the remediation within the range tested.	
Conclusions/Discussion see results	
Summary Statement This experiment compares the natural reaction of water to oil in varying water types and oil concentrations.	
Help Received Dr. Sarah McMillen helped fine tune my procedure.	