



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) Vijay Yanamadala	Science Fair Use Only S0822
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Use of Phosphate Binders to Combat Eutrophication in Fresh Water Lakes	Division _ Junior (6-8) <u>X</u> Senior (9-12)
Preferred Category (See page 5 for descriptions.) 8 - Environmental Engineering	
Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p>Eutrophication, the process by which a lake becomes rich in dissolved nutrients such as phosphates due to point and non-point pollutant sources, is a major cause of the loss of natural lake ecosystems throughout the world. This process occurs naturally in all lakes, but is hastened by human activities. Harbor Lake Machado was studied as a moderately eutrophic lake in Los Angeles County, also being the largest natural lake in the greater Los Angeles Area. It is a significant ecosystem, containing several unique species and attracting hundreds of migratory birds annually. The main goal of this experiment was to find a successful approach to decreasing phosphate ion content in polluted lakes. The procedure was divided into several phases. The first phase consisted of collecting water from several storm drains and agricultural runoff in order to test for phosphate, dissolved oxygen, pH, salinity, temperature, and ammonium concentration. The second phase involved usage of calcium carbonate as a phosphate binder to decrease phosphate concentration. Solid calcium phosphate settled and the carbonate ions decomposed to water and carbon dioxide. Plants were used to increase oxygen content and test for the biological effects of calcium carbonate. They were determined to be extremely healthy, and the calcium carbonate had no negative effects. The plant specimens were given a thorough pathological analysis under light microscope and dissecting microscope. Soil horizon A was examined for sulfite and carbonate content, both of which were present. A microorganism analysis was done also using a blood/Macconkey agar finding gram negative and positive cocci and bacilli and giving warning that the water is relatively polluted. On average, phosphate levels were decreased by 70% using the calcium carbonate. These results will lead to the building of an ion exchange filter consisting of a dual layer of calcium carbonate and fine graphite carbon, which will purify water and better the conditions in polluted lakes.</p>	
Summary Statement (In one sentence, state what your project is about.) Phosphate binders were tested in various phases for effectiveness in reducing eutrophication.	
Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. None	