



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.) Andrew R. Franks	Science Fair Use Only
Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) Copper in Santa Cruz Harbor Sediments, Toxic or Tolerable?	J0509
Preferred Category (See page 5 for descriptions.) 5 - Earth Sciences/ Planetary Sciences/ Physical Environments	Division <u>J</u> Junior (6-8) <u>J</u> Senior (9-12)
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>Objective: My project was to measure the levels of bio-available copper in the sediments of the Santa Cruz Harbor. Since most of the boats in the harbor use a copper based bottom paint; I thought the copper levels in the sediments might be higher than what is considered normal.</p> <p>Materials/Methods: Using PVC pipe as a coring device, sediment samples were collected from various locations around the harbor. Sampling was done from either from a small boat or from the docks. Samples were homogenized and weighed aliquots (1-2 gm) dried in an oven at 100°C. The samples were weighed again and a measured amount of weak (0.5N) HCl was added. After one day the samples were centrifuged. I pipetted 5 ml of the liquid into a test tube. These solutions were analyzed for the amount of copper with an ICP-OES.</p> <p>Results: The samples from the Harbor entrance were less than the detection limit (<0.5 ppm). Samples collected near Harbor Marine (a commercial boat yard) were quite high (500-3000 ppm). Samples from other locations in the harbor were variable but in general were less than 100 ppm.</p> <p>Conclusion: In the literature, there are a variety of acceptable levels for copper in marine sediments. These levels range from a #Threshold Effect Level# of 19 ppm to a #Sediment Quality Objective# of 100 ppm. In most areas of the Santa Cruz Harbor, copper levels were not above acceptable levels. The highest levels measured were by a boat yard where boat bottom paintwork is abundant.</p>	
Summary Statement (In one sentence, state what your project is about.) What are the levels of copper in the sediments of the Santa Cruz Harbor?	
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. Used lab equipment at UC Santa Cruz under direction of my dad.	