



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> Geena N. Garabedian	<b>Project Number</b> <b>J0609</b>
<b>Project Title</b> <b>Tsunamis: Could Target Cities and Ports along California's Coast Be Better Protected?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Since California is unprepared for a major tsunami, I wondered if a man made shallow underwater structure would make the wave break earlier before and give up some of its destructive energy before it hits homes, businesses and people.</p> <p><b>Methods/Materials</b> I first built a wave tank six feet long, two feet wide, and seven inches deep. I then built a wave maker with springs and a paddle to create a constant wave force. Sand was placed on one end of the tank to create a beach. On the opposite end was the wavemaker. Ten wooden pegs, representing buildings, were placed vertically on the beach 1/2 inch into the sand and two inches above the water surface. The Shallow underwater structure, which I will call an SUS for short, was placed thirty six inches from the shore. The SUS was made of bricks. The control group had no SUS, exp. gr. #1 was two inches below the water surface, and exp. gr. #2 was one inch below the water surface. I did ten trials for each group, by making a wave and counting how many of the ten pegs were still standing.</p> <p><b>Results</b> The average number of standing pegs after the model tsunami hit was 2 for the control, 4 for exp. gr. #1, and 8.4 standing pegs for exp. gr. #2. I even have pictures of how the wave appeared to break as it passed over the SUS. The more standing pegs in the experimental groups meant that the SUS may have helped reduce damage</p> <p><b>Conclusions/Discussion</b> I think my results support my hypothesis. The SUS makes the model wave break before the wave hits the pegs. Less wave energy may destroy fewer buildings, and reduce damage to important to important ports such as San Diego and Long Beach. The SUS could be made of rock or concrete. Since I learned that a wave breaks when the water depth is 1/2 of the wavelength, for example in 50 feet of water the SUS would be built 15 feet under the surface of the water. Ships could still pass over by staggering the SUS. If a loud siren would be added to my idea then even more lives could be saved. A SUS would not damage the view, or prevent waves from coming in for recreation.</p>	
<b>Summary Statement</b> Offshore shallow underwater structures could reduce tsunami damage along California's coastline.	
<b>Help Received</b> My father cut out the wood for my tank, and my teacher proofread my first draft and offered suggestions.	