



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>William C. Mebane</b>	<b>Project Number</b> <b>J0715</b>
<b>Project Title</b> <b>Which Erosion Prevention Method Is Most Effective for Earthen Levees?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The problem hoped to be solved is to find the best way to prevent surface erosion of earthen levees, by testing four different erosion prevention methods. Improved levees are very important to prevent flooding, which is a major risk in many areas including New Orleans and the Sacramento Delta in California. <b>Methods/Materials</b> Model levees of five different types were constructed using sand. These included five samples of control levees with no erosion protection measure and two samples each of levees with four different variables: rip-rap, grass, simulated deep roots, and reinforcement of weak points using concrete chunks. The protected side of each levee was flooded by pumping in water, and the amount of time it took for eight liters of water to cross the levee was used as the measure of erosion. This time changes depending on the amount of erosion that occurs. <b>Results</b> The rip-rap covered levee had a 29% improvement over the control levee. The grass covered levee had a 44% improvement which was the best of all types. The levee with reinforcement of weak points did slightly worse than the control levee, and the simulated deep roots levee was similar to the control levee with only a 2% improvement. <b>Conclusions/Discussion</b> It was demonstrated that grass is most effective for short term flood control. It was noted that the height of the grass and depth of the roots were greater relative to the levee height than they would be on a real levee, which contributed to the strong results of the grass in this test. Rip-rap performed well and is believed to be best for long term periods of exposure to water or where a more low-maintenance method is needed.	
<b>Summary Statement</b> Models of earthen levees with four different erosion protection measures were tested to determine which technique is most effective for making levees more reliable to prevent major flooding.	
<b>Help Received</b> Mother proofread work. Father helped with technique for building levees and recommended a pump. Parents supplied materials. Science teacher Elaine Gillum suggested studying levees and provided advice.	