



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Aaron M. Zuspan	Project Number J0626
Project Title A New Method for Tracking Individual Particle Movement in Streams	
Abstract Objectives/Goals My project objectives were to 1) develop and demonstrate the use of Radio Frequency Identification (RFID) as an effective and economical method for tracking individual particle movement in streams; 2) to investigate the relationship of particle size to distance traveled in a California stream Methods/Materials Eight rocks, of four different size groups, were implanted with 32mm glass passive interrogation transponder (PIT) tags and placed in Freshwater Creek, Humboldt County in the winter of 2005. We tracked the downstream movement of these tagged rocks by scanning the creek on two occasions using a backpack-mounted RFID antenna/receiver unit. We recorded the location that the rock were detected on a GPS device and later plotted the sites on a USGS 24k topographic map. Results We scanned the creek twice (10/23/05 and 2/10-2/15/06) from the point of placement downstream about # of a mile where we were confident that our study rocks had not traveled beyond. In these two surveys, we located 7 of the 8 rocks (87.5%) and found they had traveled between 378 to 3,120 feet. In this study, the size of the particle had little or no influence on the distance it traveled. Rock #7, from the largest group, traveled nearly the same distance (2,424 ft) as Rock #1, from the smallest group (2,629 ft). Additionally, rocks in the same size groups did not travel similar distances. Conclusions/Discussion My study showed that RFID can be used effectively to track the downstream movement of individual rocks as they are mobilized by high flows. The use of RFID in bedload movement studies should lead to a much better understanding of this important geologic process, currently not attainable using conventional methods. Additionally, my study has shown that the size of rock particle has little or no effect on its downstream migration to the ocean.	
Summary Statement My project was to develop, and demonstrate the effectiveness of, RFID technology to track individual particle movement in streams.	
Help Received California Department of Fish and Game provided the equipment for the study. My Father gave technical advice and reviewed and made comments on my report.	