



# CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

<b>Name(s)</b> <b>Brandon S. Kandarian</b>	<b>Project Number</b>  22368
<b>Project Title</b> <b>A Study of the Effects of Fire-Retardants on Oncorhynchus mykiss in a Stream or Watershed Environment</b>	
<b>Objectives/Goals</b> The objectives in this experiment are to determine which companies fire-retardants, when dropped aerially, will be the least toxic to rainbow trout, and at what coverage level should these retardants be used to be the most effective, based on the maximum amount of retardant with the maximum survival rate. The goal of this experiment is to preserve aquatic life in and around streams and waterways by using oncorhynchus mykiss as an indicator of harmful pollution for stream dwelling organisms.	
<b>Abstract</b> <b>Methods/Materials</b> A stream environment was created with all the specifications of a real stream, based on research and interviews. A holding tank was built and maintained to create a stable environment for the organisms. This was to eliminate the shock and other variables. Once all the specifications were met, the fish were added to the test and control stream. The amount of retardant to drop into the test streams was based on the proportion created between coverage levels used in real life compared to the area of the stream currently being used. The retardants were then added using aluminum wire (same metal used in planes that drop the retardants) and plexi-glass to create the rain drop effect, to simulate the way the retardants would be dropped in real life. The fish were left in this environment for an allotted period of time (based on research done on chemicals in retardants as well as the amount of time the retardant would be left in the stream for). A total of 285 fish were used in this experiment.	
<b>Results</b> D75 fire-retardant proved to have a much higher survival rate than GTS fire-retardant. D75 fire retardant at coverage level 5 proved to be the most effective coverage level for this retardant. GTS at coverage level 6 proved to be the most effective coverage level for this retardant.	
<b>Conclusions/Discussion</b> With the results I acquired, I recommend D75 and GTS fire-retardants be dropped at their most effective level (found in my research). This can allow for aquatic environments to be preserved and give organisms dwelling in the stream a much better chance at surviving. These recommendations should be used when retardants are dropped in any area that has a possibility of getting into a waterway. I am recommending D75 retardant, as well as the other retardants manufactured by the company that made D75, be used in place of GTS. I also recommend that GTS fire retardant either be removed from the market, or have its formulation reworked.	
<b>Summary Statement</b> The effects of fire-retardants on rainbow trout (indicator of pollution) are being tested in stream and water-shed environments to help adjust procedures used in dropping the retardants, to assist preservation of aquatic life.	
<b>Help Received</b> In this experiment, I designed and built all the environments and equations used. I did receive help getting research through interviews and acquiring some measuring equipment through the Forest Service. I also received help through Fish and Game in acquiring a permit.	