



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Karissa J. Willits	Project Number S1923
Project Title Super Salon: Year 2	
Abstract Objectives/Goals Elevated stream temperatures (T) and low dissolved oxygen (DO) are two components which are detrimental to salmonids. Ground water is generally cool enough to be considered thermal refugia to salmonids; but has low DO. The objective of this project was to see if the T tolerance of fish changes from year to year by comparing the influences T and DO have on steelhead salmon over two summers in Redwood Creek, Humboldt County, CA. My hypotheses were that due to high water flows this year fish would use the seeps less; fish would exhibit the same behavior trends as they did last year; fish would stay in the main channel until the stream reached an elevated temperature of 24°C; to cope with DO levels of the seeps, fish would weave back and forth between the seeps and the stream channel. Methods/Materials Four times a day, five days a week I made fish observations and measured the T and DO of the stream, seeps, seep transition zones and stream margin. Seep transition zones were identified by T and DO levels. Results The seep water had extremely low DO content, ranging from 2.65 mg/L to 3.65 mg/L. The seeps had water T under 20°C. Fish converged in transition zones, which had an average DO level of 6.53 mg/L and average T of 19.7°C. By utilizing the transition zones fish were able to get thermal refugia and adequate DO. In 2004 the creek would reach 26°C almost daily by mid summer. This year the creek would reach 24°C towards the end of summer. Significantly more fish used the seeps last summer than this summer. Conclusions/Discussion This summer at temperatures around 22°C fish were noted using the seeps, but were not stressed. Once the main channel reached 24°C fish exhibited stress behavior. Fish exhibited the same characteristics this year as they did last year, even though the creek did not reach the stream T it did last year. This year showed that fish do only use the seeps for thermal refugia because the creek did not reach as extreme T as last year, and a significantly lesser amount of fish used the seeps.	
Summary Statement I studied fish behavior to determine if the temperature tolerance of salmon changes from year to year by comparing the influences temperature and dissolved oxygen have on steelhead salmon over two summers in Redwood Creek, Humboldt County.	
Help Received Michael Sparkman from Department of Fish and Game suggested this project and provided the dissolved oxygen meter	