



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Damon C. Kawamoto	Project Number S1417
Project Title Population Modeling of the Sacramento Salmon: Combining Compositional Data with Traditional Abundance Estimates	
Abstract Objectives/Goals Many challenges are faced when forecasting the abundance of salmon for the ocean-fishing harvest. I compared two methods to estimate the abundance of Sacramento River Fall-run Chinook salmon. The standard method, the jack count method, uses the number of jacks (fish that have matured one to two years early) returning to freshwater to predict the Sacramento salmon abundance for the following year. I investigated an alternative method in which the Sacramento abundance is derived using a separate abundance estimate for Klamath Chinook and the relative occurrence (determined by genetic methods) of Sacramento and Klamath fish in the harvest. I first assessed the feasibility of this new approach using historical data from the Pacific Fishery Management Council (PFMC) including the Klamath harvest, Sacramento harvest, Sacramento Index, Klamath abundance and the Sacramento jack count. Second, I applied this method to historical fishery composition data recently obtained using genetic analysis. Methods/Materials I used the statistical modeling program R to assess the strength of the relationship between the overall abundance of Klamath and Chinook salmon and their proportional representation in ocean fisheries across different seasons and coastal locations. Results Analysis of the PFMC data revealed little relationship in the overall abundance and the harvest proportion. Conclusions/Discussion Based on an r^2 measure, the jack count method is much more accurate than the alternate methods I investigated. This suggests that fishery composition estimates from genetic data are unlikely to provide substantial improvement in abundance estimates.	
Summary Statement I investigated an alternate method to estimate the abundance of the Sacramento Chinook Salmon, utilizing a separate abundance estimate for Klamath Chinook and the relative occurrence of Sacramento and Klamath fish in the harvest.	
Help Received Eric C. Anderson helped teach me how to use R, NOAA provided data needed for my project, and my advisor led me in the correct direction.	