



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Haidyn N. Washburn	Project Number S2212
Project Title Assessing Environmental Risk of Silver Nanoparticles Using Daphnia magna	
Abstract Objectives/Goals Colloidal silver and silver nanoparticles have been used for decades to treat various medical conditions and are now being extensively added to a variety of textiles and home goods as an antimicrobial. The present study aims at assessing the environmental impact of silver nanoparticles on the aquatic ecosystem. Methods/Materials Daphnia magna were exposed to varying concentrations of colloidal silver to assess mortality. A stock solution of 1,000 µg nanosilver to 1L water was diluted to 5µg/L, 10µg/L, and 25µg/L to form the 3 test solutions. Each test group consisted of 5 plastic cups containing 5 Daphnia magna for a total of 25 Daphnia magna per test solution. The tests were monitored closely and mortality of Daphnia magna was documented every 2 hours over the course of 28 hours. After 28 hours all Daphnia magna in test groups 1, 2, & 3 were dead. Results After 28 hours all test groups had 100% mortality. The average lifespan per trial of test group 1 (5µg/L) was 19.32 hours. Test group 2 (10µg/L) had an average lifespan of 9.44 hours and test group 3 (25µg/L) had an average lifespan of 6.8 hours. The control group, consisting of 500mls water, only had 3 of the 25 test Daphnia die during testing. Conclusions/Discussion Although mortality was proven to be dose dependent, changes in terms of death rate were significant at 25µg/L colloidal silver concentration exposure. These findings are significant in showing increased toxicity to a vital part of the aquatic food web.	
Summary Statement This study proves that silver nanoparticles dramatically increase mortality in Daphnia magna; threatening a vital component of the aquatic food web.	
Help Received I researched testing techniques required for this study and performed all tests myself.	