



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Cesar G. Garcia	Project Number 33261
Project Title Impacts of Urban Runoff on Rocky Intertidal Biodiversity	
Objectives/Goals Urban runoff has become an increasing threat for marine organisms due to high toxicity levels, lower salinity and extra nutrients supplied from drain outflows. An experiment was conducted to determine whether urban runoff had an impact on rocky intertidal organisms by measuring relative abundance of colonial anemone (<i>Anthopleura elegantissima</i>) and sea lettuce (<i>Ulva lactuca</i>) as well as species richness. So, what impact, if any, does urban runoff have on the species richness and relative abundance of the rocky intertidal? It was hypothesized, that an increase of foreign toxins would have a negative impact on both relative abundance and species richness of rocky intertidal.	
Abstract Urban runoff has become an increasing threat for marine organisms due to high toxicity levels, lower salinity and extra nutrients supplied from drain outflows. An experiment was conducted to determine whether urban runoff had an impact on rocky intertidal organisms by measuring relative abundance of colonial anemone (<i>Anthopleura elegantissima</i>) and sea lettuce (<i>Ulva lactuca</i>) as well as species richness. So, what impact, if any, does urban runoff have on the species richness and relative abundance of the rocky intertidal? It was hypothesized, that an increase of foreign toxins would have a negative impact on both relative abundance and species richness of rocky intertidal.	
Methods/Materials A series of observational measurements were conducted in three sites that were impacted by urban runoff, each with a corresponding control site, in order to assess relative abundance of two key species: colonial anemone and sea lettuce as well as species richness of the entire rocky intertidal. Percent coverage, and average count served as indicators for relative abundance. Other species were then identified and recorded to calculate species richness.	
Results Data from both impact and control sites were compared through statistical tests to see if there was a significant difference in relative abundance and species richness. The results proved to partially contradict the original hypothesis of a negative impact on rocky intertidal caused by urban runoff. None of the three sites showed any correlation for percent coverage or average count. Additionally, two of the sites had a high species at the drain-impacted site. The third site showed the contrary: there was higher species richness at the control location.	
Conclusions/Discussion The patterns observed throughout the entirety of the data collected at each site were contrary to the original hypothesis. One explanation for the occurrence of higher species richness near the drains is the supply of extra nutrients, such as phosphates and nitrates, provided by urban runoff. Wave exposure may also have significant influences on the impacts urban runoff can have on rocky intertidal due to the washing away of toxic substances. Further research and analysis is needed to formulate a concrete conclusion and gain a better understanding of the impacts of urban runoff on rocky intertidal.	
Summary Statement Possible negative impacts of urban runoff on rocky intertidal were measured by quantifying relative abundance of colonial anemone and sea lettuce as well as species richness of the entire rocky intertidal.	
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