CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J1022

Project Title
Baywatch: Spread Rate Analysis of Pollutants in a Coastal Bay Environment

Abstract

Objectives/Goals
I wanted to see how different bay pollutants might spread in Humboldt Bay. Which pollutant would have the fastest and farthest spread rate if it fell into a coastal bay?

Methods/Materials
Four sections of ten foot plastic gutter were used to represent four different bays. These gutters were protected from wind, temperature and gradient influences. Four different types of pollutants; gasoline, kerosene, diesel, and motor oil were introduced into their respective gutters. We added the same amount of pollutant and water to each gutter. The water used was drawn from Humboldt Bay, California. Each pollutant spread rate was measured in inches over a twelve hour period. The experiment was repeated three times the exact same way.

Results
The gasoline had the fastest and farthest spread rate over time. The kerosene and diesel results were very similar in their spread rates of time and distance in each experiment. The motor oil was the slowest and traveled the shortest distance.

Conclusions/Discussion
My hypothesis was that the gasoline would spread the fastest because it had the lowest molecular weight. The gasoline did spread the farthest and fastest in the gutter environment. Its molecular weight is 92-95, which is significantly less than the other pollutants. This study was limited only to spread rate over time. I realized from doing my experiment that in order to truly analyze the worst pollutant spill, numerous additional variables would need to be studied. These would include evaporation rates, wind, tides, longevity, depth, temperature, and chemical risk to marine life. Based solely on spread rate study, gasoline would be the worst spill in a coastal bay environment.

Summary Statement
I tested four different pollutants in a coastal bay environment to see which pollutant would have the worst spill if it were to fall into a bay; based upon spread rate over time.

Help Received
Oral interview with Glen Sonntag; a member of the United States Coast Guard Spill Abatement Team; My parents helped me build my bay gutters; My father helped me understand the scientific method.