# CALIFORNIA STATE SCIENCE FAIR
## 2008 PROJECT SUMMARY

**Name(s)**
Sam Falkenhagen

**Project Number**
**J1005**

**Project Title**
# The Effect of Precipitation on Nitrate Concentrations in San Francisquito Creek

**Abstract**

**Objectives/Goals**
The purpose of my project was to determine how the level of nitrate (NO3-), a common pollutant coming mainly from fertilizers, varied in different locations along Los Trancos-San Francisquito Creek. I was especially interested in how the nitrate levels varied before, during, and after a torrential rainstorm that dropped more than 4 inches of rain across the Bay Area on January 4th, 2008.

**Methods/Materials**
On January 3, I took 5 water samples along a 10 mile stretch of San Francisquito-Los Trancos Creek the day before the driving rains were forecasted. As heavy rains hit the Bay Area on January 4, I went out and collected 7 more samples, again working my way down the creek. On January 6, after the storm had passed and I had allowed enough time for immediate run off to drain down the creek, I collected 8 more water samples. After organizing my samples, I used a Horiba Ion Meter (NO3-) to measure the concentration of NO3- in each sample (ppm).

**Results**
- Water samples taken during the rains had 5 to 6 times more nitrates (100-200 ppm) than samples taken before the rains (15-30 ppm).

- Sediment laden samples contained significantly higher nitrate levels than the same samples measured subsequently, after sediment was removed.

- On every day I collected samples, nitrate levels generally increased through the town of Portola Valley, decreased through Stanford#s more rural property, and then increased through Palo Alto, an urban area.

**Conclusions/Discussion**
Since sediment laden samples had more nitrate than the same samples without sediment, I conclude that much more nitrate is contained within the soil itself, than the amount of nitrate dissolved in the water. If one can filter out the sediment in a heavily nitrate-polluted creek, many of the negative effects of high amounts of nitrate can be mitigated. Since the samples taken in the rural, Stanford area had lower amounts of nitrate than the samples in urban areas, I conclude that human presence, whether it be on a Portola Valley farm or in a concrete apartment building in Palo Alto, is the main cause for nitrate pollution. Soil that is generally untouched by humans can not contribute large amounts of nitrate to a water system.

**Summary Statement**
The goal of my project was to determine how the nitrate concentrations in Los Trancos/San Francisquito Creek varied at different locations along the creek and also to see how these concentrations were affected by a torrential (4+ inches) ra

**Help Received**
My dad drove me to each sample location I had selected, and my family supplied the funds to purchase my nitrate meter. The experiment#s design, inspiration, and execution were all conducted by me. I also consulted Alan Launer, at the Stanford Center of Conservation and Biology, who helped verify my data