According to the World Health Organization, at least two billion people drink contaminated water. In California, there are many organizations looking at a range of contaminants from bacterial such as E. coli, to chemical such as Nitrate. In 2008, the state Legislature enacted SBX2 which required the State Water Board to research nitrate in groundwater through pilot projects across the state. In order to accomplish this goal, the State Water Board teamed up with University of California, Davis’ Center for Watershed Sciences to gather nitrate levels from public drinking water wells. The study mainly analyzed data from Tulare Basin and Salinas Valley as Nitrate levels around farming installations are assumed to be higher. I decided to look at Los Angeles County nitrate level data from UCD and found high amounts of Nitrate in southern part of the County where there is no farming.

**INTRODUCTION**

The United States Environmental Protection Agency started regulating the nitrate and other chemicals of concern through the Safe Drinking Water Act in 1975 (Fau 1995). The maximum contamination level (MCL) was first established in 1977 by the state of California as 10 milligrams per liter in the form of Nitrate-nitrogen (NO2) and adopted by the rest of the country in 1991. When the body converts Nitrate to Nitrite and turns the hemoglobin, into methemoglobin a form of hemoglobin that is able to retain oxygen but not able to release it to the tissues. This process in infants under six months of age is called methemoglobinemia also known as blue baby syndrome because the child will begin to turn a bluish tint as they lose oxygen. Other serious complications that nitrate can cause include diuresis, a condition in which the kidneys malfunction and produce large amounts of urine, bladder cancer and ovarian cancer.

**METHODS**

I used UCD Nitrate data measured in milligrams per liter measuring Nitrate as N. I also used Toxic Release Inventory (TRI) data from the Environmental Protection agency. This data provides the location, type of contaminant and approximate amount of contaminant being released. I refined the data to only show TRI sites releasing Nitrate into groundwater in Los Angeles County. In order to test my hypothesis. I created a buffer of 100 feet, 1000 feet and 1 mile around each well. I then overlayed that buffer on the TRI data to find TRI sites within 100 feet, 1000 feet and 1 mile radius’ around each well. The results were inconclusive as I found zero TRI site within 100 feet of a well, 4 TRI sites within 1000 feet of a well and 7 TRI sites within 1 mile of a well. Due to these results, I decided to look at how depth of the wells could have an effect on the results. I hypothesized that the greater contaminant levels would be found in the wells dug on shallow aquifers and the low levels would be found in wells dug on deep aquifers. I used California Water Board well depth data (>3000 data points) as my UCD data did not have depth information. I then kriged these points using the ordinary kriging geospatial analyst tool. Using the Geostatistical Wizard, I went through the 6 steps as though I was looking at elevation. I then imported the resulting raster into ArcScene and used the well depth data as the base height and multiplied this column by -1 to show the depth data as under the surface of the earth. Lastly, I imported the nitrate data and overlayed this onto the 3D model. I then used the contamination level as the base height resulting in larger towers for larger amounts of nitrate.

**CONCLUSION**

I found that the CalEnviroScreen 3.0 is misleading by using complicated methods to provide a score that does not necessarily reflect the reality of how vulnerable a population may be to drinking water contaminants. Vulnerability assessments are extremely difficult to do on drinking water because there are so many contaminants to consider. It would be expensive and difficult to test for all chemical and bacterial contaminants. The scores are supposed to reflect a person vulnerability to environmental hazards but instead they give false idea of clean water. As for my analysis, I conclude that contaminants are more dense in shallow aquifer wells, therefore the deep aquifers will be the best location for “safer” water.