Introduction

From the 1960s to the 1980s, the city of Woburn, MA was plunged into a dark period of environmental and medical unrest. The incidence of childhood leukemia skyrocketed, and contaminants were found in many of the wells in the area in 1979. In an article discussing the fallout from the environmental damage in Woburn, the city is described as "infamous for what the Center for Disease Control called "the most persistent leukemia cluster in the United States." From 1966 to 1986, 28 cases of childhood leukemia were reported in Woburn, while only six cases were expected" (Durant 93).

The contaminants leached into the groundwater from five sites, mainly W. R. Grace, NEP, and Beatrice Foods. Tanneries have been thriving in Woburn since the mid-1800s, and over the years industrial plants began to accumulate in the area to form the Industri-Plex site. In 1979, drums containing toxic waste from these industrial sites were found, and the contaminants were discovered to have seeped into wells G and H, the sources for 30% of the city’s water (epa.gov).

The Environmental Protection Agency declared a total of 330 acres a Superfund site and put measures in place to protect against further harm. The clean-up process has been underway since, but even today the sites in Woburn continue to be one of the most dangerously contaminated Superfund sites on the EPA’s watch list (epa.gov).

Methods

An examination of the flow direction of the groundwater in Woburn and the neighboring Burlington and Wilmington clarifies the true impact of the contamination. Data on the location of the Superfund sites and Toxic Release Inventory sites in Woburn, Burlington, and Wilmington was taken from toxmap.nlm.nih.gov to locate the sites in the area. A layer was created describing the complex of polluting sites with information from Durant’s article on the Wells G&H case and a topographic map. An analysis of data from MassGIS demonstrates that the flow of groundwater away from the contaminant sites has created a large area of toxic contamination, and with the water table already infiltrated, it becomes difficult to cordon off the dangerous areas and mitigate the effects of the contamination.

This investigation encourages an important question: what is the neighborhood surrounding the Superfund sites like today? This project attempts to answer this question with tools like clip, join, symbology, mask, flow accumulation, and field calculator.

Many sites in these three cities have been designated by the EPA as Toxic Release Inventory sites, or facilities that are required to inform the public about the toxic chemicals they use in their production processes (epa.gov/). TRIs surround the three superfund sites that are found in the area this project focuses on. Dangerous chemicals continue to be used in the area, and monitoring of the original contamination is still necessary.

After learning about the ongoing situation, I became curious about the population that continues to live in the area and the environmental justice they receive. The EPA defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” (epa.gov). I studied the changes in minority population and income from 1990 to 2010 to understand how the continued toxicity of the land is affecting the community. Calculations from data downloaded from MassGIS and the American Census Bureau illustrated the changes in minority population and income in areas close to the sites.

Conclusions

The examination of the community in terms of minority population are statistically significant and show an influx of minority communities in the years between 1990 and 2010. However, data on changes in income are inconclusive and contradictory. Income in the area has risen, whereas the hypothesis that the area is lacking in environmental justice would encourage expectations that income would have dropped. On the other hand, in the areas where income has risen more significantly, there is a greater abundance of single family homes; areas closer to the superfund sites have a greater number of multi-family homes, which may indicate a lower land price near Superfund sites.

For the future, it is essential to continue the clean-up process and develop new regulations. Though the regulations that are in place are a good start to protecting communities, there are still dangers in the area, and more regulations should be put in place to protect the community.

References:
NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001_Feet
Cartographer: Licole Paroly
Date: April 29, 2013
Professor: Carl Zimmerman, TA: Carolyn Talmadge
Data Sources: toxmap.nlm.nih.gov, American Census Bureau, MassGIS
Scale: 1:18,000
Projection: WGS 84_WEB_1042101902
References: