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NRE 1000 Assignment 5
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Newtown Environmental Problem

When Scott Sharlow, Manager of Technology and GIS for the town of Newtown, was asked what the biggest environmental problem is he responded, "In my opinion, the protection of the Pootatuck wellheads has the greatest potential environmental impact. It is a sand aquifer and has industrial inputs. Those wells serve most of the pressurized water customers. If they were seriously damaged it would be very costly to remedy". The U.S Environmental Protection Agency qualified the Pootatuck aquifer as a sole source aquifer based on section 1424 of the Safe Water Drinking Act (2). Section 1424 of the Safe Water Drinking Act authorizes the E.P.A to designate an aquifer for special protection (1).

The Pootatuck Aquifer is was recognized as the sole source of drinking water for the residents of Newtown as the result of a petition submitted by State representative Mae Schmidle of the 106th District in Connecticut in March of 1989. There is no alternative drinking water source with sufficient supply. If the Pootatuck aquifer were to become contaminated then there would be no easy alternative for providing sufficient drinking water to the residences in Newtown. The drinking water is rated as good to excellent but it is highly vulnerable to contamination. Some contamination may include chemical spills, runoff, septic systems, road salt, and landfill leachate. This 79 Square mile aquifer is capable of yielding approximately 4.0 million gallons per day (2).

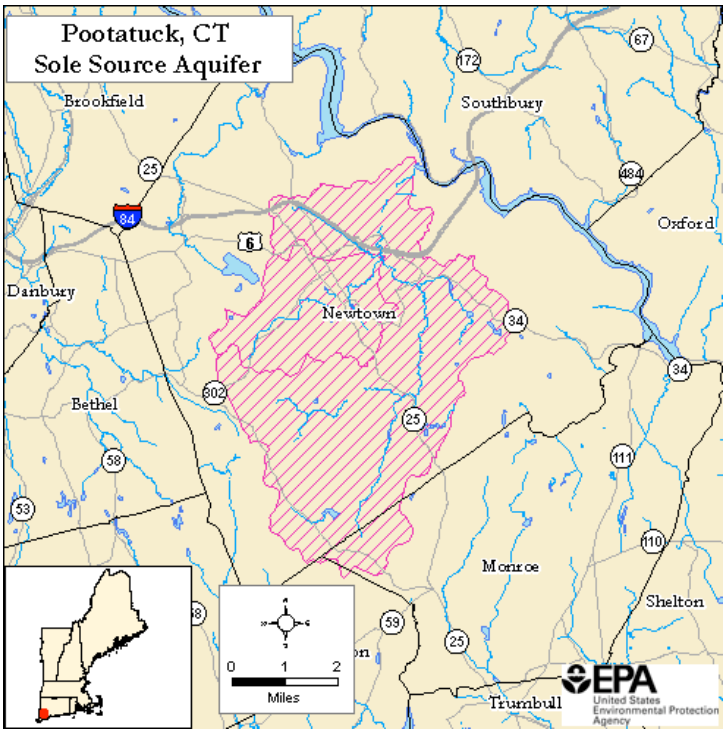

Figure 1: Pootatuck Aquifer in Newtown CT

There are major concerns for the location of the aquifer. One issue is that there is a heavy industrial plant near the location of the aquifer. There is also a town sanitary landfill in the area, as well as, an industrial waste disposal site. Road salt stockpiles and sewage plants are also located near the aquifer. Additionally, there is also gravel mining, small industrial plants and general commercial uses along the southern portion of the aquifer. (6)

More than 50% of people living in the United States rely on ground water to supply their needs for drinking water. Groundwater is water that is underground flowing in the spaces in the soil, sand and rock. Groundwater is stored in the layers of soil, sand and rocks called aquifers (9). Based on the United States Geological Survey in 2005, groundwater provides for 22% of all freshwater withdrawals; 37% of agricultural uses;

37% of the public water supply withdrawals; 51% of all drinking water and 99% of drinking water for the rural population (8).

If groundwater becomes contaminated there can be serious health effects. Hepatitis can be caused by contamination from septic tank waste. Poisoning can be caused from leachate in well water. Cancer can result from exposure to polluted water. Wildlife and vegetation can also be impacted by contaminated groundwater (7). The affects of the contamination can be devastating.

There are many different ways that groundwater can be contaminated. The biggest problems are the microbes that cause diseases, which can result from human overpopulation and human manipulation of the environment. Some examples would be mercury from mining activity; nitrogen compounds used in agriculture or chlorinated molecules from sewage. These would be considered chemical water pollutants that are usually atoms or molecules. Radioactive substances are also considered chemical pollutants. These substances would arise from tobacco farming which uses phosphate fertilizers. Pathogens from untreated sewage would also cause pollutants, they are parasites found in fecal waste. Automotive fluids such as methanol and ethanol; gasoline and oil compounds such as octane and nonane are also chemical pollutants. Physical water pollutants are much larger particles such as excessive sediment or rubbish from humans such as plastic bags; or physical factors such as temperature change. The excessive sediment can be caused from agriculture, clear-cut forests or poorly managed lands. Water pollutants are put into two categories, which are point source and non point source. Point source can be linked to discharge from sewage or factory. Non point source

is linked to agricultural runoff and urban groundwater runoff. Over 50 million deaths worldwide may be attributed to water pollution. (5)

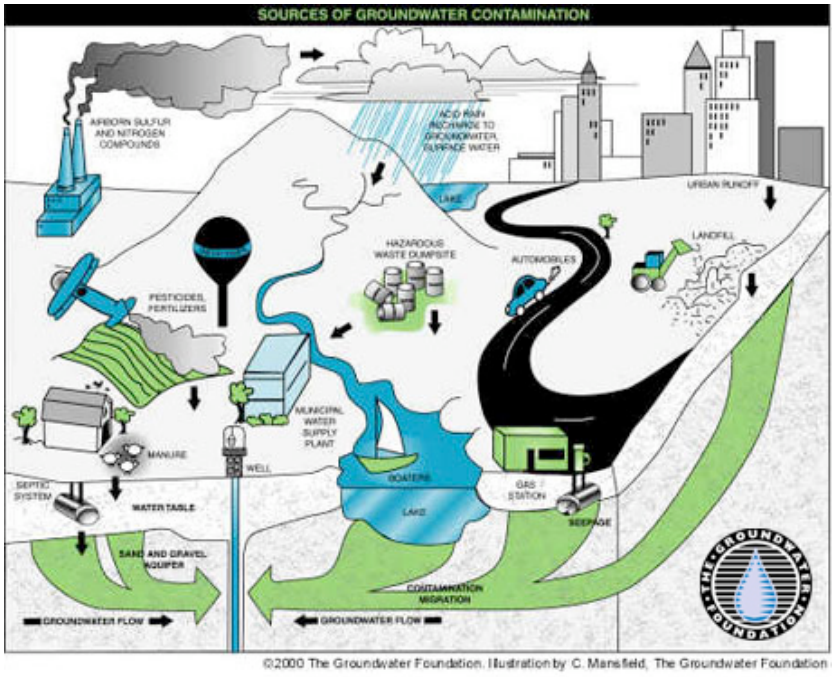

Figure 2: Sources of Groundwater Contamination

Tapping into the water supply, the wellhead is the first line of defense of protecting drinking water from becoming contaminated. The wellhead protects the well lining and the well cap and is critical in ensuring that the well does not become the access point for the contaminate. If the location is good the well is high in the landscape so the surface water will drain away from the wellhead so the contamination risk is low. If the well location is fair that means the well is on ground level so there is a moderate chance of contamination from surface water runoff. If the well location is poor then the well is poorly located in the landscape and the surface water runoff may actually move towards the wellhead, which gives it a high risk of contamination. When deciding where to put a well, one should look within 100 feet of where the wellhead would go and see if there are any of the following: septic tanks, chemical storage tanks, machinery maintenance areas,

waste piles, lagoons, sewers, underground chemical storage tanks, fertilizers, animal pens and manure storage areas. If the well is within the area of any of those things there is a high risk of the water becoming contaminated. (10).

There are a few things that can be done to improve sediment control. One is agricultural practice. Changing to contour grading and avoiding bare soils, making sure there is more vegetative cover. Another thing is to limit the usage of fertilizers, pesticide and herbicide and also to make sure not to use them in times of precipitation. Also by not using water soluble chemicals can also help so when there is precipitation the chemicals would not have such a high chance of getting into the waterways. (5)

In the case of the Pootatuck aquifer, the need to prevent contamination needs to be further driven by the town. The types of development in the immediate area of the aquifer need to be monitored. Whenever possible, industrial development should be minimized in favor of research, corporate office, and non-waste-producing uses. Stringent standards need to be mandated for on-site sewage disposal, storm water recharge, and site coverage limitation. In the case of the Pootatuck aquifer, elimination of landfill and salt storage should be taken on as a goal. In the absence of an alternative water source, Newtown needs to work to preserve wetland, flood plain and farmland, and plan to pursue the acquisition of strategic open space. (6)

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