How Humans Have an Impact on Our Watersheds Today: A Microbial Study on the Jordan River

Shields, Thanaphone (School: Syracuse High School)

The watersheds in the western United States experience many anthropogenic impacts, this project focuses on the Jordan River watershed (sourcing north of Utah Lake, running through Salt Lake City, and ending into the Great Salt Lake). It was hypothesized that areas with more human activity along the river would have lower water quality. ½ gallon water samples were gathered along 30 various points along the watershed in correlation with wastewater treatment plants. Tests including total coliforms, total E. coli, total phosphorus, and PCR detection (Human and Bovine) were performed on samples to determine the quality of the watershed. Analysis after three trials from sites 17 and 22 shows a significant increase in total phosphorus levels in mg/L from an average of ~0.06-0.45, and ~0.5-0.8 respectively. Sites 17 and 22 were located before wastewater treatment plants and prior to noticing an increase in total phosphorus; leading to the conclusion that these plants influence the phosphorus content further down the watershed. High total phosphorus is a cause of eutrophication and is problematic to the Jordan River water quality. High average E. coli levels ranging from 150-200 MPN in an urbanized area (Testing sections 4-5 after three trials) is potentially harmful to ecosystem and humans. PCR analysis shows human and bovine genetic material found throughout entire river. Negative correlation between anthropogenic impact and watershed heath was indicated through E. coli, total phosphorus, and PCR analysis. The quality of the Jordan River watershed deteriorates in areas of high human activity as the river progresses. Wastewater treatment plant emissions should be monitored closely and further testing on areas with high levels of total phosphorus and E. coli should be conducted.

Awards Won: