

Microbial Source Tracking in the Lower Passaic River Basin – Turning data into actionable information

Fecal indicator bacteria (FIB) concentrations above water-quality standards indicate that pathogens could be present and pose a human health risk to those using surface water as a source for drinking water or for recreation. According to the U.S. Environmental Protection Agency (EPA), exposure to microbial contaminants in U.S. recreational waters causes an estimated 90 million illnesses per year. As part of the EPA's Urban Waters Federal Partnership (UWFP), the Passaic Valley Sewerage Commission (PVSC) and United States Geological Survey (USGS) conducted a collaborative study in the FIB-impaired Lower Passaic River (LPR) watershed to examine potential sources. Microbial source tracking (MST) techniques were utilized to determine human and non-human sources of fecal contamination in the Saddle, Second, and Third River tributaries of the LPR in 2020 and 2021. Data collection targeted locations with varied land use (urban and forested) and historically elevated FIB concentrations to provide a better understanding of the spatiotemporal distribution of fecal contamination, as well as potential point and non-point source contributions. Results indicate that human, wildlife, and canine sources of fecal contamination were present in both the Second and Third Rivers, however, the more urban Second River was most severely affected by point source fecal contamination of human origin. In the Saddle River basin ongoing data analysis suggests human and canine sources are the leading contributors of fecal contamination. This project represents a strong collaborative effort by local, state, and federal regulators to track down and remediate sources of fecal contamination to the LPR. The identification of potential pathogen sources, such as avian, ruminant, canine, or human, can be used by stakeholders to effectively address, and reduce contaminant loading from, non-point and non-permitted sources to improve water quality. The data collected during these studies can serve as a baseline to compare additional water-quality improvement efforts or regulatory actions. These techniques used in these MST studies are easily transferable to other urban streams and provide important information for stakeholders to help achieve the overall UWFP goal of fishable, swimmable waterways.