Comprehensive Source Tracking of Illicit Discharges in an Urban Sewershed

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Background/Objective. Hickey Run is a major tributary to the tidal Anacostia River in Washington, DC and is a chronic, ongoing source of oily discharges and sewage to the river. A range of innovative sampling techniques are being used in a challenging, high-traffic environment to identify and track the sources of this contamination. Manhole-based sampling including forensics water sample collection, canine-assisted surveying, and passive techniques are proving effective in achieving the investigation objectives. Hickey Run's headwaters originate in a sewershed characterized by dense urban industrial and residential development. Downstream, the sewershed discharges to an open channel stream that flows through a wooded area (a portion of the National Arboretum) to its confluence with the Anacostia River. It is suspected that illicit connections to the piped stormwater system have caused the degraded sediment and water quality at the storm sewer outfall. A sedimentation control structure located where the upstream sewershed daylights to the open channel receives heavy sediment loads frequently containing traces of sewage, oil and grease, and a range of other contaminants. The objective of this presentation is to describe an integrated methodology for identifying and tracking potential sources of the illicit discharges and to highlight the success and lessons learned.

Approach/Activities. This study will summarize the combination of field techniques used to perform this investigation. The particular strengths of each technique and how each is integrated into the investigation will be discussed along with the data analysis procedures and the preliminary results. The techniques used include in-pipe closed circuit television (CCTV) surveying, water sampling for chemical analysis and forensic fingerprinting, passive and discrete sampling for sucralose as an indicator of sewage, specially trained canines to identify the presence or absence of human sewage, and physical dye testing of suspected facilities. Implementing these techniques in an urban environment necessitates the use of traffic control measures and the performance of work during off-hours.

Results/Lessons Learned. The application of an integrated approach for investigating contaminant sources in a densely-developed urban watershed is discussed. The effectiveness of the techniques singly and in combination and the use of confirmation sampling are discussed. Optimal phasing of the various methodologies is also discussed. The results of the contaminant source characterization for Hickey Run are presented along with the general lessons learned that could be applied in other surface water source tracking efforts.