

# **STREET SWEEPING AND ITS EFFECT ON STORMWATER QUALITY: CASE STUDY VITSIPPSBÄCKEN**

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## **Abstract**

Stormwater runoff is the main transport media of traffic related pollutants to the recipient waters in urban areas. Surface- and groundwater supplies serving for ecosystem services, drinking water production and recreation are subject to WFD regulations of priority pollutants that must comply with target or threshold values. The rapid densification of urban areas makes it difficult to implement stormwater measures in heavily polluted areas like trafficked roads or parking lots. Furthermore, other measures implemented in the sewer system, like gully filters, imply constant maintenance and higher costs. Thus, frequent street sweeping is a plausible source control alternative to implement in highly polluted areas for the reduction of pollutant fluxes induced by stormwater runoff. A mixed urban catchment draining stormwater to Vitsippsbäcken, a natural stream in the South of Gothenburg, was used as a case study area to test the effects of weekly street sweeping on stormwater runoff quality compared to gully filters. Vitsippsbäcken is a sensitive stream receiving untreated, highly polluted stormwater from the area of Sahlgrenska Hospital and the adjacent parkings and traffic roads with up to 25.000 cars/day. Weekly street sweeping with simultaneous stormwater sampling was implemented during a three-month period and its effect compared to gully filters.

The measurements under weekly street sweeping showed a reduction of most of trace metals, benzo(a)pyrene, oil and nutrients (P, N), compared to reference values from previous years measurements. Two of the main pollutants specific to the area, Cu and Zn were reduced with 40% and 30%, respectively during street sweeping in stormwater runoff. Oil and benzo(a)pyrene concentrations were 80% and 60% lower under street sweeping, respectively. These results were comparable to the reduction efficiency of gully filters with an average reduction efficiency between 40 – 60% for most of the pollutants. However, none of the above measures tested were sufficient to reduce stormwater concentration levels to local target values, due to the historically polluted areas in the studied catchment. As a conclusion, weekly street sweeping shows comparable results to gully filters and can be implemented complementary to other source control measures and possibly as full measures in less polluted areas.

**Keywords:** Trace metals, Street sweeping, Stormwater measures