DESSIN
DEMONSTRATE ECOSYSTEM SERVICES ENABLING INNOVATION IN THE WATER SECTOR

Hoffselva, Norway: Local treatment of CSO overflow

Two innovative cleaning solutions combined with data communication

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Introduction

Urban water pollution due to effluents from combined sewer overflows (CSOs) is considered a major source of water impairment by introducing high concentrations of organic nutrients, in some cases also by causing physical damage to the stream through increased water flow, erosion and the movement of boulders, trees and other debris (Lund et al. 2014). The implementation of the Water Framework Directive requires that spoiled waters regain good ecological and chemical conditions, which implies that CSOs cannot be accepted. Any impact of CSO events on the receiving water bodies must be evaluated in agreement with the defined quality targets (Andres-Domenech et al. 2010).

Objective

The objective of the demonstration is to improve the water quality in peri-urban areas using innovative local treatment solutions that enable cost efficient, sustainable mitigation of overloaded sewer systems and thereby increasing the value of Eco Service System (EES).

Site description

The Hoffselva demonstration site is a peri-urban catchment with a population of 25.000 inhabitants located in an area of 1427 ha. The site is located in the western part of Oslo, the capital of Norway. The sewer network consists of a separate system in the upper part and mainly a combined system in the middle and lower parts. The water quality in Hoffselva is poor due to pollution from 22 CSOs discharging to the river during rain events (Figure 1).

Figure 1: Visible effect on river water quality during a storm event in Autumn 2014, the CSO discharge was 1 % of river discharge.

Methodology

At Hoffselva demonstration site the efficiencies of two local CSO treatment solutions on water quality on catchment scale will be evaluated using hydraulic and quality models for the sewer system, treatment efficiencies for the demonstrated solutions, a simple hydrological and water quality model for the catchment. Specific demonstration tasks are:

1. Local treatment of CSO with an innovative high-rate filter (2015-2016).
2. Local treatment of CSO with innovative cross-flow lamella settlers (2016).
3. Integration of local CSO treatment by innovative monitoring and data communication systems.
4. Water quality and stream discharge monitoring.
5. Evaluate the effects on the ESS.

Status and results

Water quality and quantity monitoring

Selected water quality and discharge data has been measured on a regular base near the mouth of Hoffselva by Oslo VAV and analyzed in form of daily or weekly averages. For the DESSIN project, stream discharges have been additionally measured in the upper and middle part of the catchment.

This data was analyzed together with VAV's high-resolution raw data, in order to get information about the river response during storm events and CSO spill activity. Figure 2 illustrates the short response time and the need for high-resolution measurements.

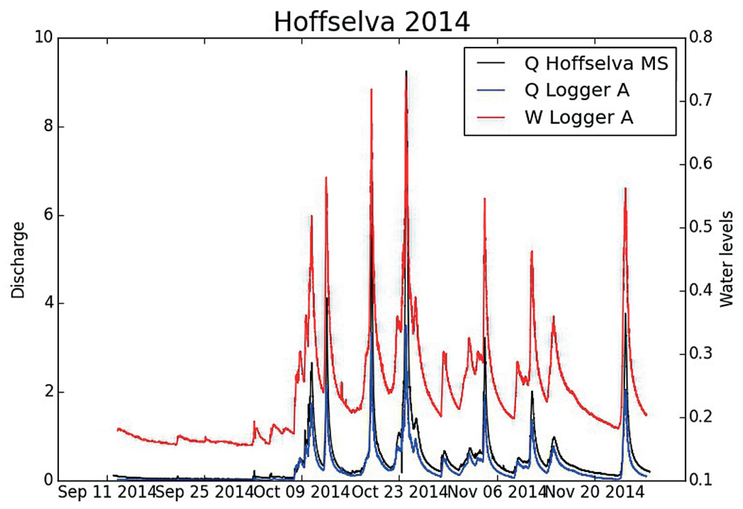

Figure 2: Measured water levels and discharges in Hoffselva during a series of storm events in Autumn 2014, illustrating the short response time and the need for high-resolution measurement. The measurement stations were situated near the river mouth (Hoffselva MS) and upstream from Holmendammen in the upper part of the catchment (Logger A).

Technical demonstration

The high-rate filtration unit was successfully installed in February 2015 at the Hoffselva site. The unit was commissioned in March 2015 and is currently operated according to the demonstration plan.

Figure 3: Installation of the local high-rate filtration unit at Hoffselva site in February 2015.

References

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