



TIRE WEAR PARTICLES IN STORMWATER POND SEDIMENTS

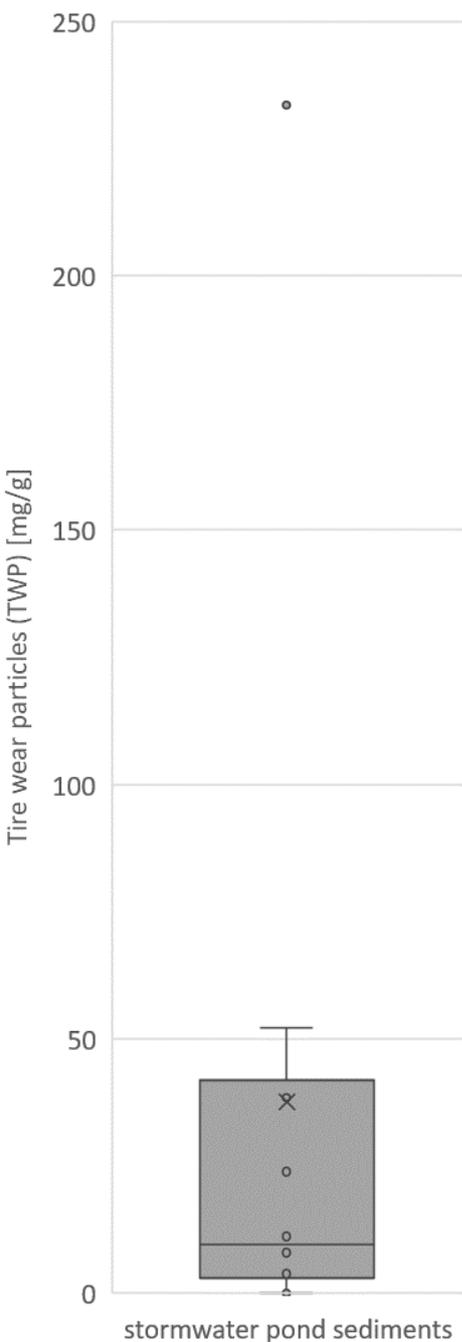
*Luleå university of Technology and Aalborg
Univeristy*

Background

A large part of the microplastics found in the marine environment are believed to originate from urban areas. The sources are e.g. tire wear, weathering of paints as well as littering and the microplastic particles may be transported via stormwater to the aquatic environment. Stormwater ponds are a widely applied treatment technique for the reduction of suspended particle and pollutant concentrations in urban stormwater. The technique relies on sedimentation of particles and particle bound pollutants which are accumulated on the pond bottom. The pond's ability to also retain tire wear particles and other microplastics may be an important factor preventing microplastics to reach the marine environment.

WHAT IS MICROPLASTICS?

*Marine littering is one of the
greatest environmental
challenges of our time and
plastic is one of the most
common types of garbage in
the sea. Microplastics are
plastic particles that are
smaller than 5 mm in size.*



About the study

Sediment samples were collected close to the inlet and outlet of four ponds and one sedimentation chamber for stormwater treatment. The land use of the facilities' catchments were for example trafficked roads, light industry and commercial areas. The sediment samples were sieved and pre-treated with density separation in order to remove mineral particles and isolate tire wear particles and several oxidation and enzymatic steps to remove organic matter. Thereafter the samples were analysed by pyrolysis-GC-MS to determine the concentration of tire wear particles (TWP). Only particles ranging from 10 to 500 μm were included in the analysis.

Results and conclusions

The concentrations of tire wear particles in the stormwater pond sediments ranged between below detection limit up to 230 mg TWP/g sediment with mean value of 38 mg/g, illustrated in the graph to the left. It is therefore clear that there are large differences in TWP content between ponds and within the same pond. The results also imply that stormwater ponds may have an important role in preventing TWP from reaching the receiving waters and marine environment and that further studies should be encouraged. Furthermore, the results indicate that disposed sediment, obtained from maintenance of the ponds, may contain significant amounts of TWP. TWP may not only be considered as pollutants in themselves, they also contain harmful substances and may carry pollutants on its surface.

ABOUT THE REPORT

Subject areas: Stormwater pond, sediment, tire wear particles

Authors: Heléne Österlund, Claudia Lorenz, Alvis Vianello

Publisher: N/A

Release year: N/A

Link: N/A

FANPLESSTIC-SEA

This fact sheet has been produced within FanPLESStic-sea, a project working with preventing and decreasing the pollution of microplastics in the water and the Baltic Sea.

Project period: Jan 2019 - Dec 2021

Total project budget: 3 m. euro

Partners: Aalborg University, Natural Resources Institute Finland (LUKE), HELCOM, Latvian Institute of Aquatic Ecology, SCICC, SALT, Gdansk Water Utilities Ltd, Gdansk Water Ltd, ECAT-Kaliningrad, Luleå University of Technology, Sweden Water Research

Read more: www.fanplesstic.com