



A characteristic study on the particles in a constructed stormwater wetland during dry days

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ABSTRACT

A 0.78 ha stormwater wetland was monitored during dry days for the characteristic behavior of particles over a period of 4 mo (June 9–September 5, 2009). The results indicated that the particles in the outflow were finer than those in the inflow due to resuspension of the fine particles and algal growth in the wetland. Based on the particles number density, the particle removal efficiency varied over a wide range (–4000–100%). This variation was largely dependent on resuspension and antecedent dry days. In terms of particles removal, the wetland can be considered as a fiber-bed filter, which is facilitated by the mechanisms of interception, diffusion and sedimentation. Particles with different size ranges showed different removal behaviors due to the different controlling removal mechanisms. The curve for the removal of particles can be divided into three parts, with two turning points within the ranges of 0.51–1 μm and 2–5 μm . Particles less than 4 μm occupied a higher number fraction, with a lower volume fraction, and accounted for the relative high surface area fraction. Particles with different size ranges play different roles in their contributions to turbidity and total suspended solids (TSS). Turbidity was mainly related to particles less than 10 μm , and TSS were more affected by particles coarser than 4 μm . In summary, the success of a stormwater wetland depends on how the resuspension of highly polluting-related fine particles are controlled and particles with different size ranges are treated via appropriate design efforts.

Keywords: Particles removal; Particle size distribution; Resuspension; Stormwater wetland; Dry days; Algal growth

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