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Urban stormwater engineering – pollutants, pollutant management and ecosystem enhancement

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Urbanization creates impermeable surfaces and drainage structures that completely alter the natural hydrology of a drainage area. The hydrological effects relate to decreased runoff attenuation, decreased groundwater formation, increased flooding issues, and a decrease in land occupied by wetlands, ponds and lakes. At the same time the buildings, infrastructure, and activities of the urban landscape lead to a formation and release of a wide spectrum of pollutants that become concentrated in the surface runoff.

The list of priority pollutants in urban stormwater is ever-increasing, and it is debatable which pollutants are the more 'serious' in terms of environmental impacts.

- This lecture presents novel data on a group of organic micropollutants which recently has gotten the attention of regulators, namely biocides from buildings. The lecture discusses if biocides from urban landscapes is one of the 'serious' pollutants, or if it is negligible.

A number of techniques have been developed to manage stormwater pollutant issues. These technologies fall in two main groups: Pollutant removal by sedimentation, and pollutant removal by filtration. The first group comprises for example retention ponds while the second group comprises for example infiltration ponds. Even though these installations are intended for technical purposes, they become inhabited by wildlife.

- This lecture presents novel data on the aquatic ecosystems of retention ponds and relates this to pollutants in form of PAH, heavy metals, and urban biocides. The lecture discusses if urban technical waters are a threat to or benefit for the biodiversity of a region.

While it is comparatively straightforward to apply stormwater treatment technologies in open urban areas like suburbs, these techniques are impractical or impossible to apply in the dense city where pollutant issues are more pronounced than in an open urban context.

- This lecture presents thoughts of how stormwater treatment in the dense city can be approached. It does not present finite solutions but invites to an open discussion on needs, possibilities, and problems.