

Contaminant assessments in the Auckland region (New Zealand): (1) industrial catchments and (2) emerging chemicals of concern

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Abstract

Urban runoff and yields have been assessed for sediment and chemical contaminants in the Auckland region (New Zealand). These are reported in a separate paper. This paper describes further field work on the characterisation of contaminants found in industrial catchments, and the assessment of the presence of emerging chemicals of concern. Contaminant runoff from industrial areas can be highly variable, dependent upon land use and activity, and on-site controls. Six industries were identified for assessment (service stations, automotive, metal processing, pain manufacturers, plastics and timber). Sediment samples were collected from catchpits for assessment to provide an indication of the presence and relative levels of contaminant runoff from the industries. The samples were analysed for particle size distribution, heavy metals and petroleum hydrocarbons. Zinc, copper, lead and petroleum hydrocarbons were found in all sediment samples, while mercury was found at half of the industry sites. Chromium was found at the metal processing and timber locations, while the presence of arsenic was limited to the catchpits near the timber industries. In a separate study, a literature review of organic emerging chemicals of concern (ECCs) was undertaken in 2007. From this review, 34 ECCs were selected for field analysis to cover the major classes of ECCs, including surfactants, flame retardants, plasticisers, estrogens, antifouling biocides, fungicides and pesticides. To assess the prevalence of ECCs in Auckland's estuaries, surface sediments were collected from 13 estuarine sites, selected to represent influences from combined sewer overflows (CSOs), marinas, landfills, industrial/urban, and agricultural/horticultural discharges. Sediments were analysed for the identified ECCs. The samples collected were kept in frozen storage for future assessment (eg, the samples are currently being used to assess the presence of pharmaceuticals). Difficulty was encountered in finding local laboratories to undertake all of the assessments, as well as challenges around the limits of detection. The study confirmed the presence of a number of ECCs in selected Auckland estuarine sediments. Polybrominated diphenyl ethers (PBDEs) were detected in all sediments, which also may be a function of the extremely low laboratory limit of detection of these compounds. Potential endocrine disrupting chemicals (EDCs), including alkylphenols, steroid hormones, and bisphenol-A, were detected in a few of the locations.

Keywords Monitoring, stormwater, urban runoff, water quality, heavy metals, emerging chemicals of concern (ECC), combined sewer overflow (CSO), Auckland region, New Zealand