

## **Spatial and temporal distribution of PAHs in the North Saskatchewan River, Alberta, Canada**

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**Abstract** Northern Canadian Rivers provide a broad range of ecosystem services, but increasing pressures from development and resource extraction have negatively impacted the ecology and water quality of many of these relatively pristine river systems. The North Saskatchewan River (NSR) drains an area of 57 000 km<sup>2</sup> in northern Alberta and provides water for multiple uses. However, landscape disturbance has increased the flux of a variety of sediments and associated contaminants in this river. To evaluate the spatial (gradient from headwater to downstream sites) and temporal (inter-annual) variation of PAHs in the NSR, grab samples of fine-grained river bed/bank sediment deposits were collected in 2010 and 2011 at 20 monitoring sites over a distance of 1000 km from Rocky Mountain House to Lloydminster. An additional 10 samples were collected in 2011 at the confluence of the main river with tributaries of varying land use. Individual congeners of 16 PAHs were extracted from sediment samples and analysed for PAHs. Compared to data reported for other northern Canadian rivers, PAH levels in the NSR are comparatively low (7 to 40 ng/g) and well below the sediment quality guidelines consensus-based Threshold Effect Concentration (TEC). PAHs in NSR sediment are primarily of pyrogenic origin and likely originate from mining processes, combustion of fossil fuels and some industrial discharges.

**Key words** polycyclic aromatic hydrocarbons; sediment; North Saskatchewan River, Canada; sediment quality guidelines