

Fraction distribution and risk assessment of heavy metals in sediments of North Saskatchewan River

R Jin^a, KO Konkauser^a, DS Alessi^a, MK Gingras^a

^a *Earth and Atmospheric Sciences, University of Alberta, AB, Canada*

Sequential extraction technique developed by Tessier was used to select different phases (exchangeable fraction, carbonate fraction, Fe/Mn oxide fraction, organic fraction, and residual) in both suspended sediment and bedload sediment collected in North Saskatchewan River to determine the mobility and dynamics of heavy metals and their bioavailability and subsequent toxicity. The distributions of heavy metals among the 8 different sampling sites collected along the river are showing no significant changes between each other. However, there are some differences between bedload and suspended sediment due to their different mineral composition. Substantial Cd, Ba and Mn are more likely to stay in the exchangeable phase than in carbonate phase in bedload sediment. In bioavailable phases, the percentages of Cu are almost three times in bedload sediment than that in suspended sediment, while the average proportion of Sr in bedload sediment is 30%, which is nearly half of that value in suspended sediment. According to the Risk Assessment Code (RAC), major portions of Cu and Sr are contained in exchangeable and carbonate fractions and therefore lead to a higher environmental risk and also threat to the aquatic species during the sorption processes. Various physicochemical parameters such as Ph, anions, alkalinity, TOC, TN, carbonate, particle size, mineral composition, etc. are also reported

Corresponding author: rjin1@ualberta.ca