



Assessment of contaminant flux from heavily polluted benthic sediment of Tongi Khal (canal): an ex-situ approach

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Received 10 July 2019; Accepted 12 October 2019

ABSTRACT

Polluted sediment bed can act as a secondary pollution source for the overlying water layer in polluted water bodies. This study investigates contaminant (selected nutrient and heavy metals) flux from the sediment of Tongi Khal (canal) through laboratory batch experiments. The results of this research suggest that accumulated pollutants in bed sediment are important contributors to the deteriorated water quality of Tongi Khal. Significant flux of ammonia (as high as 900 mg/m² d) from sediment to water column was observed. However, the ammonia concentration in water has been found to decrease with time together with an appreciable rise in pH, indicating significant algal uptake of ammonia; nitrification was not an important mechanism (for reduction of ammonia concentration) in the anoxic condition of the experimental systems. The flux of other nutrient constituents (e.g., phosphate) was not significant, but enough to support algal growth in the water column. The flux of Pb was insignificant suggesting that lead was strongly bound to the sediment layer in undisturbed condition. Though there was some flux of chromium from sediment to water, this was not very significant. However, results of this research suggest that physical disturbance of sediment could immediately make the overlying water layer anoxic, and promote enhanced release of nutrients (e.g., ammonia), organic matter, suspended solids, and heavy metals. Sustained disturbance, as could be expected during dredging, would severely deteriorate the water quality of Tongi Khal.

Keywords: Contaminant flux; Polluted sediment; Tongi canal; Nutrient flux

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