

# Evaluating sediment quality in order to find possible beneficial uses

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## Abstract

Dredged sediments are produced worldwide for the maintenance of harbours and to secure proper water levels in water bodies. Additionally, dredging could be employed to recover aquatic ecosystems and improve its environmental quality by extracting polluted sediments. On-land, sediments require proper management, and using the material in beneficial uses in the circular economy could be a response to eliminate traditional disposal methods such as landfilling and discharge in open oceans. Preliminary, the sediments must be characterized to find valuable compounds and potential pollutants that could cause a risk of pollution in society. This study evaluates the characterization of main components of sediments from Malmfjärden bay, Kalmar, Sweden. Moreover, a Tessier speciation of As, Cd, Pb, Ni, Cr and Zn was performed to assess the risk of metal pollution while dredging and during beneficial uses. The sediments were sampled from Malmfjärden bay using a manual core sampler. The studied sediments present a high concentration of nitrogen and a medium level of phosphorous. The organic matter is about 13 %, considered high, according to SS-EN-ISO-14688e2:2018. The speciation shows that the major concentration of metals is associated with the residual fraction, suggesting a natural origin and a low risk of release to the aquatic ecosystem or during in-land applications. The most concern elements were Zn and Pb, showing a medium risk of contamination. The results suggest that environmental dredging techniques are recommended to avoid spreading and effects on the surrounding aquatic ecosystem. Future studies will focus on the safe recovery of nutrients from the sediments.

**Keywords:** dredging, sediments, nutrients, metals, speciation, recovery, risk assessment, circular economy