

Chemical quality assessment of sediments of the scheldt Estuary using sediment quality guidelines

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In sediment risk assessment, analysis of the pollutant concentrations is essential in determining the degree and nature of sediment contamination. However, chemical analyses provide no evidence of toxic effects or effects in situ. The Sediment Quality Triad method incorporates measures of various chemical parameters, toxicological effects and benthic community structure in view of conducting an integrated assessment of sediment quality. In view of developing a triad assessment method for brackish sediments in Flanders, for the chemical component of the triad assessment an inventory of existing sediment quality guidelines (SQGs) was made. Numerous sediment quality guidelines have been developed during the past 30 years to contribute to managing contaminated sediments.

Originally, sediment contamination was assessed by determining bulk chemical concentrations of individual compounds and comparing them with reference of background concentrations. Since the 1980s biological effects have been more incorporated in the derivation of SQGs. Approaches to derive SQGs include among more the equilibrium partitioning approach, the effects rang approach, effects level approach, apparent effect tresholds and screening level concentration approach. In total 75 SQGs for micropollutants were gathered in a database. For every SQG the derivation method and type was indicated, and a "class" was contributed to each SQG with class 1 indicating no ecotox effect, class 2 indicating an ecotoxeffect, and class 3 indicating a severe/unacceptable ecotox effect. In 2015, 30 sediment samples were taken along the Scheldt estuary (Sea Scheldt (Flanders) and Western Scheldt (The Netherlands)) and other brackish aquatic systems in Flanders. For these samples, chemical parameters (e.g. metals and organic pollutants) were determined and evaluated against the SQGs.

Based on the SQG database, a first determination of SQGs will be made for application in the Triad Assessment Method, allowing for grouping of sediments into 4 different quality classes, varying from "no ecotox effect" to "unacceptable ecotoxeffect".