

A methodology to select contaminated sediments for prior remediation on a regional scale – case Flanders

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Introduction: In Flanders, waters contain abundant amounts of aquatic sediments, which in most cases are contaminated. The sediment monitoring network from the Flemish Environment Agency (VMM) points out that more than 80% of the sediments in navigable and unnavigable waters in Flanders show a significant indication of (severe) contamination. Because of the high cost for the removal of dredged material and the shortage of dredge landfill, there is currently an accumulation of contaminated sediments.

The Public Waste Agency of Flanders (OVAM) is responsible for waste management and soil remediation in Flanders. The remediation of contaminated sediments is contained implicitly in the general regulation on soil remediation and soil protection. Besides this general regulation conform soil remediation, the decree also contains a specific stipulation on the necessity and actual realisation of remediation projects [1], and this in harmony with the Integral Water Policy [2]. The starting point for this regulation is the selection of contaminated sediments for prior investigation and remediation on a regional scale.

Integral water policy in Flanders is coordinated through the coordination commission of integrated water management (CIW). Therefore, the OVAM and the CIW developed a methodology to prioritise the contaminated sediments in Flanders.

Methods: A methodology was worked out, based on a Multi Criteria Analysis (MCA), setting the frame for a decision support system for the selection of sediments that need to be prior investigated. Within this MCA, ten criteria were taken into account, and obtained a score and weight depending on their importance. In this way, an ecological investigation priority (EIP) factor could be calculated.

The methodology itself consists of two stages. In a first stage, only objective data from the sediment monitoring network or other scientific investigations are taken into account through the decision support system, while during the second stage the active role of the expert is a necessity in order to add specific knowledge on specific water courses to the methodology (e.g. recent discharge point,

infrastructural planning, known contaminating sources hampering sustainable remediation,...).

Results: In the first stage, the decision support system listed up a first 'theoretical' selection of contaminated sediments based upon objective scientific data generated over the year for a specific measurement point. For this, ten different criteria were taken into account. These criteria can be grouped into three groups: 1. criteria that define the quality of the sediment and how it interferes with the original (ecological) functions of the waterbody. 2. criteria that determine the aquatic ecosystem and 3. criteria that enhance a successful ecological recovery after remediation. These ten criteria account for a specific EIP factor for each measurement point. By listing these different EIPs, a first selection of 266 measurement points from more than 5000 measurement points was made possible.

This resulting list was used as input for the second stage, where it was evaluated through an expert judgment. Therefore all water course managers concerned were consulted. In this way, the specific expert judgment could be linked with the theoretical list. As a result of the practical expertise of the water course manager, a final list of contaminated aquatic sediments that need to be prior investigated was made up. This final list contains 60 selected measurement points. These measurement points were translated into 60 water course segments. At this moment, the first 15 segments listed are selected to be investigated in the near future.

Discussion: By use of a MCA, a first selection of measurement points was made possible before expert judgement was conducted. In this way, a broadly based prioritisation of contaminated sediments could take place taking into account all measurement point available within the sediment monitoring network. Through this first 'theoretical' selection, expert judgement became a feasible task.

References: [1]Decree on soil remediation and soil protection, 27 October 2006, www.ovam.be
[2]Decree on integral water policy, 14 November 2003, www.ciwvlaanderen.be