

PHYSICOCHEMICAL CHARACTERIZATION OF SEDIMENTS AND WATER IN MALMFJÄRDEN BAY, KALMAR AS BASIC INFORMATION FOR DREDGING FOLLOWED BY METALS AND PHOSPHORUS RECOVERY

Silvia Dalle Pezze¹

Fabio Kaczala²

William Hogland²

¹*University of Trento, Italy*

²*Linnaeus University, Sweden*

Abstract

The Environmental Science and Engineering group (ESEG) at LNU has recently started the project “SURE- Sediment Uptake and Remediation on Ecological Basis” in cooperation with the municipality of Kalmar and the business sector. The project has funds from the EU LIFE program and it has the objectives of showing how feasible it is to restore the ecological status and hydro morphology from an eutrophic sea bay, the Malmfjärden Bay, Kalmar, without creating any disturbances and major environmental/ecological impacts. The project consists of using an innovative method for bottom sediments dredging, followed by dewatering and treatment of both aqueous and solid phase. Besides treatment, the project will investigate potential techniques for metals and phosphorus recovery from the dredged sediments in way that valuables lost from the anthropogenic cycle are “given back” within the beyond zero waste concept.

During these first months of project, a preliminary assessment of the physico-chemical status of the area was carried out with water and sediments being sampled from different points and depths in order to understand how contaminants are spatially distributed in the bay in the current situation. From each sample, sediments and pore water were initially characterized in terms of organic matter, water contents, bulk density, metals, COD, TOC, and P. The first results have shown that dried sediments were rich in nutrients such as Fe, Ca, K which are essential for agricultural purposes. In a zero waste vision this is a positive result, in particular because the project’s sub-objectives are to demonstrate a process to clean and recycle at least 70% of dredged sediments. Also heavy metals like Cu, Zn, Pb, Cr, Co were found in the sediments. The values were compared to the standard values established by the Swedish Environmental Protection Agency (SEPA) and all the data were in acceptable range imposed except for Cobalt. The average values was 95 mg/kg compared with 30 mg/kg imposed by SEPA. This means that before reused the sediments a treatment is necessary. To conclude, it can be stated that these initial results are very interesting since the main idea of the project is to remediate the area and recover as much as possible valuables from the dredged sediments such as metals and nutrients.

Keywords

Dredging, Sediments, Metals, Phosphorus, Resource recovery, Remediation.