

Impact of offshore Dumping Sites on the state of the marine environment in SE Baltic Sea region

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Introduction: Dumping Sites these are separate areas of the seabed, where dredged sediments from ports may be deposited. Generally dredging is a very important process. Dredging is necessary to prevent flooding, to facilitate sailing, to keep ports vital, to allow all the uses of a given water system. Big part of dredged material is deposited in the sea (on dumping sites). Currently, there are more than 20 offshore dumping sites in South-Eastern Baltic Sea, which are used for depositing of dredged material from port areas and navigation channels. Improperly managing dumping site may pose a threat to the marine environment and ultimately the health and life of marine organisms and humans. The aim of the study was to examine the state of dumping sites in SE Baltic region and their impact on the marine environment.

Methods: In the Baltic Sea Region was realized (in 2011-2014) ECODUMP project ("Application of ecosystem principles for the location and management of offshore dumping sites in SE Baltic region") conducting by Klaipeda University Coastal Research and Planning Institute (Lithuania) and Maritime Institute in Gdansk (Poland) in the framework of South Baltic Cross-border, Co-operation Program. The project carried out geophysical surveys of sediments in areas of existing dumping sites. The actual deposits of excavated material are identified on the basis of the sonar maps of dumping sites made previously during the project. The study of physico-chemical and ecotoxicological parameters of dumping sites (in Poland and Lithuania) were conducted on a large scale. The sediment samples were taken using vibro corer and grab from Multipurpose Oceanographic Research Laboratory r/v IMOR. After macroscopic description of the cores single geological layers were isolated. The subsamples of sediment were prepared for laboratory analyses. In these samples were carried out the following analyses: density, humidity and loss on ignition by gravimetric methods; total nitrogen by titration after acid digestion and steam distillation; phosphorus by ICP-OES; labile form and total content of metals (As, Pb, Cu, Zn, Ni, Cd, Cr, Hg, Ca, Mg, Al, Fe, Li) using methods ICP-OES and AAS; PAHs, PCBs and oils by CG-MS and GC-FID

methods. In surface sediment from this area was carried out biological analysis also.

Results: Results of analysis of Dumping Sites (in Poland and Lithuania) allow us to assess the degree of contamination of stored sediments and their potential impact on the environment.

Chemical studies of Dumping Sites in Lithuania and Poland, have shown that the highest concentration of some pollutants in bottom sediments was observed outside Dumping Sites. It was probably caused by moving fine fractions of dredged material during the process of deposition of sediments on dumping site.

The level of chemical pollution at Dumping Sites (in Poland and Lithuania) does not generally exceed the allowable concentrations and was typical for the Gulf of Gdansk and Lithuanian part of the Baltic Sea.

Biological studies of Gdynia Dumping Site have shown that no significant alterations of macrozoobenthos community and structure that could be directly connected to dumping activities were found.

Deposition of the dredged material in the sea always causes impact on the marine environment. However if leading this process under control and accordance with the rules previously followed should not cause adverse effects in marine environment

Results of investigation were used while creating monitoring and control programme of Dumping Sites in the SE Baltic Sea and Guideline for location of new Dumping Sites within the project ECODUMP (WTPB.02.01.00-72-016/10).

References:

HELCOM Guidelines for the Disposal of Dredged Material at Sea - Adopted in June 2007 (2007).