

Environmental budget related to dredging and depositing of polluted sediments in Stamsund harbor, Norway

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Introduction: The Norwegian Coastal Administration is planning to change the entrance to Stamsund harbor to make room for larger boats. In connection with the planned work on the new entrance there is also need for dredging of polluted sediment close to the entrance, and in an area in the inner part of the harbor. The sediments are planned to be deposited in a natural submersion in the seafloor of the harbor.

Methods: Sediment samples were taken in the areas where the dredging is taking place, in the natural submersion in the seafloor and in surrounding areas.

All sediment samples were analyzed for the content of heavy metals, PAHs, PCBs and TBTs. Analyses for potential of chemical leaching were also performed.



Fig. 1: Polluted sediment

The results from the chemical analysis were used to calculate the risk of release of pollutants from the sediments to the water column as an environmental budget. The risk assessment includes bioturbation, propeller disturbance and transport by organisms.

The release of pollutants from the sediments to the water before dredging was compared with the release of pollutants while dredging and the release of pollutants from the sediments to the water after the cleanup. This was done to determine the environmental gain of the cleanup in the polluted sediments.

Results: Tab. 1 gives the effect of the cleanup in the sediments in Stamsund harbor as a function of time.

Tab. 1: The effect of the cleanup as a function of time.

Time (year)	Cu	Pb	B(a)p	PAH ₁₆	PCB ₇	TBT
2	4 %	-4 %	20 %	31 %	20 %	45 %
4	29 %	21 %	45 %	56 %	45 %	70 %
6	38 %	29 %	54 %	64 %	53 %	78 %
8	42 %	33 %	58 %	68 %	57 %	83 %
10	44 %	36 %	60 %	71 %	60 %	85 %
100	53 %	45 %	69 %	80 %	69 %	94 %
1000	54 %	45 %	70 %	81 %	69 %	95 %

Discussion: For heavy metals the effect of dredging does not seem to be discernible the first 5-10 years. The concentration level of metals in the sediments was relatively lower than the level of organic pollutants before dredging was performed. On the other hand, an improvement of the concentrations of major pollutants (PAH₁₆, PCB₇ and TBT) is observed shortly after dredging.