

## Sustainable sediment management in a 'rigid' river basin, a port's perspective

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**Introduction:** The last century river basins have been confronted with reduced capacity for dynamic processes. Inundation areas and buffer areas disappeared, urbanisation increased and agricultural practices changed. Room for rivers was decreased tremendously. This all resulted in unbalanced sediment dynamics in the river basin and also increased load of contaminants. As a result seaports, which are often situated in the brackish zone of the river basin, are like reservoirs confronted with an accumulation of sediment related problems. In first instance the ports focused mainly on removing the (contaminated) sediments, but last decade there was a change in a more sustainable approach addressing the ecosystem functions that different parts of the river basin have to fulfill as well as trying to reduce the impact of contaminants on the ecosystem as well as ensuring the more sustainable transport mode over water. The approach of the port of Antwerp will be presented as an example.

**Upstream:** Both sediments as well as contaminants are coming from the upstream part of the Antwerp port area. The port area is fed by water from the Meuse as well as from the Scheldt. The docks, located between locks, act as a kind of sink of the sediments and contaminants. To get a better idea about the relative input from upstream, the port made an inventory of all sources of a number of contaminants. Especially nutrients and pesticides enter the docks mainly from upstream. For sediments it is still not known what the relative contribution of the river basin is.

**The port area:** The water body 'Docks of Antwerp' is required to reach also the good ecological potential. However the whole water body is manmade. Deep water systems with vertical quays and low water velocity. The main function of the port is navigation and therefore both maintenance dredging as well as deepening is almost a continuous process. The port of Antwerp investigated the impact of the contaminated sediment on the ecological status, both directly as well as indirectly due to resuspension. The impact seems to be rather low. The

ecological status is likely hampered by a lack of structures. Artificial structures as well as fish pounding grounds have therefore been installed.

On the other hand it is clear that the concentration of contaminants in the surface layer decreased a lot last decade, due to burial of more polluted sediment, dredging activities etc. However there are a number of contaminants, such as copper, mineral oils and some PAHs that showed higher concentrations. An inventory of all diffuse and point sources makes it possible to address the sources as far as they are located in the port area itself.

**Downstream:** Like many ports, the port of Antwerp is located at the 'end' of an estuary. Due to land reclamation and deepening of fairways dynamic processes in the estuaries have been hampered and this has an impact on the goods and services delivered. Three recent studies show that sustainable sediment management in the estuary can enhance the ecosystem functioning as well as ensure the navigation capacity as well as protect the area against the impacts caused by climate change. A direct link between sediment management and the ecosystem functions in the Scheldt estuary was worked out in the Tide project (see presentation of K. Wolfstein). Strategic dumping projects can enhance the development of low-dynamic and ecological valuable habitats in the estuary (see presentation of Y. Plancke). Finally the Flemish Ccaspar project showed that strategic and sustainable management of sediments in the Vlakte van de Raan, just in the mouth of the Schelde estuary, should be worked out to optimize the area for multiple use purposes as well as to reduce the impact of climate change.

**Discussion:** Like other ports, the port of Antwerp changed the way how they manage sediments. They are more and more involved in a more sustainable management approach and try to address also sediment management in the river basin in function of nature development, safety as well as nautical purposes.

