

# Let's synergize and really start building with nature! Three examples of sediment reuse in The Netherlands

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## **Introduction:**

In The Netherlands most of the highly polluted sediments have been dredged in the 90s and 20s. As a result of Dutch policy and regulations water quality has improved tremendously which has affected sediment quality as well. Regrettably, most sediments are still considered as a waste product and unnecessary transported to landfills.

This really is a big waste, since it might have been beneficial reused instead. By going over all project phases of three cases, we like to share our experiences and inspire you to change your mindset.

## **Background**

As dredging of sediments is necessary on regular basis for nautical reasons either the increase of water discharge capacity, this is a good starting point for Eco-engineering and nature based solutions to improve water quality in a durable and sustainable way. With the National Dutch Environmental law, to be implemented in the coming years, it is expected that areal approaches will be stimulated. The legislation for large scale applications for soil and sediment in surface water (like deep pits) first steps are already made, whereas other measures are in progress.

It is expected that a more integrated approach for contaminations and nutrients will be implemented in which the re-use of sediment in 'nature based solutions' will contribute in the sustainable functioning of water systems.

While initiating a project you might encounter several bottlenecks you need to pass, before you can really start executing it. Bottlenecks could be related to policy, politics regulation, planning, decision making, designing and stakeholder management. In this paper three cases will be discussed in more detail.

### *Shallow lakes of Wormer- and Jisperveld*

The Wormer- and Jisperveld is under European Natura2000 protection and classified under the EU Water Framework Directive (WFD) as surface water body. Two types of light weight geotextile constructions were built to steer fines and to store sediment. About 15.000 cubic meters of slightly

polluted sediment was dredged and transported to these constructions in order to alter hydrodynamics and induce nature development.

### *Former sandpit in urban area*

This former sandpit is located in an urban park in the city of Veenendaal. This lake is characterized by steep shores and lacks underwater vegetation. In summer time blue-green algae dominate and threaten water quality. In order to improve water quality, 35.000 cubic meters of sediments with low phosphorus concentrations will be used to create shallow zones. On these platforms vegetation can develop in order to make this waterbody more resilient to high nutrient concentrations. As a coagulant, iron chloride ( $\text{FeCl}_3$ ) is added to the dredged material to facilitate sediment settling and immobilize phosphate under aerobic conditions. Over time it is expected that helophytes and submerged vegetation will compete with algae for nutrients and make this waterbody more robust.



**Fig. 1:** Creating shallow and ecological zones in a former sandpit (location Veenendaal).

### *Shores of Langwarder Wielen*

In order to improve the lakes water quality of the Langwarder Wielen, the surface area of helophytes needs to increase. To do so, over 200.000 cubic meters of sediment will be reused to create shallow banks on which plants can develop. Upcoming vegetation will be protected for wave impact by a barrier of geotextile (Sediment Storer). Fish passages facilitate fish migration from the lake to this shallow zones for breeding and refugee spots.