

# The Tidal Elbe Concept – Sustaining the Tidal River Seaport of Hamburg

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**Introduction:** Fired by a considerable increase of dredging necessities during the last decade and the challenges implicated by the designation of the fairway as EU-protected Natura 2000 sites, the Hamburg Port Authority (HPA) together with the Federal Waterways Administration (WSV) has - based on extensive scientific expertise - developed a long term strategy with the potential to benefit both nature and economy. This so called Tidal Elbe Concept is continuously being revised, adjusted and gradually implemented to sustain the tidal river seaport of Hamburg for the 21<sup>st</sup> century and beyond.

**Methods:** The Tidal Elbe Concept is based on the facts of a constantly changing estuary. An estuary that is changing (natural changes such as erosion/sedimentation, sea level rise etc.) and that has been and is being changed by men (land reclamation, fairway adjustments, river engineering, port extensions etc.), with the result of high siltation rates in the upper part of the estuary, especially in the valuable shallow water areas and the port. A strong tidal pumping has lead to the high dredging needs in the last decade, with a peak in 2005.

Three crucial targets have been derived from the findings: 1) reducing the incoming tidal energy, especially through soft constructions in the mouth, 2) creation of shallow water areas in the upper part of the estuary (room for the river), and 3) an adapted sediment management considering the whole system including the remediation of contaminated sediments in the river basin area.

To tackle the first option numerous investigations have been conducted including deep hole drillings and seismic exploration to establish a geological model as a basis for the search for sand suitable to “feed” sandbanks in the eroding mouth. Through this appropriate sand has been found so that currently design and feasibility of such quasi-natural constructions are being investigated, same as their hydrological effects.

The implementation of the second cornerstone will be begun even sooner. With the creation of a 42ha tidal area, including some 30ha of natural tidal shallow water out of a formerly realigned but high lying spill site, the Hamburg Port Authority is setting the stakes when it comes to give back room to the

river, which is an indispensable prerequisite to sustainably enhance the estuary’s condition. Knowing this is only the start, other options for more tidal volume are being examined in and around Hamburg.

A special focus in context with the second cornerstone is the identification of synergies with other spatially significant aspects such as nature conservation, urban- and landscape planning, flood risk protection or recreation. To set off a societal dialogue, a book of landscape architectural visions for urban tidal landscapes has been produced.

The third aspect of the concept, the sediment management has already been concretized with a complementary river engineering and sediment management strategy, together with the neighboring Laender and the Federal Waterways Administration. Besides an adapted holistic relocation scheme, a special focus is being put on the remediation of abandoned industrial sites in the catchment area which are the source of a major part of the contamination of some sediments that need to be treated and deposited when dredged in Hamburg.

For the entire concept communication and collaboration is crucial. This is why the Port Authority is actively engaged in numerous exchanges regarding estuary management. Together with the environmental ministries of the neighboring Laender and the Federal Waterways Administration HPA is setting up an integrated management plan regarding Natura 2000. Since 2010 HPA is lead partner in the Interreg VIb project TIDE, a vital exchange of experts from the Humber, the Scheldt, the Weser and the Elbe.

And Hamburg is even thinking beyond this century: As sea level rise will come in the course of climate change, the HPA, together with its partners, is developing scenarios that could ensure the beneficial use of the Elbe as an artery of the region, including sea bound navigation. Intelligent dredging will play a crucial role thereby.

More information can be found online:

[www.tideelbe.de](http://www.tideelbe.de)

[www.hamburg-port-authority.de](http://www.hamburg-port-authority.de)

[www.tide-project.eu](http://www.tide-project.eu)