

Developing sediment management measures

ELBE ESTUARY

The German "Waterways and Shipping Administration" (WSV) and the "Hamburg Port Authority" (HPA) are responsible for the maintenance of the waterway of the Elbe estuary. They face the challenge of sustainably and cost-effectively managing this task while preserving or improving the functions of the estuarine system. They have to mitigate the effects of the main pressure for the system - tidal pumping. Conducting river engineering measures is considered to be one of the solutions, but they must find common acceptance in the region.

The IMMERSE project partners, the Federal Waterways Engineering and Research Institute (BAW) and HPA are working together to assess the effects of one of several engineering measures being currently evaluated in a stakeholder process that intends to find the most feasible measures.



The Elbe estuary is the artery of the Metropolitan Region of Hamburg with Germany's largest seaport and the most important shipping route for international maritime traffic in Germany. Additional to the various economic uses, it functions as a unique habitat for highly specialized flora and fauna that is under pressure and therefore protected by national and European environmental legislation. The diverse estuary is also highly dynamic, and changes its shape constantly as a result of strong tides and massive sediment transport.



The Elbe estuary

Sediments out of balance

Since the beginning of development in the region, human activities have changed the natural estuarine system: Land reclamation, construction of dikes and barriers for flood protection, deepening of the fairway and backfill of harbour basins.

As a consequence of these changes, the natural estuarine system and its sedimentation and erosion patterns is out of balance. Tidal pumping, an imbalance between flood and ebb currents, enhances upstream sediment transportation and deposition in the upper estuary. The stronger flood tide currents transport the sediments upstream, whereas the weaker ebb current is not capable to fully move them back resulting in a net accumulation, especially in the Hamburg area with consequences for economy and ecology.

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Over the last six years, dry periods of low headwater discharge have exacerbated the tidal pumping pressure, and sedimentation and thus dredging necessities increased dramatically.

In addition, contaminants from former industrial and mining sites in the upper river catchment bind to suspended matter and end up in the tidal Elbe. Both the increased amount of sediments and the contamination result in high maintenance efforts and costs for the port. Additionally, further uses as well as natural areas are affected by the consequences of the high amount of sediments.

Developing measures with early stakeholder participation

In 2013, the responsible authorities for the maintenance of the fairway, WSV and HPA realised that an adapted sediment management strategy is needed to meet the challenge. They started to develop management measures to cope with the increasing pressure and involved the various stakeholders along the estuary in that process. For the first time at the Elbe estuary they all together discussed an appropriate sediment management strategy, including long term river engineering measures to dissipate tidal energy and thus tidal pumping, and suitable disposal sites for dredged material. In 2015, the consultation process ended with a common accepted report and recommendations. One of them was the establishment of the estuary partnership "Forum Tideelbe" that should identify and assess possible sites for river engineering measures.



Port of Hamburg at night

The reconnection of the anabranch "Dove-Elbe" is one of those measures that should dissipate tidal energy and create new tidal habitats.

What role does IMMERSE play?

The aim of IMMERSE is to advance management measures and enhancing stakeholder commitment. Therefore, the project partners BAW and HPA support the partnership by assessing how suitable and feasible it will be to reconnect the "Dove-Elbe" to the tidal regime. They will evaluate the hydro-morphological and ecological effects and have the concerns of the residents analysed. The results will be discussed with the IMMERSE partners and be made available for other interested estuaries. In the next Elbe story, you will find out more about the estuarine partnership, and the results on the assessment of the Dove-Elbe reconnection.



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