

MODELLING IMPACTS OF ANTROPOGENIC MEASURES OF THE PAST CENTURY ON HABITATS OF THE SCHELDT ESTUARY

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The River Scheldt has a macrotidal estuary with a tidal reach up to 160 km upstream. During the last century the estuary is heavily modified by anthropogenic measures such as land reclamation, widening of the navigation channel, sand extraction, channel straightening and reduction of river discharge. Tidal marshes, intertidal and sub-tidal mudflats have reduced with more than fifty percent. Therefore, a better understanding of cause-effect relation of human interventions and sea level rise on ecological important habitats is required to give guidance to managers reducing possible negative effects of future actions.

Firstly, a 1D and 2 Dimensional hydraulic model is used to quantify the effect of different anthropogenic measures and sea level rise on high- and low-water levels, flood- and ebb-volumes and mean velocities. Additionally we have analysed high and low tide measurements of the last century are analysed.

Secondly, the evolution of ecotopes since 1850 are mapped for the Sea Scheldt and tidal tributaries based on available data on tidal regime, bathymetry, hydrographic maps and aerial photographs.

Results show that land reclamation have mainly an effect on high-water level in order of the area and the location in the estuary and reinforce sea level rise. Widening of the navigation channel result in contrast to the sea level rise in a decrease of the low-water level in combination with sand extraction. In the limited estuarine area of the Sea Scheldt both effects strengthen the impact on tidal mudflats and marshes by significant increasing of the intertidal slope.

Characteristic for the fresh water zone, the effect of channel straightening dominates the reduction of the river discharge causing major loss of low dynamic flooding areas.

This combination of numerical modelling and the analysis of tidal data and ecotope improves our understanding of pressures and impact on the estuary and will help to predict changes in the spatial distribution of ecological units following induced or natural physical changes.