Lessons learned in managed realignment design along the Scheldt estuary (Belgium)

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With the updated Sigmaplan the Flemish government aims to harmonise flood control and ecological rehabilitation in the Scheldt Estuary. Tidal wetland restoration is essential to success.

Three different types of managed realignment have yet been applied:
- Removal of defences: Ketenisse, Lillo west,
- Breach of defences: Paardeschor, Lillo east, Heusden
- Realignments of defences: Paddebeek, Noordkasteel

In these managed realignment projects crucial design issues includes initial ground level, creek precursors, breech dimensions, whether or not to remove dikes and width of the area.

In 2003 Ketenisse has been levelled below mean high water resulting in a brackish tidal area of 60ha. Similarly at Paardenschor (2004) and Lillo west (2012) 12ha and 5ha are restored. Defences have been breached at Heusden (2006) and at Lillo East (2011) resulting in 11ha freshwater and 3ha brackish tidal area. By realigning the dikes near Paddebeek (2004) 1.6ha and 2.4ha near Noordkasteel (2010) was restored.

Initial ground levels varied between the sites from mean high water to 1 meter below MHW. The lowest levels are obtained at dike removal sites (1-0.5m-MHW) compared to breached sites (0.5-0.1m–MHW) and defence realignment sites (0.3m-MHW). Creek precursors have been dug out in Paardeschor and Lillo.

One aim in managed realignment design is to optimise creek formation. In these sites creek formation occurred exclusively in zones with net sedimentation. Creek density increased with a decreasing slope and an increasing width. At Lillo breaching is compared with an adjacent dike removal area and sedimentation rate did not differ. These measures together with creek precursors led to a dendritic creek system in the deposited sediment.

In managed realignment projects along the Scheldt wide areas, levelled well (1-0.5m) below mean high water with deep creek precursors appear to have the highest potential for tidal marsh restoration.