

Transfer to other estuaries (Replicability & Transferability)

The core concept of combining Flood Control Areas (FCA) and Areas with a Controlled Reduced Tide (CRT) to give “Space to the River” is an original idea that has been developed, implemented and monitored in a pilot project in Flanders, Belgium. The experience gained at the pilot site Lippenbroek (a CRT studied during the LIFE project MARS) combined with the development of 8 additional realisations during this project, complemented with additional knowledge gained in this action will be used to assess the applicability of the core concept in other European Estuaries.

In order to facilitate knowledge transfer, the latests state-of-the-art modeling tools will be applied to describe the hydrodynamics, the sediment dynamics and the habitat succession for the 8 realisations. Flanders Hydraulics Research (FHR) associated with the Own Capital Flanders Hydraulics (EV FH) will collaborate on this with the Research Institute for Nature and Forest (INBO) and the University of Antwerp (UA). The models will be calibrated and validated using the in-situ data from the monitoring at the 8 locations.

In order to speed-up the model development, and to enhance applicability and acceptance of the model results, only well-established models and methodologies will be used in this work package.

The SCALDIS model is an extensively calibrated 3D Telemac model for the Scheldt estuary (Vanlede et al., 2015). It will be locally refined in order to describe the detailed hydrodynamics in the selected locations and calibrated and validated using the in-situ data from the project-monitoring.

Sedimentation in the 8 project areas is estimated using a calibrated empirical approach (Vandenbruwaene et al., 2011).

Habitat Mapping is done based on the modelling results using the methodology established by INBO (Van Braeckel et al, 2015).

The SCALDIS model is coupled with the ecological model of UA (Maris et al, 2007) to model uptake of nutrients and provision of silicon in the areas.

The models will give a deeper insight in the expected effects of the 8 realisations on Nature and on Safety than the estimates that are at hand during the writing of this proposal.

During a series of 3 international technical workshops the core concept, the design methodology, the expected effects and the monitoring plan is shared with European partners. The final outcome of these workshops is a quickscan of the applicability of FCA and CRT in other European estuaries to obtain protection against flooding in combination with nature development.

For the CRT system to function properly, a carefully dimensioned lock construction with combined inlet and outfall has to be placed at a specific height within the tidal window. This

is the only way to secure an appropriate neap-spring tidal variation, which is crucial for the development of mudflats and tidal marshes in the area.

The CRT technique is often unknown in the other EU member states but can also be used in other estuaries. Especially under the following conditions:

- Available space is very limited, which means maximum storage capacity is required when the peak of the storm surge hits.
- The relative altitude of adjacent land is unfavourable in relation to river, which prevents formation of proper mudflats - tidal marshes in case of depolderisation.
- The embankment alongside the river needs to be retained and kept accessible.
- Large tidal fluctuations are undesirable in floodplains.
- Large depolderisation operations are undesirable because the fairway is left without sufficient water at times when little water is available, which jeopardises shipping.

Based on the existing international network of the project partners, These 7 estuaries are considered for a series of 3 international technical workshops:

- Scheldt (Belgium, the Netherlands)
- Seine (France)
- Loire (France)
- Tidal Elbe (Germany)
- Weser (Germany)
- Ems (Germany, the Netherlands)
- Humber (United Kingdom)