

Controlled reduced tidal areas: an evaluation of 10 years Lippenbroek

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When considering marsh restoration on embanked sites, managed realignment is not always an option, due to site characteristics or safety considerations. Regulated Tidal Exchange (RTE) can offer an alternative. Here we present results of ten year of monitoring of the pilot project Lippenbroek.

Lippenbroek is a flood control area with a controlled reduced tide (CRT), a technique similar to RTE, but with major ecological advantages. A well designed sluice system allows semi-diurnal water exchange between the safety area and the estuary. Although the tidal amplitude is strongly reduced, the newly created marsh faces inundation characteristics similar to our macrotidal reference marsh, showing a wide range of inundation frequencies. Most RTE on the contrary reduce this essential inundation gradient by minimising the springtide - neap tide differences.

We present results of ten years intensive monitoring on tidal variation, nutrient processing, species colonization and habitat development in the 10 hectare big pilot CRT. Mass balance studies show that the CRT acted immediately as a sink for e.g. nitrogen. The site evolved from a source of phosphorus to a sink. Rapid colonisation of benthic species is related to input of estuarine sediments. Vegetation patterns and sedimentation rates are linked to flooding frequencies. Long term predictions are however difficult since a CRT has no feedback mechanism that decreases flooding frequencies with increasing elevation of the marsh. For this, adaptive management at the sluices is an option, depending on the kind of habitat that is requested.

Our results indicate that the CRT-technique provides strong potential for durable, adaptive restoration of tidal marshes on low sites. Within the Schelde estuary, the technique will be implemented on larger scale: more than 1500 ha of CRT marshes is under construction.