EVALUATION OF ECOSYSTEM SERVICES OF A FRESH WATER TIDAL RESTORATION PROJECT

Oosterlee Lotte, Tom Maris, Sander Jacobs and Patrick Meire

Ecosystem Management Research Group, Department of Biology, University of Antwerp, Universiteitsplein 1c, 2610 Belgium
E-mail: Lotte.Oosterlee@ua.ac.be

All over the world estuaries are considered to be economically very important ecosystems that provide ecosystem services (Costanza *et al.*, 1997) which for their part contribute to human welfare (Fischer *et al.*, 2009). To compensate for losses of estuarine habitat and accompanying services, costly investments are often needed. However, not all ecosystem services are replaceable causing a decrease in human welfare. World-wide restoration projects and nature development of estuarine ecosystems take place to restore the delivery of ecosystem services. Disfunctioning of ecosystems corresponds with the reduction or standstill of the delivery of several ecosystem services. To determine and evaluate these deliveries an evaluation of the ecosystem is a prerequisite. The functions or ecosystem services of intertidal restoration areas were already described in literature (De Groot *et al.*, 2002; Cox et al., 2006) and even used as conservation goals of the Schelde (Adriaensen *et al.*, 2005). However, the quantification of these services was not performed before. In this study three ecosystem services of intertidal habitats, i.e. aeration, nitrogen retention and silica delivery, were quantified to evaluate these services. Our study site is a former agricultural area that was turned into a flood controlled area with a controlled reduced tide (Cox *et al.*, 2006). Since four years, fresh water intertidal mudflats and marshes are developing. Due to the controlled in- and outflow through a system of sluices, this site is perfect for mass balance studies. During tidal campaigns dissolved oxygen, nitrogen and dissolved silica concentrations were measured several times a year after which mass balance studies were performed. The results of these mass balance studies show that the study area provides in two functions: aeration and nitrogen retention. Also silica delivery was observed when estuarine silica concentrations were limiting.

References

Adriaensen F., S. Van Damme, E. Van den Bergh, D. Van Hove, R. Brys, T. Cox, S. Jacobs, P. Konings, J. Maes, T. Maris, W. Mertens, L. Nachtergale, E. Struyf, A. Van Braeckel, P. Meire. 2005. 'Instandhoudingsdoelstellingen Schelde-estuarium', University of Antwerp, Report Ecobe 05-R82, Antwerp. 252p. + annexes. Study was carried out in cooperation with the Institute for Nature Conservation, Flemish Community (Department Nature), KULeuven (Laboratory Aquatic Ecology).

Costanza R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R.V. O'Neill, J. Paruelo, R.G. Raskin, P. Sutton, M. van den Belt. 1997. The value of the world's ecosystem services and natural capital. Nature 387(6230):255.

Cox T.J.S., T. Maris, P. De Vleeschauwer, T. De Mulder, K. Soetaert and P. Meire. 2006. Flood control areas as an opportunity to restore estuarine habitat. Ecological Engineering 28(1):55-63.

De Groot R., M.A. Wilson and R.M.J. Boumans. 2002. A typology for the classification, description and valuation of ecosystem functions, goods and services. Ecological Economics 41:393-408.

Fischer B., R.K. Turner and P. Norling. 2009. Defining and classifying ecosystem services. Ecological Economics 68(3):643-653.