Predicting the provision of ecosystem services in coastal landscapes

Michael Kleyer[1*], Martin Maier[1], Annett Schibalski[2], Boris Schröder-Esselbach[3]

[1]Landscape Ecology Group, University of Oldenburg, 26111 Oldenburg, Germany
[2]Institute of Earth and Environmental Science, University of Potsdam, Karl-Liebknecht-Str. 24-25, 14476 Potsdam-Golm, Germany

[3]Institute of Geoecology, Department Landscape Ecology and Environmental Systems Analysis, University of Braunschweig, Langer Kamp 19c, D-38106 Braunschweig

* michael.kleyer@uni-oldenburg.de

Climate change threatens coastal areas of the North Sea and the Baltic Sea primarily through accelerated sea-level rise, increasing storm surges, and increasing winter rainwater discharge. Accelerating sea-level rise and changes in hydrological cycles are likely to affect coastal ecosystems and may restrict the efficiency of existing protective measures in the future. Here, we will present an inter- and transdisciplinary investigation of four land management scenarios, applied to a North Sea and a Baltic Sea coastal region. These scenarios aim at an increased rainwater retention and storage. We show the chain of models to quantify and evaluate the performance of multiple ecosystem functions and services in each scenario for the next 100 years. Modelling includes process-based hydrological models and statistical species distributions models. We then model the provision of provisioning, regulatory and cultural ecosystem services based on the traits of the predicted species with yearly time steps until 2100.