



Identification of ecosystem services in an artificial reef and quantification of coastal protection

Ecosystem Services in the Coastbusters project

- Aim? Provide an overview and a first quantitative estimation of the benefits supplied by an artificial reef in the North Sea
- What? Ecosystem services describe the benefits our society gains from natural components and processes.
- Why? Analysing ecosystem services helps to evaluate the ecological/sustainable aspects of the project.
- How? Converting these services via different methods to monetary values.

Table 1: Expected tendencies of ecosystem services in the Coastbusters project.

Class	Services	Mussel	Flora	Sand Mason
Provision	Nutrition	↑ ⁴	Possible for algae ⁴	-
	Materials	-	Possible for algae ⁶	-
	Energy	-	Possible for algae ⁶	-
Regulation	Climate	↑ ⁴	↑ ⁴	↓ ⁷
	Mediation of Waste	↑ ^{2,4}	↑ ⁴	↑
	Coastal Protection	↑ ^{2,4}	↑ ^{3,4}	↑ ⁷
Cultural	Intellectual	↑	↑	↑
	Experimental	↑ ⁴	↑ ⁴	-

↑

↓

-

Positive tendency

Negative tendency

No impact

Expected

Measured

Quantification of Coastal Protection

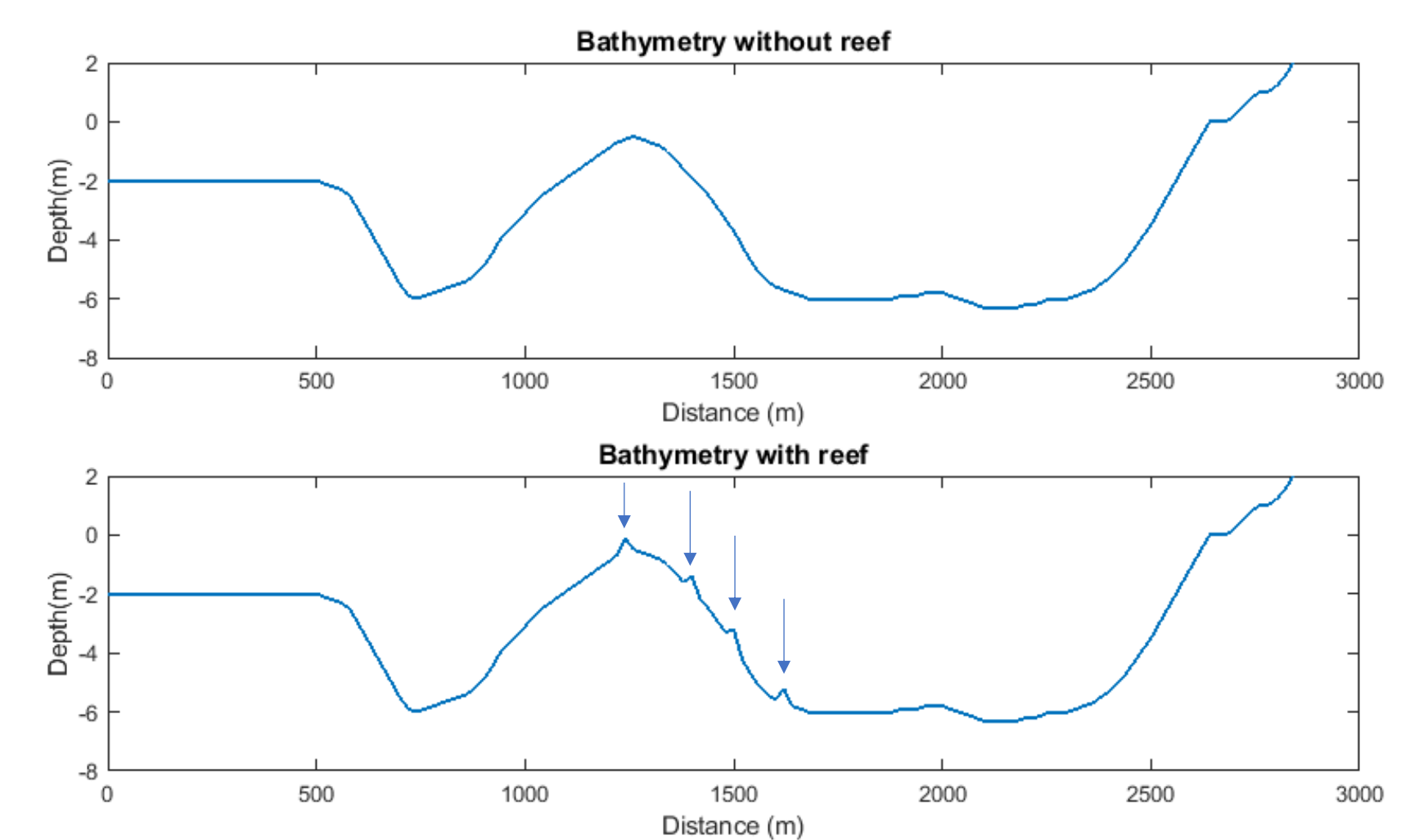
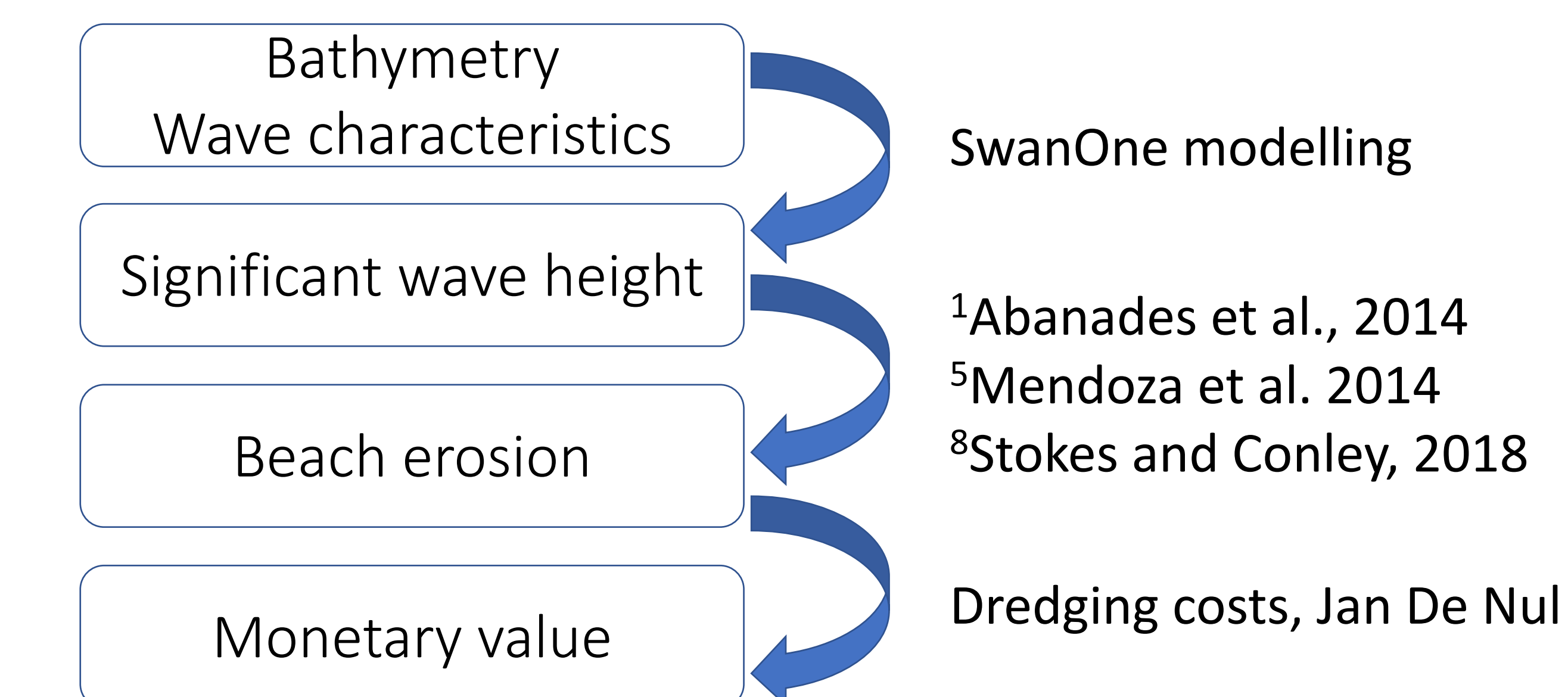


Figure 1: Local bathymetry without and with the reefs

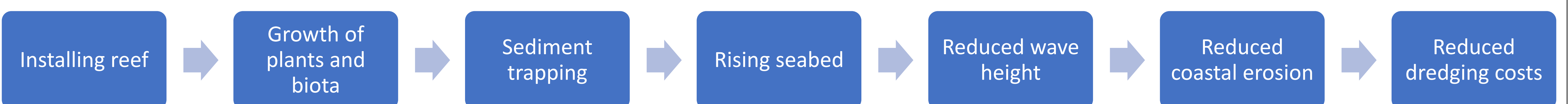


Figure 2: Expected effects chain within the Coastbusters project

Conclusion and expectations

The reef provides other services than only coastal protection. Expected is that the reduced wave height will lead to reduced dredging costs

nature based solutions: like biogenic reefs

- **improve** water quality and clarity
- **prevent** erosion and **stabilize** shorelines
- are more **resilient** against storms
- **reduce** wave height up to **66%** during storm events
- **act as** natural **barriers** to waves
- **provide** fisheries habitat, **increase** biodiversity and **promote** recreation
- **store CO2**



ILVO, eCoast, DEME, Jan De Nul and Sioen industries have gathered forces to develop a new natural way of coastal protection. Coastbusters is a project financed by VLAIO Government Agency (Flemish Flanders Innovation & Entrepreneurship) where several tools for the creation of ecosystem based flood defense (shellfish reefs/marine flora reefs/sand mason worm reefs) will be tested. These ecosystems have the capacity to reduce erosion and even storm waves and can keep up with sea-level rise by natural accretion. If the project is successful, it can be implemented globally on a large scale, creating healthy ecosystems and protecting many of the world's highly populated coastal zones.