The foreshore: an ecological valuable ecosystem in danger

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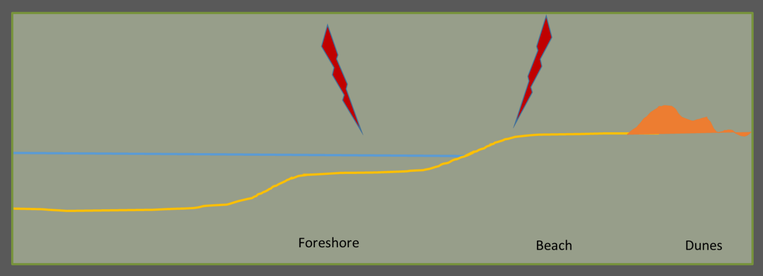
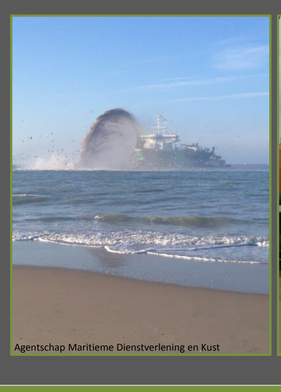
The beaches and foreshore are under pressure due to climate change and anthropogenic use

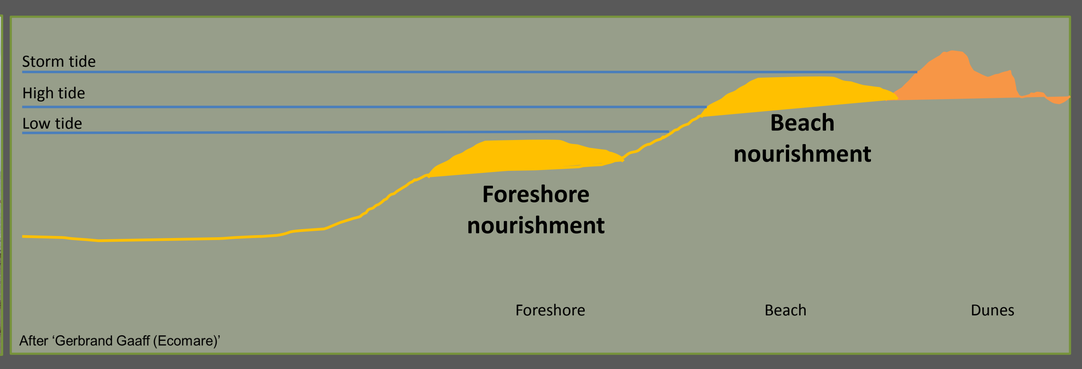


In the framework of 'Masterplan Coastal Safety' of the Flemish government, weak spots will be managed to protect the flemish coast and hinterland → *social and economical aspects*

Hard substrates as coastal defense technique are known to hamper ecosystem functioning, therefore soft defense approaches such as **beach nourishment**, are applied worldwide. To optimize the maintenance of these nourishments, **foreshore nourishment** is proposed as alternative technique

The foreshore harbours a relative diverse marine ecosystem and is important as nursery ground for early life history stages of fish and other marine organisms. The maintenance is of vital importance for the health of marine coastal ecosystems → *ecological aspects*





4 SHORE: ECOLOGICAL MONITORING CAMPAIGN

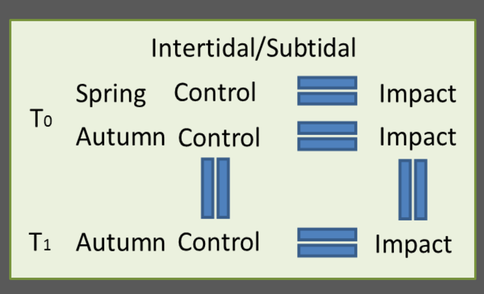
Aim of the project

- Evaluate the ecological value of the marine ecosystem (macro-, hyper-, epibenthos, demersal fish) in the nourished area before nourishment
- Follow-up the ecological effects of this anthropogenic disruption on these fauna, during a period of 2 years
- Possible effects of nourishment can be assessed by possible changes in the ecological value and the recovery capacity of the present fauna

Strategy

Before After Control Impact strategy (BACI)

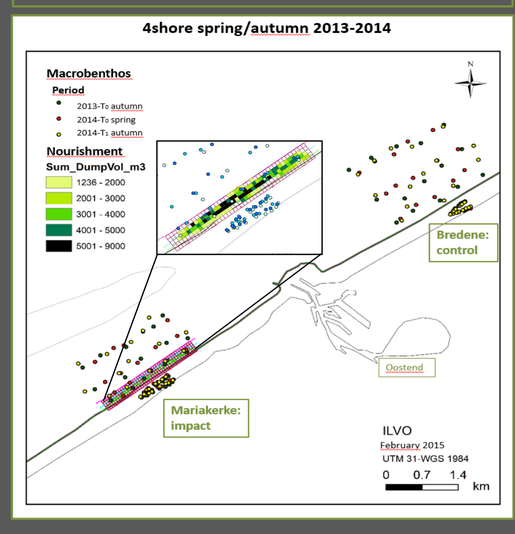
H0: 'there are no differences for the different ecosystem components in space and time'



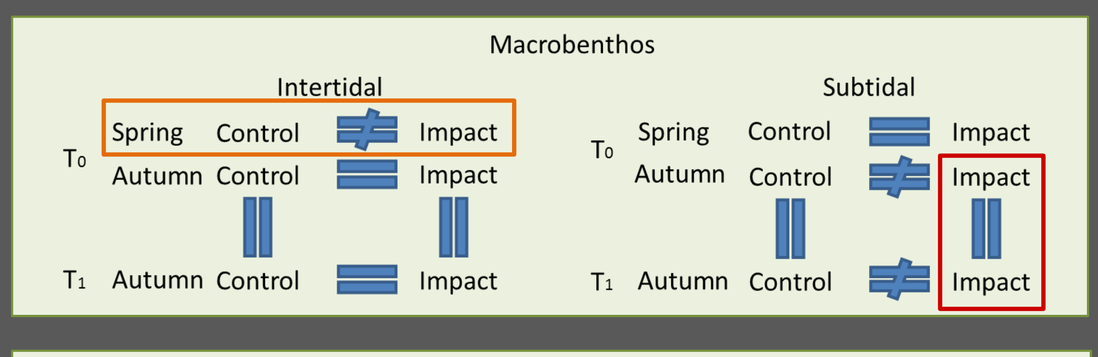
Sampling and suppletion events

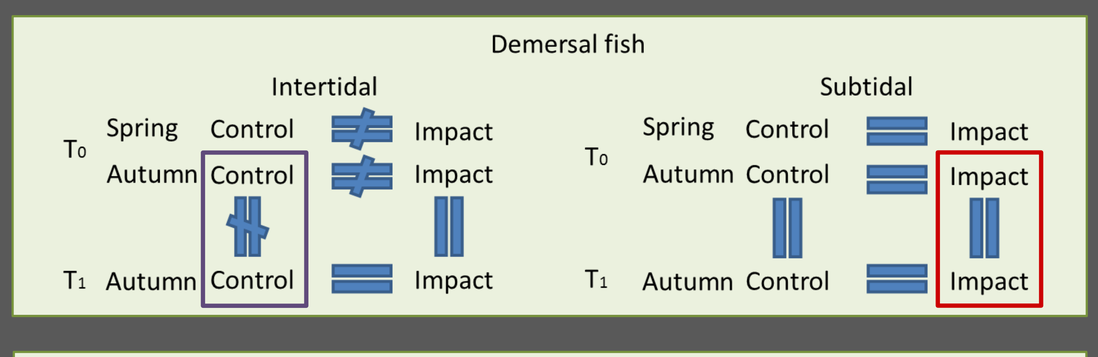
		Autumn 2013	Jan-Febr 2014	Spring 2014	March 2014	April-May 2014	Autumn 2014
Mariakerke Impact	IT	T0 autumn sampling	Large beach nourishment	T0 spring sampling			T1 autumn sampling
	SU	T0 autumn sampling		T0 spring sampling		Foreshore nourishment	T1 autumn sampling
Bredene Control	IT	T0 autumn sampling		T0 spring sampling	Small beach nourishment (after storm)		T1 autumn sampling
	SU	T0 autumn sampling		T0 spring sampling			T1 autumn sampling

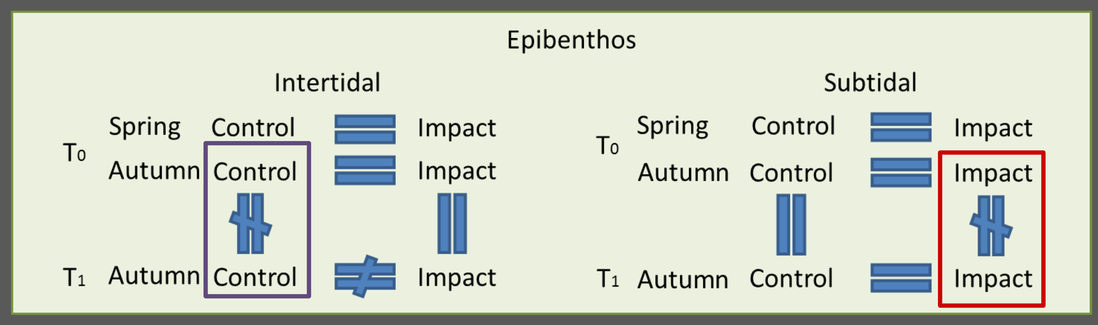
Macrobenthos sampling design



Intermediate Results







Results are based on density, biomass, species composition and number of taxa

Clear impact on beach macrobenthos from large beach nourishment in Jan-Febr 2014

No obvious impacts related to the foreshore nourishment, except subtidal epibenthos

Small nourishment on the control beach shows effects on intertidal epibenthos and demersal fish due to temporal changes in beach morfology (disappearance gullies)

Conclusion

- We observe differences in fauna in space and time. These are variable and more clear for the mobile fauna
  → next to nourishment activities, natural variation will influence the results of the BACI design
- After 6 months, the intertidal fauna was almost completely recovered due to good timing of the beach nourishment (before recruitment of the fauna)
- The subtidal fauna is not significantly influenced by the foreshore nourishment and is mostly influenced by natural spatial and temporal patterns
- Long term effects will be evaluated in the continuation of this project

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