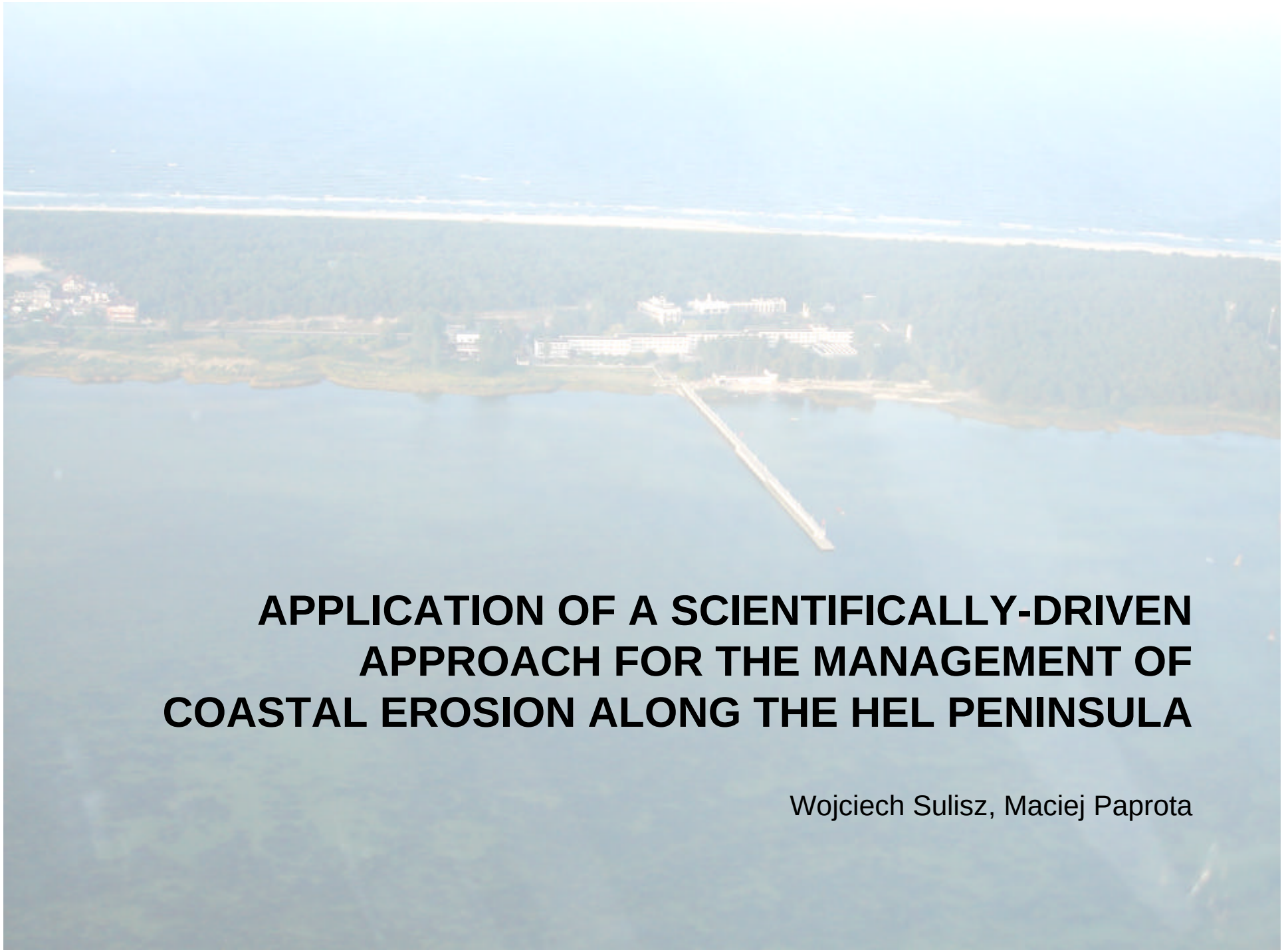

APPLICATION OF A SCIENTIFICALLY-DRIVEN APPROACH FOR THE MANAGEMENT OF COASTAL EROSION ALONG THE HEL PENINSULA

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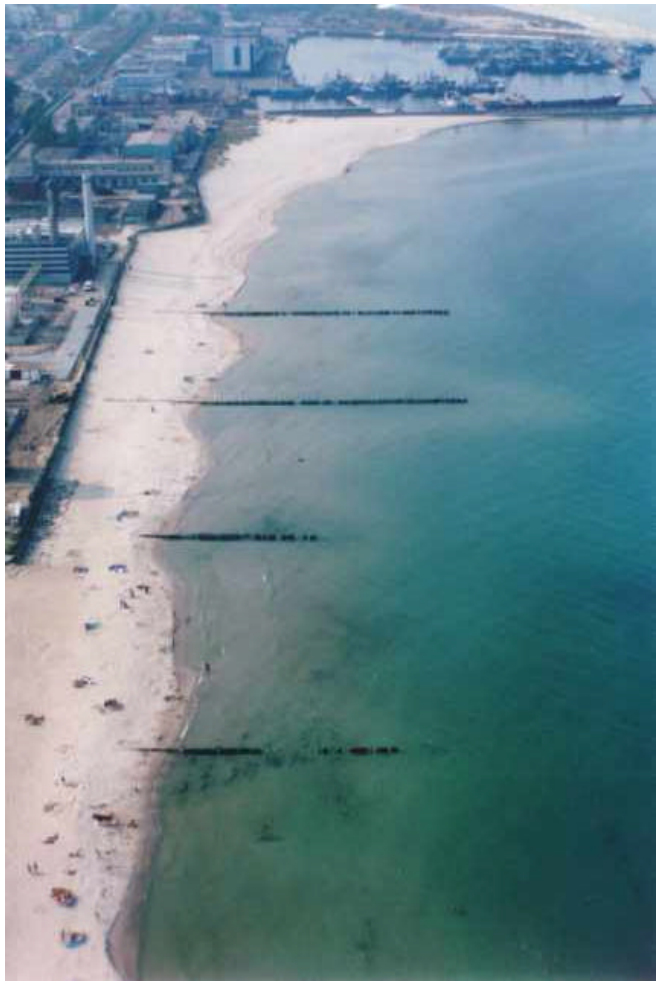
- Introduction
- Coastal Processes and Problems
- Application of Conscience Approach
- Conclusions

Introduction

Hel Peninsula – Poland

Sandy strip of land length – 35 km
Width – 200 m
3 km

Infrastructure:
road and railroad from Wladyslawowo to Hel
Towns, ports, tourist resorts:
Wladyslawowo, Chalupy, Kuznica, Jastarnia, Jurata, Hel



Coastal Processes and Problems

Since the construction of the Wladyslawowo harbour

- significant coastal erosion eastwards from the eastern breakwater
- sand accumulation – west of the western breakwater
- significant effect on shoreline in the vicinity of the harbour (2 km)
- east of the harbour the shoreline retreated at a rate of 5 m per year
- the artificial nourishment by direct dumping of sediment onto the beach has started since 1989

Conscience approach

Strategic objective:

The preservation of Hel Peninsula coastal system

Operational objectives:

Maintaining the beach width and preventing breaching

Conscience approach

Main natural processes affecting coastal erosion in the area

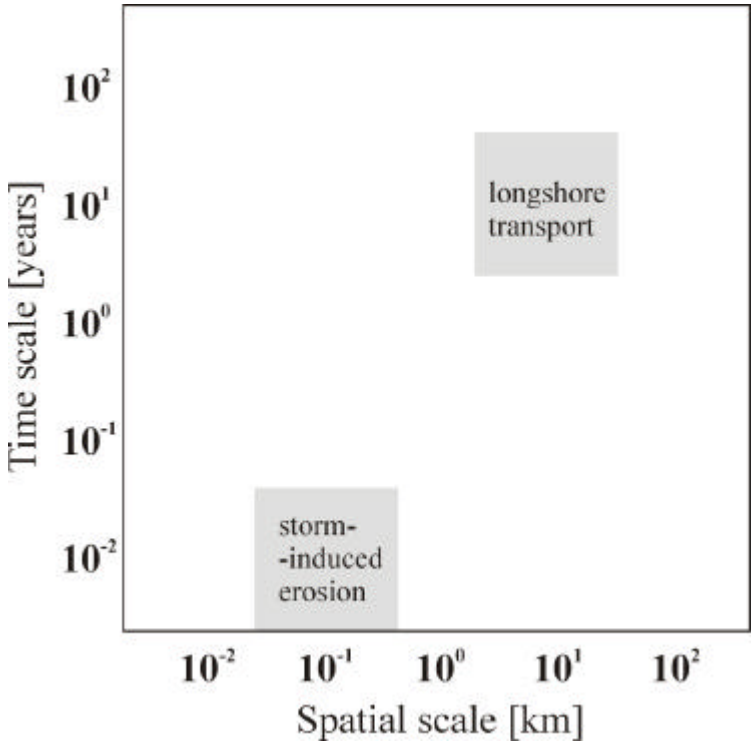


Figure 1. Hel Peninsula case study in the spatial – temporal plane.

Conscience approach

Main natural processes affecting coastal erosion in the area
Coastal cell boundaries

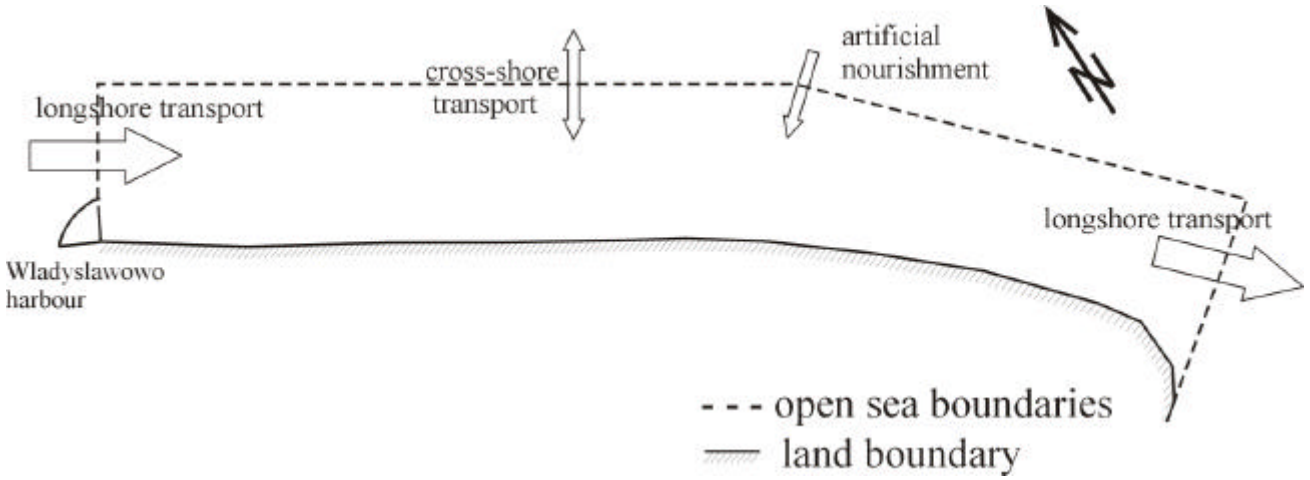


Figure 2. Sediment fluxes in the Hel Peninsula coastal cell.

Conscience approach

Strategic sediment reservoirs

- **the entrance channel to the Wladyslawowo harbour**
- **offshore areas**
- **Puck Bay and Gdansk Bay (under certain conditions)**

Conscience approach

Coastal State Indicators

Threshold values for required level of safety of the shore for T_p=100 years:
beach width: 30-40m
beach height: 1.5-2.0m
dune width: 40m
maximum dune height: 4.5m
dune section area: 180m²
hinterland height: 2.5m

Conscience approach

Favourable sediment status and coastal resilience

Collected data indicate complexity of the processes undergoing along the Hel Peninsula. To achieve the strategic objective more information and long-term data are necessary. In particular, long-term data regarding the rate of the sediment flux due to a longshore transport, cross-shore transport, and artificial nourishment. All these activities are necessary to identify a favourable sediment status that can promote coastal resilience and, in consequence, to achieve the strategic objective.

Conclusions

- Scientifically-driven approach is proposed to investigate processes responsible for the erosion problems along the Hel Peninsula.
- Key concepts of the approach including coastal resilience as a strategic objective, a favourable sediment status as an operational objective and a strategic sediment reservoir as a management goal, are applied to understand the specific character of the processes and to support the coastal zone management.
- The coastal sediment cell has been defined for the Hel Peninsula site.
- Strategic sediment reservoirs have been proposed.
- Coastal State Indicators have been defined.
- In order to identify a favourable sediment status that can promote coastal resilience and, in consequence, to achieve the strategic objective, more information and long-term measurements are necessary.