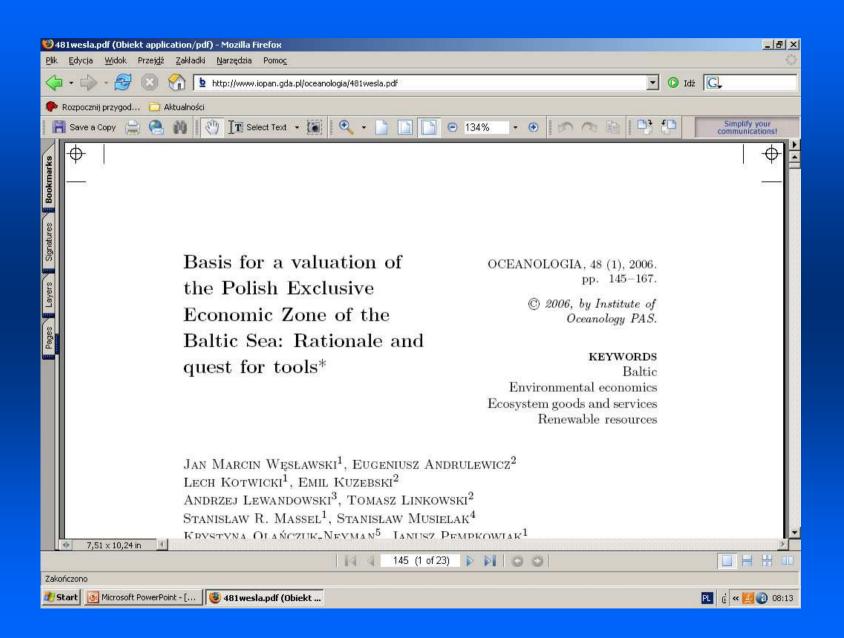
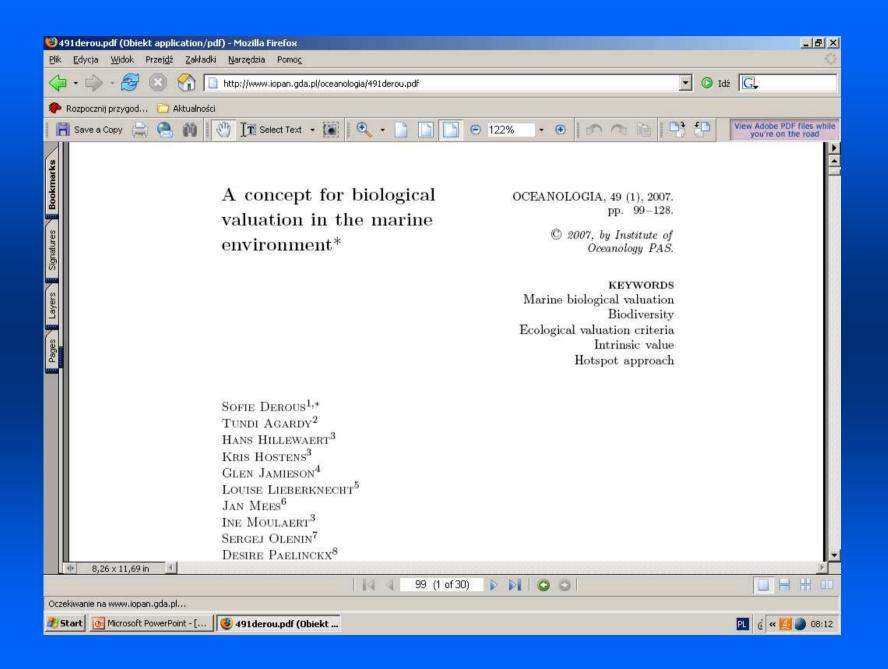
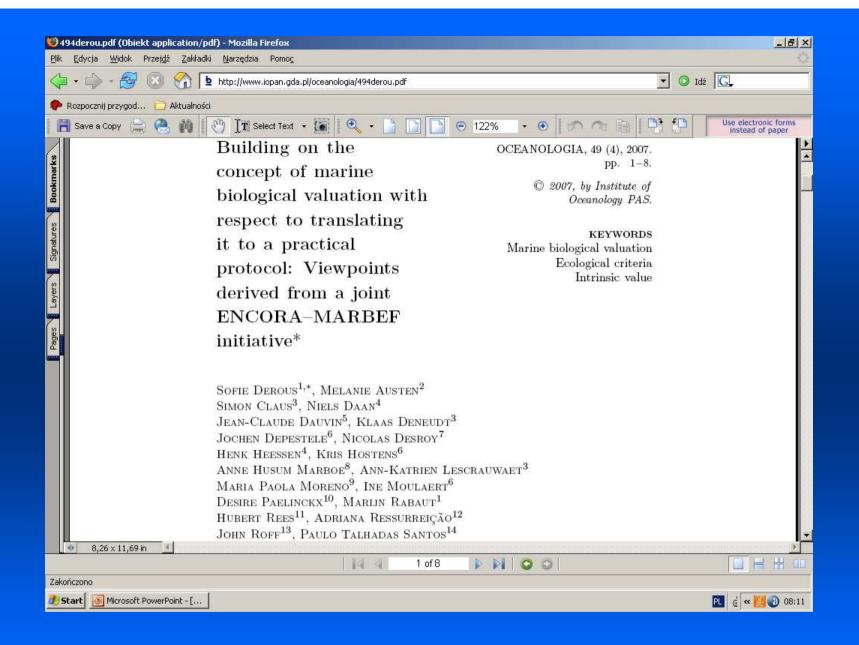


Jan Marcin Węsławski, Lech Kotwicki, Józef Wiktor, Agnieszka Tatarek, Katarzyna Huzarska, Eugeniusz Andrulewicz

With acknowledgements to inspiration from EU COSA project, EU ELME project and HELCOM BSRP study group







Southern Baltic Sea

along over 500km of sandy coastline there are just few isolated moraine cliffs with stony outcrops (less 1% of the coastline)



Landscape icon in the scale of Poland



Redłowo moraine Cliff underwater reserve

- Proposed as MPA, endorsed by HELCOM list
- The richest and most biologically diverse unit of open Gdansk Bay
- Contains habitats and species protected by EU habitat and water directives
- Combines highest esthetic/cultural/educational values with biological importance and local trademark

Seagras bed – protected habitat and Zostera marina – protected species



Delimitation of valued area

- Is it a part of larger system?
- What are the physical borders of the area?
- Sink or source?

Natural and antropogenic limitations

- Depth of the euphotic zone
- Substrate type
- Water dynamics
- Fast ice

- Sediment replacement
- Coastal defence & infrastructure
- Nutrients & pollutions discharge
- Overfishing
- Encroachment & trampling

Valued Ecosystem Components

- Species (protected, commercial, charismatic, keystone, habitat builders)
- Habitats (protected, commercially used)
- Functions (sustaining, commercially used)

VEC - Habitat builders





Chara aspera



Zanichellia sp.



Stones & encrusting fauna.



Furcellaria sp.



Mytilus edulis trossulus

VEC – rare species





Zoarces viviparus

Nerophis ophidion

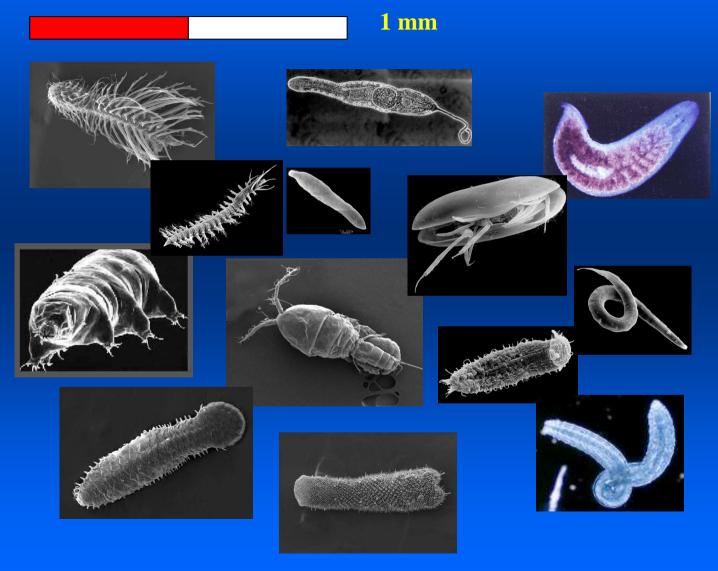


Hydrozoa

Charismatic species – disproportionally valued

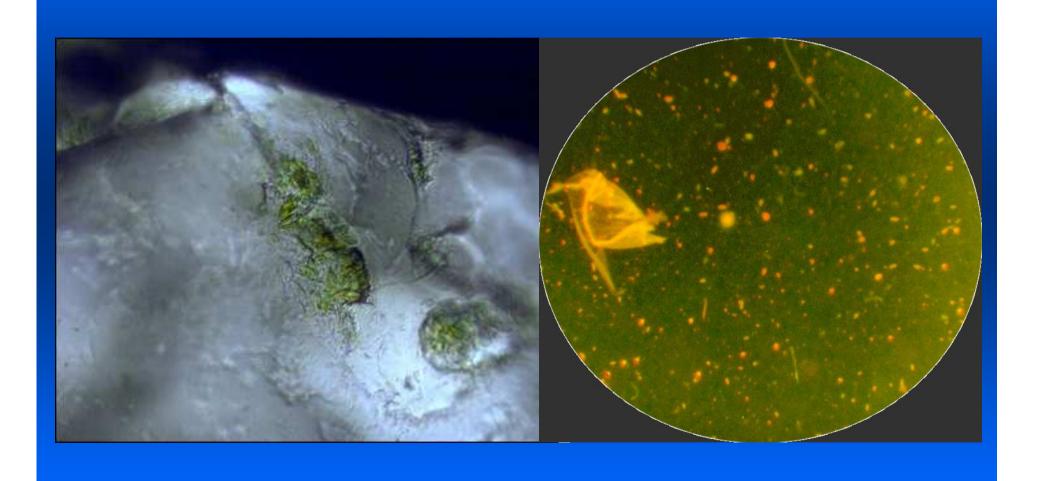


Meiofauna – important but not valued

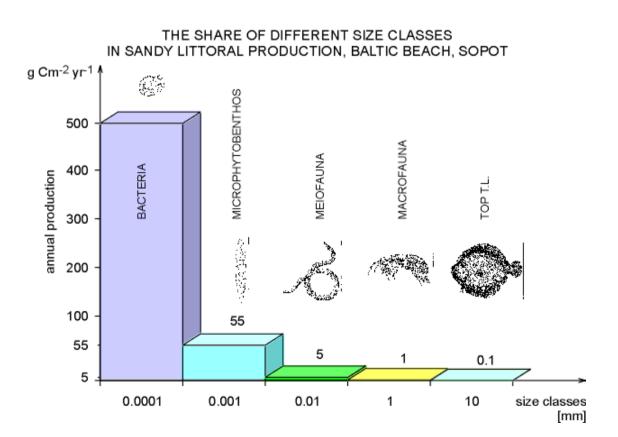


Zdjęcia: Matthew D. Hooge, Rick Hochberg; http://hooge.developmentalbiology.com/meiofauna

Microorganisms – most important but not valued



The smaller, the more important



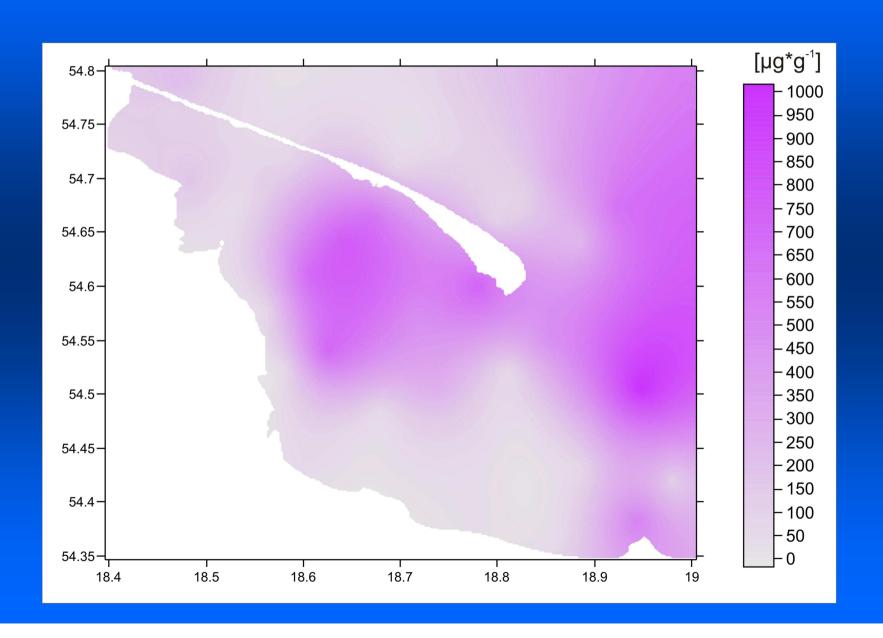
VEC – functions & processes

- Sand production
- Sediment stabilisation
- Water filtration
- Fish nursery

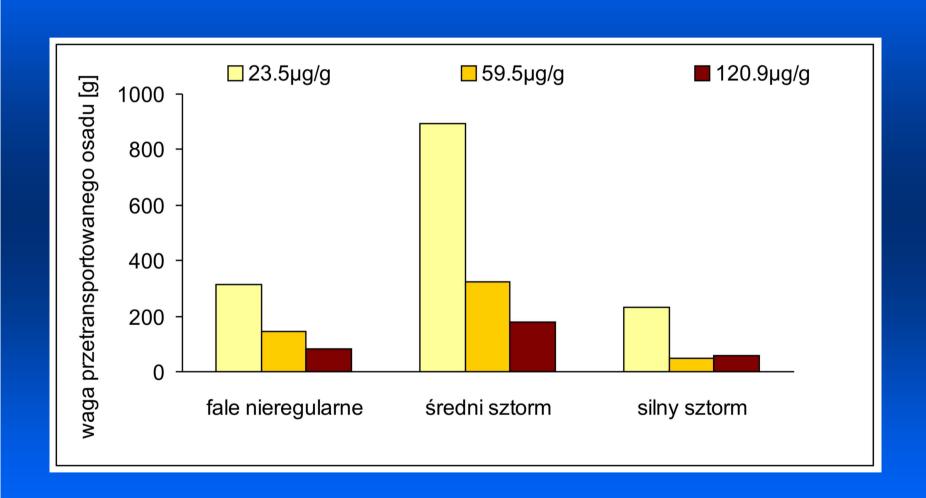
clean removal (oxydation) of 75kg of organic matter per m2 per year



EPS (biological film) occurrence in surface sediments, summer



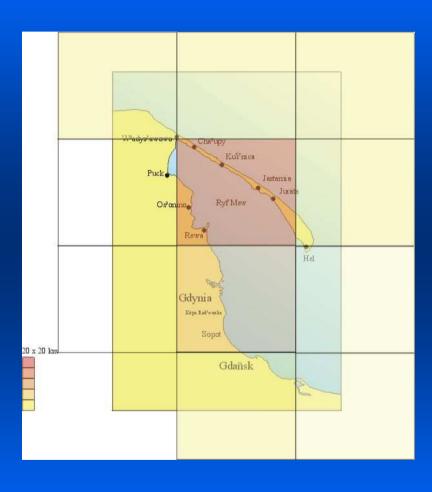
Sediment stabilisation by biofilm (irregular waves, storm and strong storm)



Management of VEC – question of scale

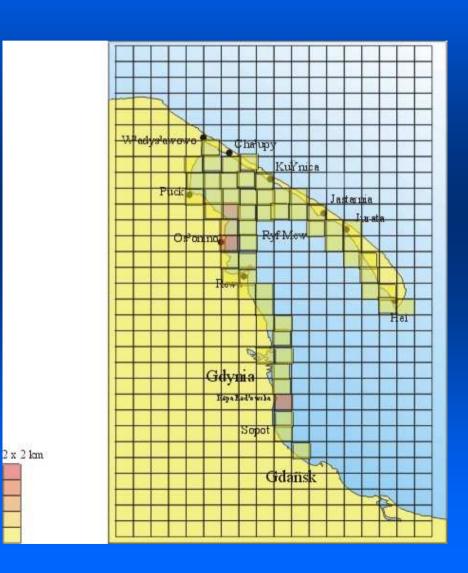
VEC Furcellaria, scale 20x20km





VEC Furcellaria, scale 2x2km





Fight for public support –

" coastal defence is a response to public demand"

or

"from 1200 anquetes distributed among local citizens 85% select green option"

Jaki krajobraz wybierasz?



NATURALNY BRZEG MORSKI

wady: utrudnione przejscie pod klifem zalety: unikalny krajobraz, niezaburzone środowisko naturalne

BRZEG ZABUDOWANY

wady: brak naturalnego środowiska zalety: łatwość komunikacji

BRZEG USTABILIZOWANY

wady: brak unikalnego krajobrazu zalety: łatwiejsze przejście plażą

Environmentalists lost battle

 from "EIA" on sediment replacement and wavebrakers formation, prepared by chemist and accepted by local administration:

 "...replacement of sediment in this area will not harm the seabirds wintering here"

Engineers option



Marine Protected Areas and Environmental law in Poland

- Does not enter the marine ecosystem
- Ideas are implemented from land conservation
- EIA are not regulated nor controlled

