



**"Vistula and Curonian Lagoons Stakeholder meeting"**  
**Gdynia, 21<sup>th</sup>-22<sup>th</sup> July 2010**

# **Vistula Lagoon peculiarities and project goals**

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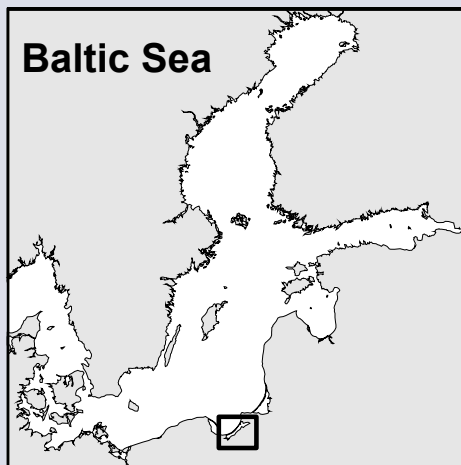
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- ✓ Area: 838 km<sup>2</sup>  
(RUS – 56%, PL – 44%)
- ✓ Length: 90 km
- ✓ Width: 10-19 km



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- ✓ Connection with the Gulf of Gdansk:  
narrow, dredged channel  
near Baltiysk (Russia)

- width - 400 m
- depth - 10-12 m
- minimal vertical transect - 4200 m<sup>2</sup>



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✓ Navigable channel, the Kaliningrad Marine Canal





- ✓ The new Vistula River mouth was artificially created between 1889 and 1895 and it was officially opened on 31 March 1895, on the personal order of Emperor Wilhelm II.



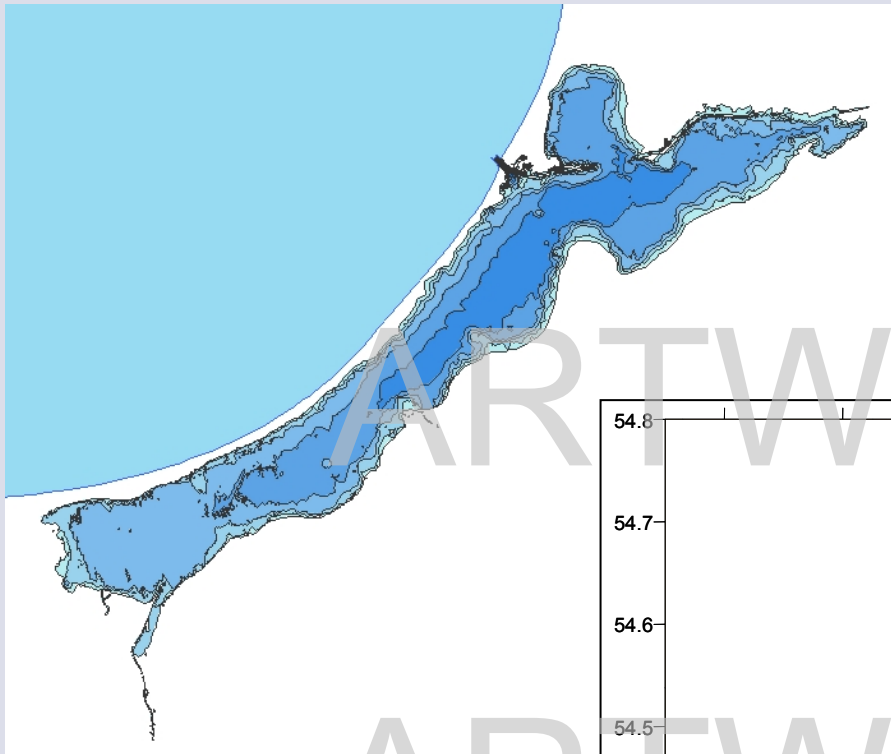


- ✓ 'Biala Gora Lock' finished in 1915 cut off the Vistula Lagoon from the Vistula River. In 1550 about 85% of river runoff was reaching the sea through the Nogat River. Now it is reduced to less than 5%



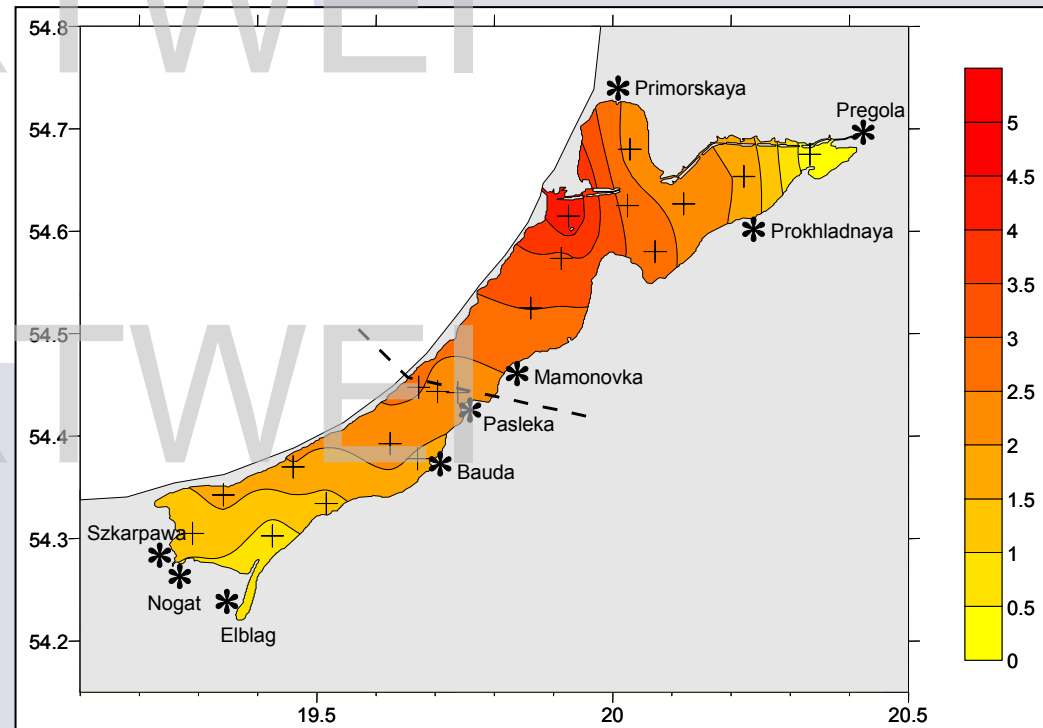
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- ✓ Average depth: 2.7 m
- ✓ Water volume: 2.3 km<sup>3</sup>

✓ Salinity: 0.1 - 4.5 PSU

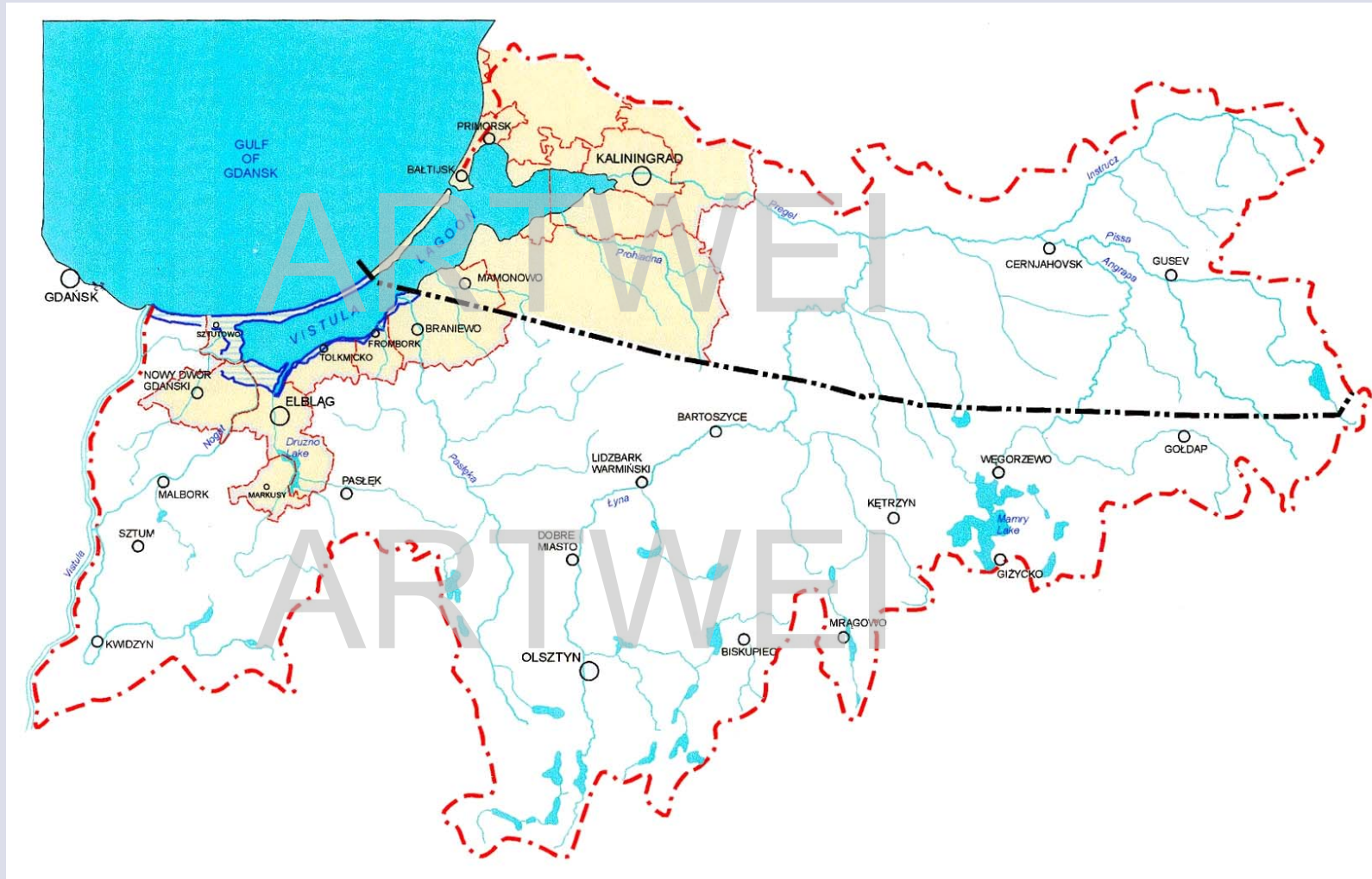


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✓ Drainage area: 23,871 km<sup>2</sup> within Poland and Russia

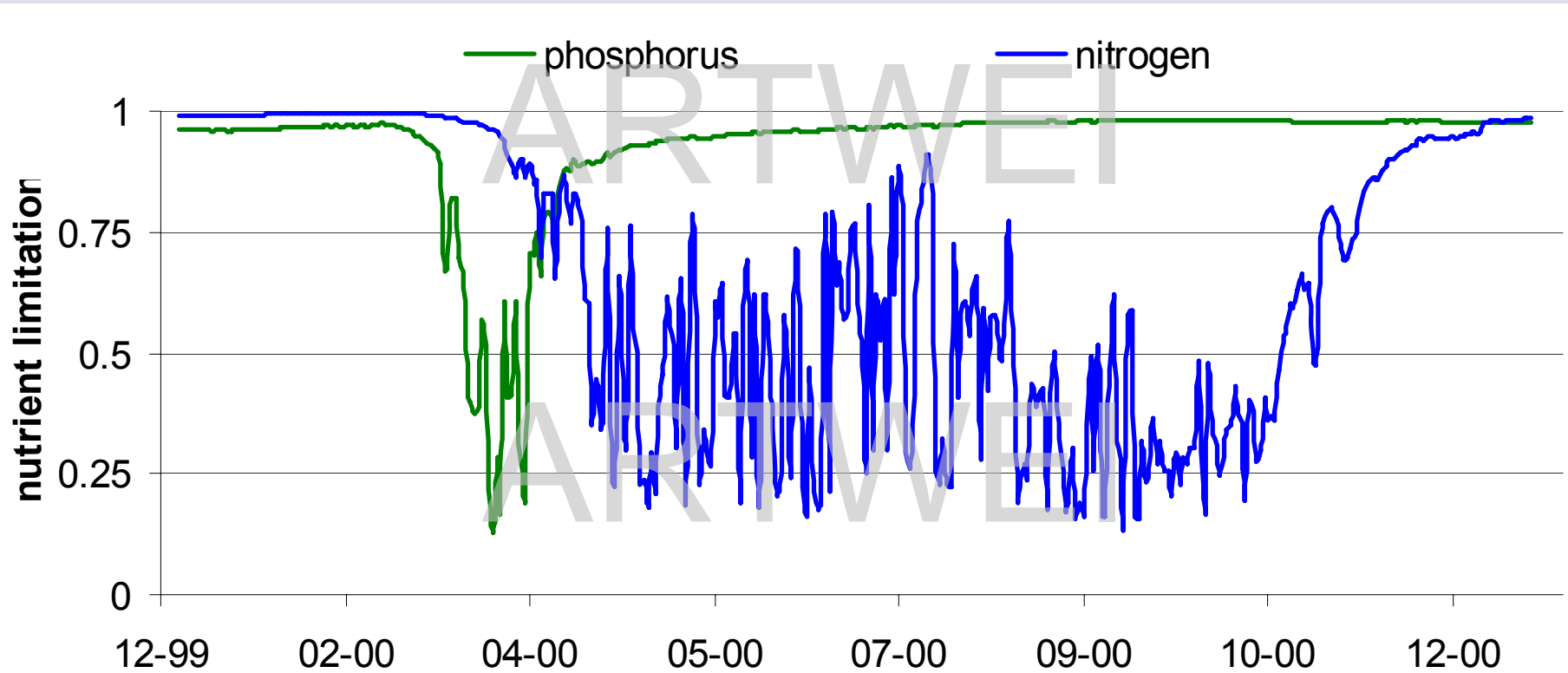


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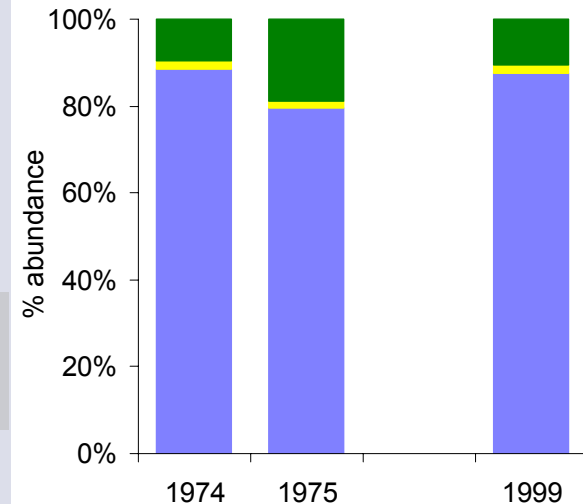
## Phosphorus or nitrogen limited water body?



# Phytoplankton

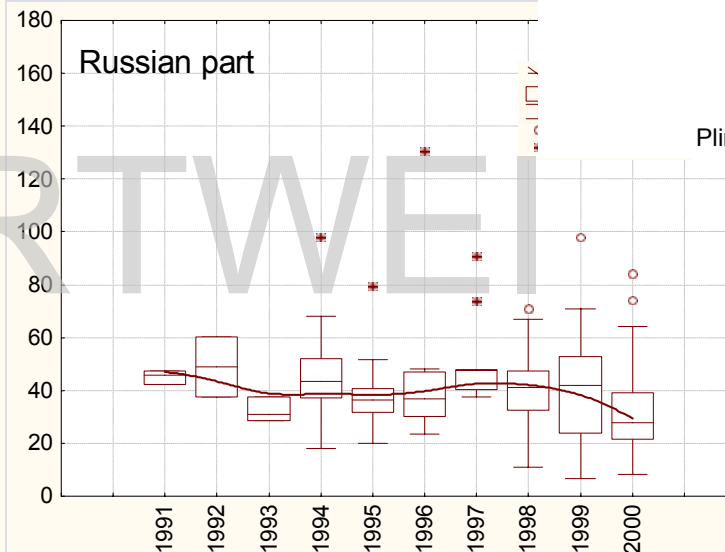
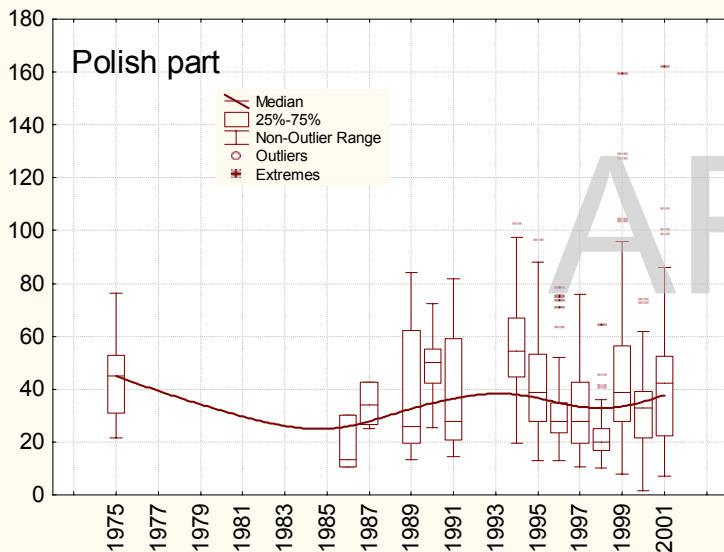
## Polish part:

- no major changes in proportion of main group abundance between mid 1970s and late 1990s
- occurrence of blue-green algal blooms (*Anabaena* genus and *Aphanizomenon flos-aquae*)
- high level of chlorophyll *a* concentrations over the last 20 years,
- total phytoplankton biomass indicating eutrophic status



■ green algae  
■ diatoms  
■ blue-green algae

Pliński and Simm (1978)



median ~ 30-40 mg/m<sup>3</sup>

stable at ~ 40 mg/m<sup>3</sup>



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There were apparent changes in abundance, biomass and taxonomic composition of zoobenthos and zooplankton.

It seems that these changes might be explained by:

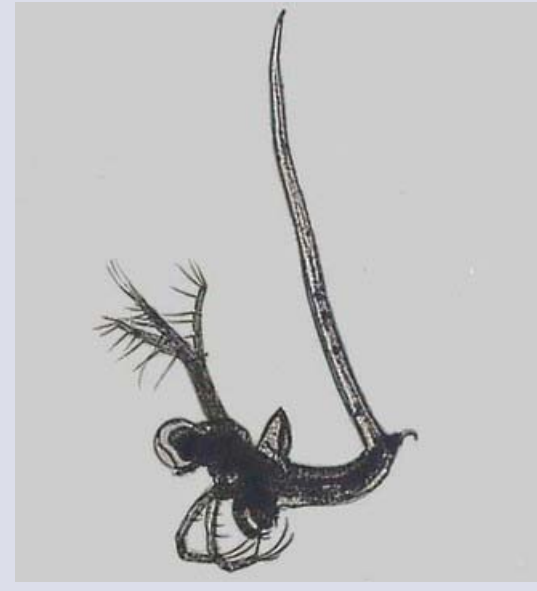
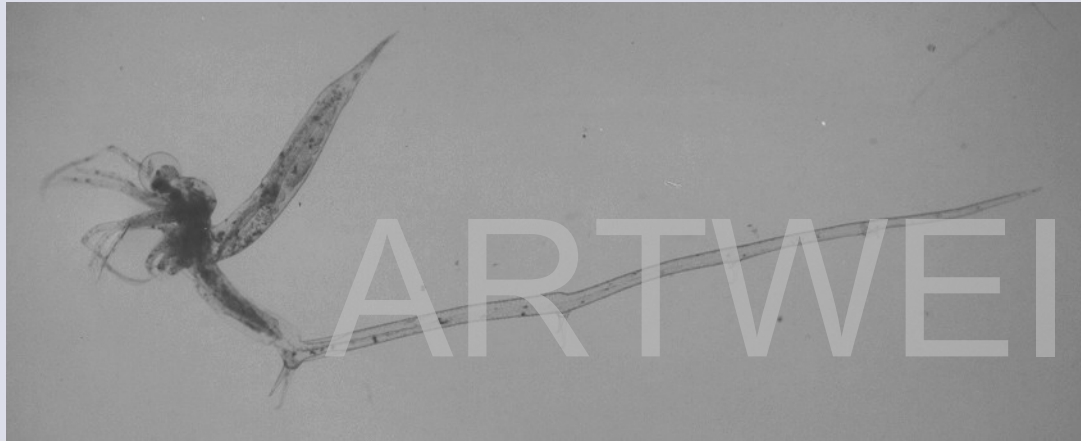
- **eutrophication**,
- **invasions of a new species**,
- **changes in salinity** caused by **hydro-meteorological processes** influencing the exchange of water masses between the Gulf of Gdańsk and the Lagoon, and partly by **human activities** (dredging the channel connecting the Lagoon with the Baltic Sea).



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## Alien species



New predatory Cladocera species: *Cercopagis pengoi*: first appearance in August 1999

*Marenzelleria viridis* appeared in the Russian part in 1990



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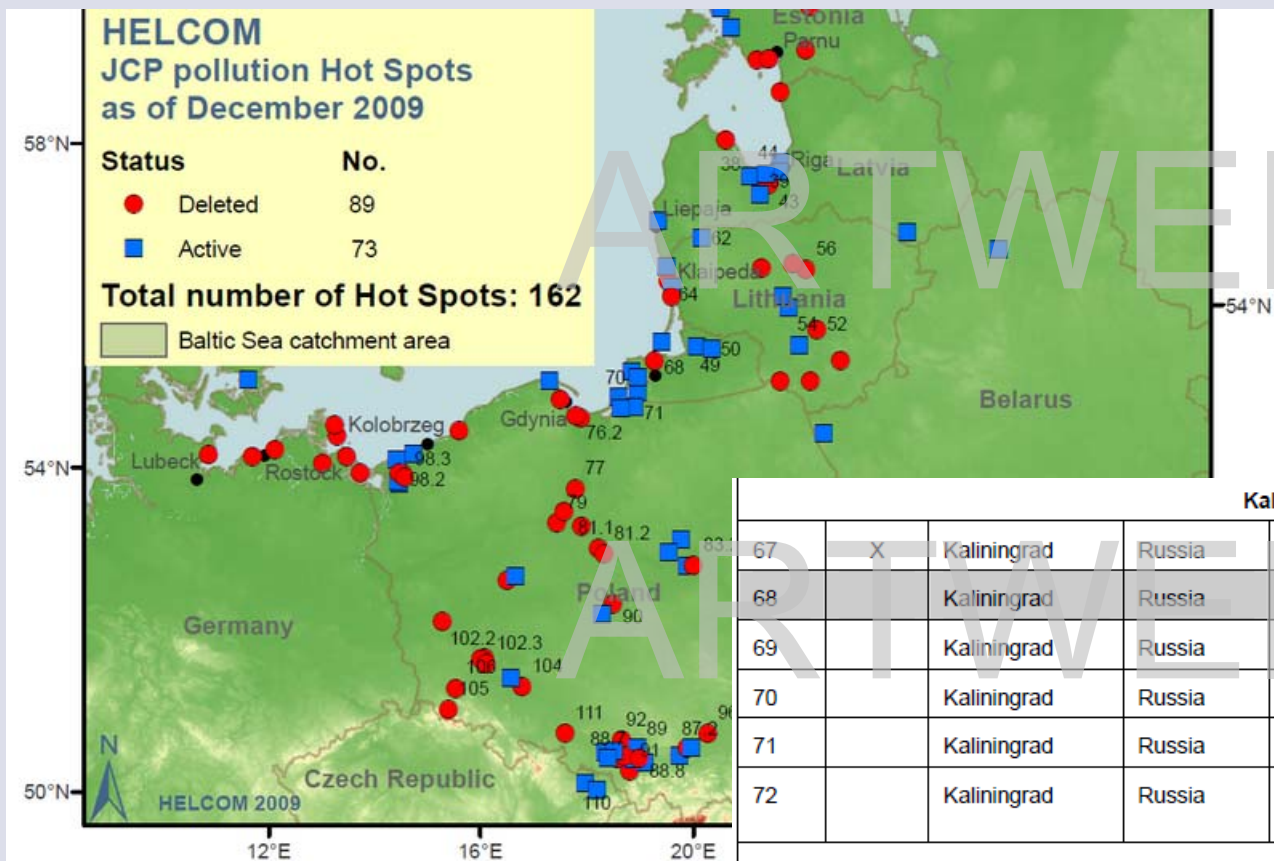


## Environmental problems

- eutrophication;
- during the last decade a numerous water treatment plants were constructed, but sanitary conditions did not improved much. This is most probably due to recycling from sediments;
- intensification of water-exchange with the Baltic Sea due to continuous dredging of the Baltiysk Strait (increase of salinity);
- overuse of the Polish part of the Vistula Spit for recreational purposes during the summer season beyond the carrying capacity of resources;
- fishing pressure;
- appearance of alien species;
- danger of flooding of low-lying areas due to poor technical condition of anti-flood and drainage infrastructure.



# HELCOM Hot Spots



Kaliningrad					
67	X	Kaliningrad	Russia	Kaliningrad	Municipal & Industrial
68		Kaliningrad	Russia	Pulp & Paper No 1	Industry (Pulp & Paper)
69		Kaliningrad	Russia	Pulp & Paper No 2 (4)	Industry (Pulp & Paper)
70		Kaliningrad	Russia	Kaliningrad	Hazardous Waste
71		Kaliningrad	Russia	Oil Bunkering Station	Industry
72		Kaliningrad	Russia	Agriculture / Livestock	Agricultural Runoff Programme
Kaliningrad / Polish Coast					
73	X	Kal/Pol Coast	Russia/Pol	Vistula Lagoon	Management Programme







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## Natura 2000

**Special Protection Areas (SPAs) for birds**

**PLB280010**

**Special Areas of Conservation (SACs) to be designated for other species and for habitats**

**PLH280007**



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## Some socio-economic statistics:

- population along the coastline of the Polish part: 183,000
- main cities: Elblag: 127,000; Braniewo: 18,000; Tolkmicko: 2,700; Frombork 3,800; Krynica Morska 1,400
- negative population growth
- emigration
- 71.5% of the average GDP in Poland
- high level of unemployment
- source of incomes: industry, agriculture, transportation, tourism, fisheries



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## Economic characteristics

- the area includes large population centres, scattered small cities and rural settlements, and significant agricultural land;
- industry is not concentrated; farms are small when compared to both western and eastern European conditions;
- high level of unemployment in the region due to disintegration of former economic structures (e.g. state farming);
- unused tourism potential of the Lagoon due to poor water quality;
- shrinkage of commercial fishing activity due to water quality and overexploitation;
- loss of historical role of Elblag city as a harbour;
- relatively poor region;
- agriculture which relatively low profit potential



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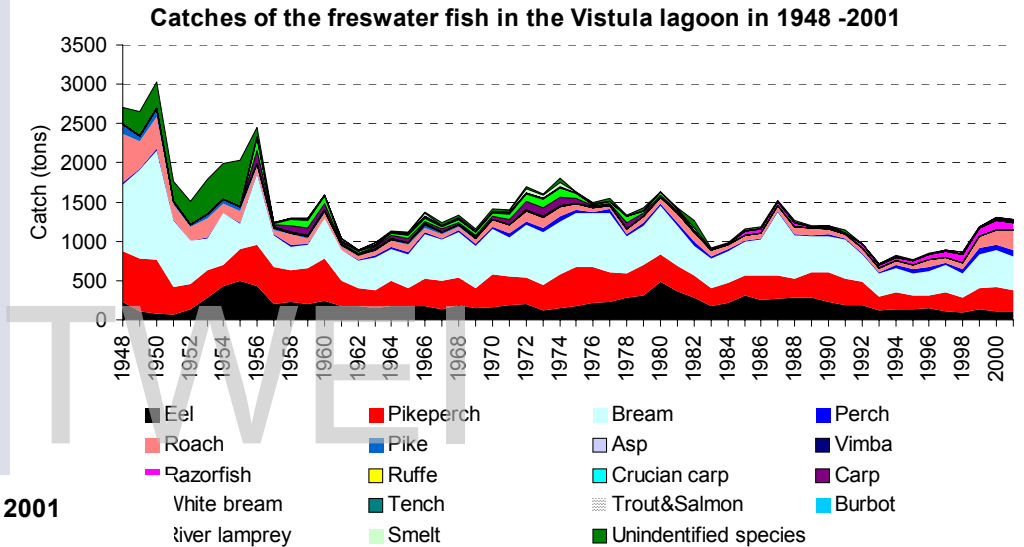




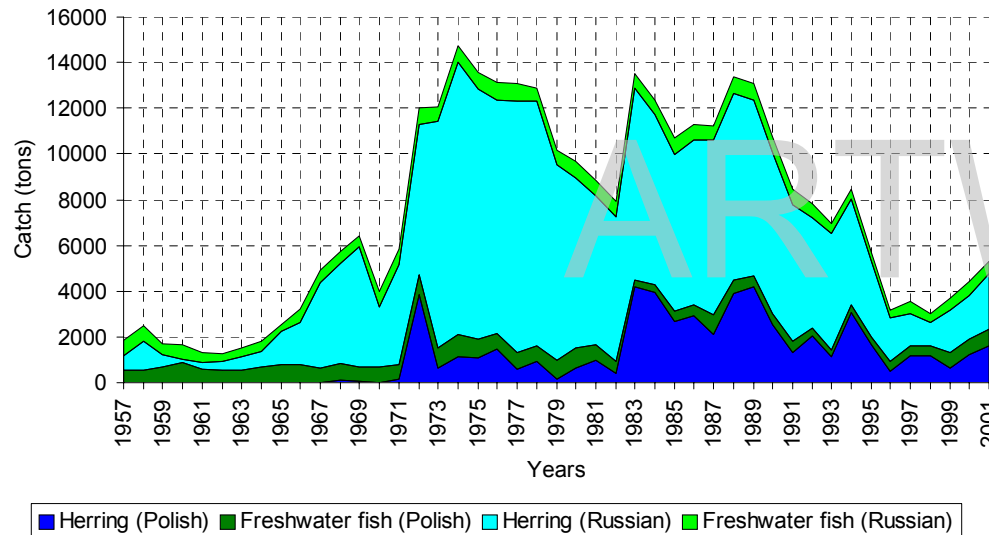
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## Fisheries

- based on small fisheries harbours
- no fish processing
- limited stocking recently
- number of boats and fishermen dropped from 220/250 to 67/140



**Polish and Russian catches in the Vistula lagoon in 1957 - 2001**



**Changes in level of exploitation depends mainly on human activities:**

- international regulations (common bream, pikeperch)
- prices at the market (herring, partly)
- drainage of the wetlands (pike)
- low level or lack of stocking (eel)

**and natural conditions:**

- year-to-year changes in intensity of spawning migrations (herring)



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## Transport

**Sea harbours:** Elblag, Tolkmicko, Frombork, Nowa Pasłęka, and Kamienica Elbląska; **Other harbours:** Krynica Morska, Kąty Rybackie, Suchacz, and Piaski

Total cargo in Elblag Harbour (2007-2009): 4,000 – 6,000 tons  
and 30,000 – 40,000 passengers



In total: 130,000 – 160,000 yearly

### ZALEW

obowiązuje: 01.05.2010 - 25.06.2010 oraz 01.09.2010 - 12.09.2010

### STATKI I WODOLOTY

r - rejs rezerwowy, w - rejs wodolotem, x - od 21.08.06 o 1 godz. wcześniej

KRYNICA MORSKA - FROMBORK			FROMBORK - KRYNICA MORSKA		
Krynica Morska o.	9.30	14.00R	Frombork o.	11.15R	15.40
Frombork p.	11.00	15.30R	Krynica Morska p.	12.45R	17.10
ELBLĄG - KRYNICA MORSKA			KRYNICA MORSKA - ELBLĄG		
Elblag o.		R	Krynica Morska o.		R
Krynica Morska p.		R	Elblag p.		R
PRZEJAZDŹKI PO ZALEWIE WISLANYM					
w cenę wliczony przewodnik z odznaką					
z Fromborka		11.30R		14.00R	
z Krynicy Morskiej		13.00R		17.20R	18.00R



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## Tourism

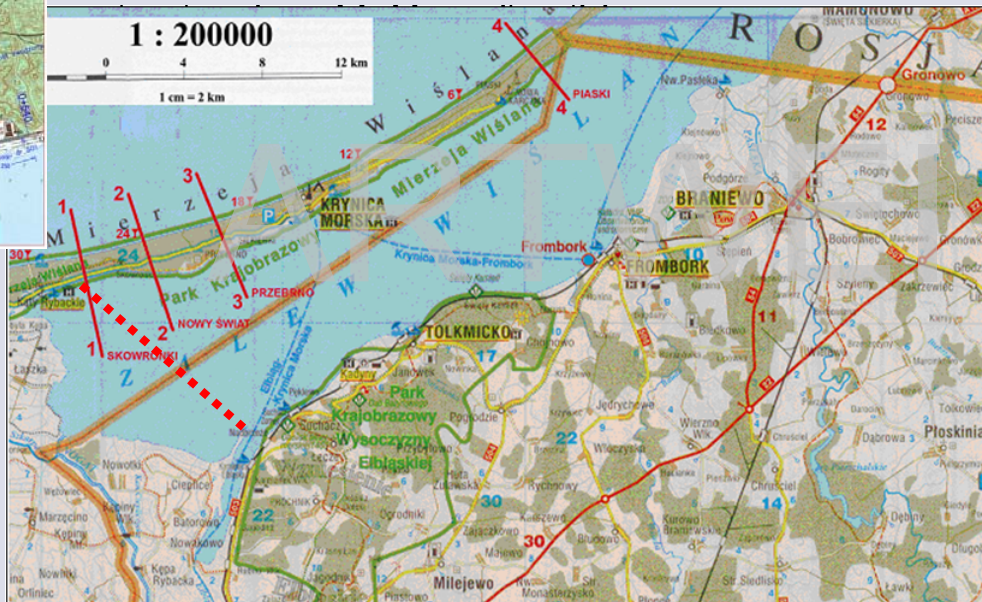
- spatially and temporarily unbalanced: short season; much more intense use of the Vistula Spit
- harbour capacity: ~ 300 yachts
- registered yachts: 70
- 130,000 – 160,000 passengers yearly





## Artificial channel 'Skowronki'

- direct access to Elblag Harbour
  - for ships with length of 100m, width of 20m and draught of 4m
  - growth of total cargo in Elblag Harbour to 3,500,000 tons per year
- but
- potential serious environmental problems





## Transboundary cooperation

- Polish- Russian Intergovernmental Commision for Economic Cooperation
- No coordination in monitoring activities
- Scientific cooperation:
  - RU - Shirshov RAN, AtlantNIRO
  - PL - IMGW, SFI, IBW PAN, GEOMOR

### INTERESTING FOR US:

‘System for the exchange of information on ecosystem state of Vistula Lagoon in frame of the Polish – Russian transboundary cooperation’ (August 2008 - ), Norwegian Financial Mechanism

The purpose of the Project is to establish a sound organisational and technical structure of Polish-Russian co-operation for collecting and exchanging information on the ecosystem status of the Vistula Lagoon with the overall objective to develop a common monitoring plan and a database to be shared with the Russian and Polish partners.



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## Selected cross-border issues for Vistula Lagoon

- ✓ **hydro-technical constructions and their potential impact on lagoon environment**
  - future investments in the facilities of Kaliningrad Harbour
  - idea of building a new artificial channel connecting lagoon with the Gulf of Gdansk near Skowronki village
  - Espoo Convention



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## **Selected cross-border issues for Vistula Lagoon**

- ✓ **water quality problems**
  - relatively shallow-water body with huge drainage basin
  - restricted water exchange with the Baltic Sea
  - high internal potential for eutrophication caused by significant sources of nutrients accumulated in the sediments



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## **Selected cross-border issues for Vistula Lagoon**

- ✓ **fisheries management and possible(?) alternatives**
  - **high productivity provides favourable conditions for many fish species**
  - **dominant freshwater species are accompanied by fewer brackish water species**
  - **herring catches has had a major impact on total catches**
  - **high pressure and lack or limited stocking programme caused serious problems for the local fisherman community**
  - **number of active fishing boats and gears was seriously limited recently**
  - **current status and future scenarios for fisheries in both countries will be summarised and presented**



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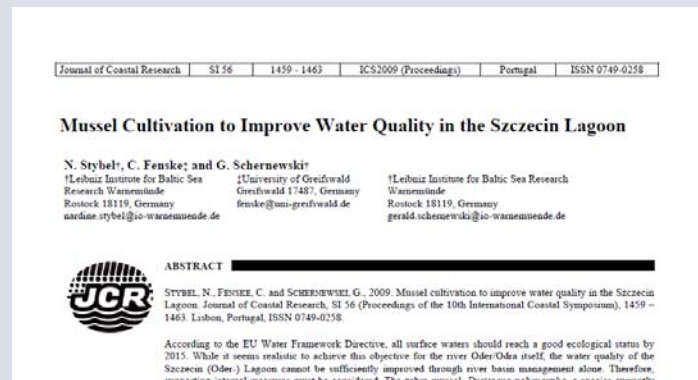
## Selected cross-border issues for Vistula Lagoon

### Zebra mussel farming – a magic solution?

- high filtration abilities
- high concentration of faecal pellets in the location of farm
- quality of mussel tissue (is it safe in our conditions?)
- alternative source of incomes for fishermen ...

### Water Zebras - Water quality improvement using zebra mussels (Interreg IVa project)

- Ernst Moritz Arndt Universität Greifswald – leading partner
- University of Szczecin
- Sea Fisheries Institute in Gdynia



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## Selected cross-border issues for Vistula Lagoon

**WebGIS as an useful tool for information  
exchanged and analyses of management options**



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