"Vistula and Curonian Lagoons Stakeholder meeting"
Gdynia, 21\textsuperscript{th}-22\textsuperscript{th} July 2010

Vistula Lagoon peculiarities and project goals

Boris Chubarenko\textsuperscript{1} and Piotr Margonski\textsuperscript{2}

\textsuperscript{1} Atlantic Branch of P.P.Shirshov Institute of Oceanology of Russian Academy of Sciences, Kaliningrad, Russia
\textsuperscript{2} Sea Fisheries Institute, Gdynia, Poland
ARTWEI

- Area: 838 km² (RUS – 56%, PL – 44%)
- Length: 90 km
- Width: 10-19 km

Part-financed by the European Union (European Regional Development Fund)
Connection with the Gulf of Gdansk: narrow, dredged channel near Baltiysk (Russia)

- width - 400 m
- depth - 10-12 m
- minimal vertical transect - 4200 m²
Navigable channel, the Kaliningrad Marine Canal

- length 43 km
- depth 9-12 m
- separated by a set of artificial islands
- built in 1901 by traders (depth of 6 m)
- needs a permanent maintenance dredging.
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%.
Part-financed by the European Union (European Regional Development Fund)

- Average depth: 2.7 m
- Water volume: 2.3 km³
- Salinity: 0.1 - 4.5 PSU

www.balticlagoons.net/artwei
✓ Drainage area: 23,871 km² within Poland and Russia
Phosphorus or nitrogen limited water body?

![Graph showing nutrient limitations over time](image)

- **Phosphorus** represented by green line
- **Nitrogen** represented by blue line

Nutrient limitation is measured on the y-axis, while time is shown on the x-axis, from 12-99 to 12-00.
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

median ~ 30-40 mg/m³ stable at ~ 40 mg/m³
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).
New predatory Cladocera species: *Cercopagis pengoi*: first appearance in August 1999

*Marenzelleria viridis* appeared in the Russian part in 1990
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

HELCOM JCP pollution Hot Spots as of December 2009

Status No.
- Deleted 89
- Active 73

Total number of Hot Spots: 162

Kaliningrad

<table>
<thead>
<tr>
<th>No.</th>
<th>X</th>
<th>Country</th>
<th>Region</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>67</td>
<td></td>
<td>Kaliningrad</td>
<td>Russia</td>
<td>Kaliningrad</td>
</tr>
<tr>
<td>69</td>
<td></td>
<td>Kaliningrad</td>
<td>Russia</td>
<td>Pulp &amp; Paper No 1</td>
</tr>
<tr>
<td>69</td>
<td></td>
<td>Kaliningrad</td>
<td>Russia</td>
<td>Industry (Pulp &amp; Paper)</td>
</tr>
<tr>
<td>70</td>
<td></td>
<td>Kaliningrad</td>
<td>Russia</td>
<td>Pulp &amp; Paper No 2 (4)</td>
</tr>
<tr>
<td>71</td>
<td></td>
<td>Kaliningrad</td>
<td>Russia</td>
<td>Oil Bunkering Station</td>
</tr>
<tr>
<td>72</td>
<td></td>
<td>Kaliningrad</td>
<td>Russia</td>
<td>Agriculture / Livestock</td>
</tr>
<tr>
<td>73</td>
<td>X</td>
<td>Kal/Pol Coast</td>
<td>Russia/Pol</td>
<td>Vistula Lagoon</td>
</tr>
</tbody>
</table>

Kaliningrad / Polish Coast

Part-financed by the European Union
(European Regional Development Fund)
Natura 2000

Special Protection Areas (SPAs) for birds

PLB280010

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

PLH280007

Part-financed by the European Union (European Regional Development Fund)
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
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.
Fisheries

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

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)
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

Part-financed by the European Union (European Regional Development Fund)
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.
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
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

Part-financed by the European Union
(European Regional Development Fund)
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
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 save 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

---

Mussel Cultivation to Improve Water Quality in the Szczecin Lagoon

N. Urban, C. Rentsch, and G. Scheremetjeva
Ernst Moritz Arndt Universität Greifswald
Research Institute for Baltic Sea
Research & Environment Management

Abstract


According to the EU Water Framework Directive, all surface waters should reach a good ecological status by 2015. While it seems realistic to achieve this objective for the coastal lagoons, the water quality of the Szczecin Lagoon cannot be sufficiently improved through active management alone. Therefore, support from other measures must be considered. The idea aims to demonstrate the potential of mussel cultivation for water quality improvement.
Selected cross-border issues for Vistula Lagoon

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

Part-financed by the European Union (European Regional Development Fund)