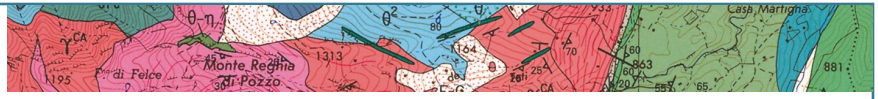
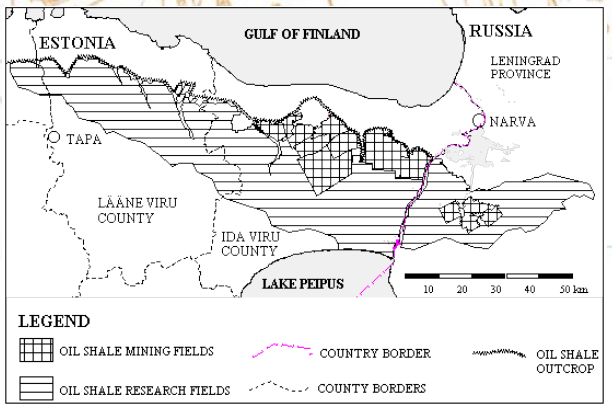
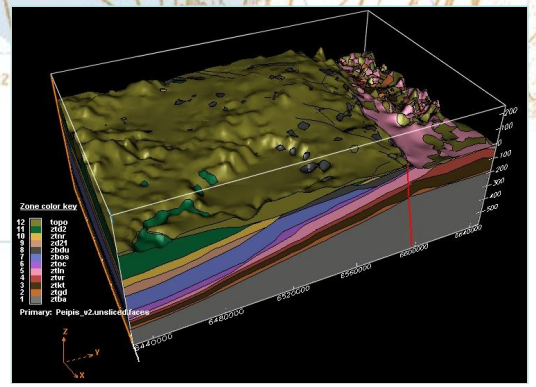


IV International Symposium on Transboundary Waters Management - 2008

The Challenge of Implementing the WFD Concepts at the Frontiers of Europe for Transboundary/Shared Water Resources Management - *The Lake Peipsi /Chuskoye water resources system*

D.Pennequin – d.pennequin@brgm.fr –





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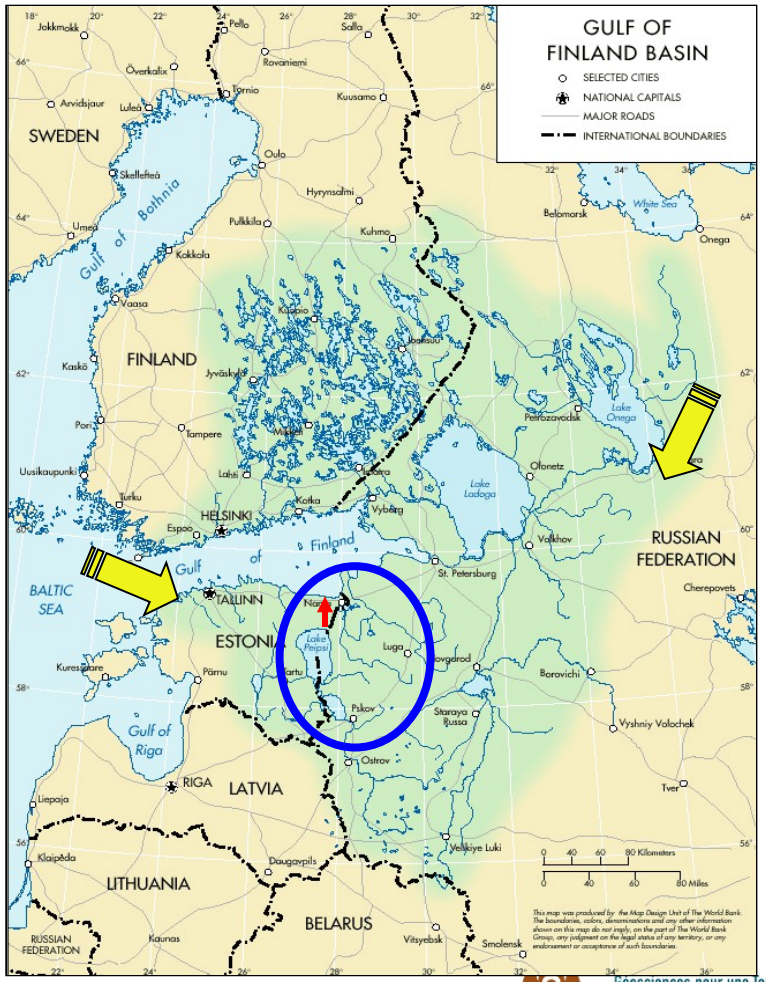
Lake Peipsi/Chuskoye Transboundary Water Resources –TBWR *: The catchment area*

- TBWR between Estonia (Member state since 2004) and the Russian Federation.
- Area of the lake: 3 558 km², the largest TB lake in Europe in 2004
- Total area of the catchment: 47 814 km² (> Switzerland)
- Area of the catchment in Estonia: 11224 km² (1/4 of the area of the country)
- Outlet of the lake: Narva river, flows into the Gulf of Finland, present boundary between Estonia/Russia
- Population in the Lake Peipsi catchment:
  - **Estonia : 444 500 inhab**
  - **Russia : 421 000 inhab**



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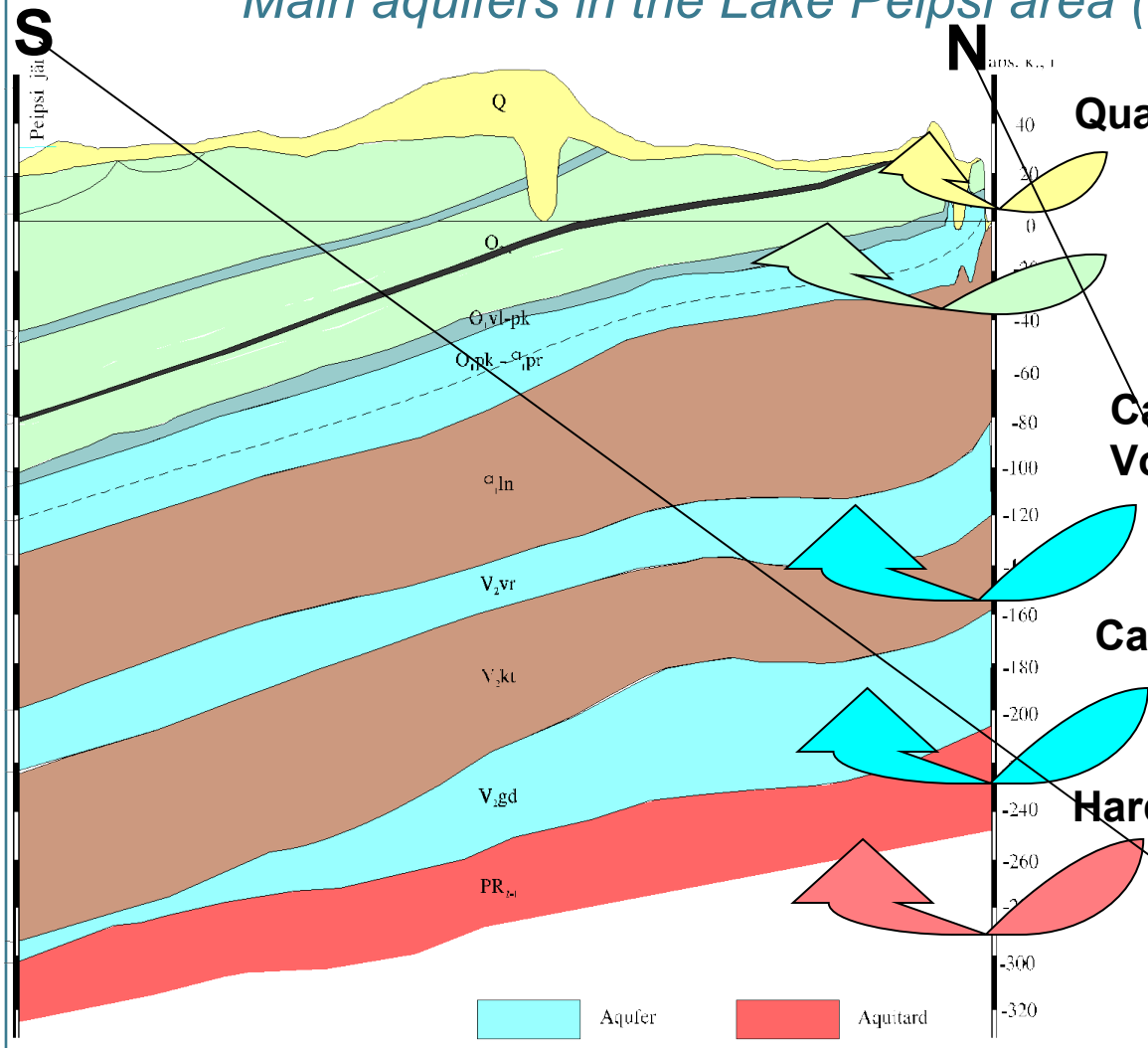
Lake Peipsi/Chuskoye Transboundary Water Resources -TBWR :

Main aquifers in the Lake Peipsi area (Transboundary)



Quaternary aquifer

Ordovician aquifer (includes Oil shale layers)

Cambro-Vendian Aquifer / Voronka

Cambro-Vendian aquifer / Gdov

Hard rock or basement

Surface – Groundwater interaction + shallow-deep groundwater exchanges

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Lake Peipsi/Chuskoye –TBWR *: The socio-economic framework*

> **Estonia :** The Lake Peipsi catchment includes 4 counties totalling 444 500 inhabitants (out of a total of 1.3 million for the entire country)

- **Ida-Viru Co**.: heavily industrialized at the NE of Estonia, with ***oil shale*** deposits and the border city of *Narva* ;
- **Jögeva, Tartu and Pölva Co**. located on the west side of the lake: generally rural with agricultural activity

> **Russia :** 2 regions or Oblasts : Leningrad et Pskov (including the mining sector of Slantsy) - 421000 inhabitants

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Lake Peipsi/Chuskoye –TBWR *:*

Oil shale mining …necessary to produce electricity

- Oil shale mining in Estonia:

1940 : 1,7 MT
1970 : 17 MT
1980 : 31 MT
1991 : 20 MT
2003 : 14 MT

Examples of open pit mining in the Ordovician limestone

- Today: 70% of the world production and 2/3 of the mining activity in Estonia

- Total mining area: 2700 km2

- Active mining area today: 250 km2. Depth of OP mining: 7 to 100 m

- Oil shale used for most of the Estonian electrical production, HC and solvents production, etc.

- Less intense mining activity in Russia

Lake Peipsi/Chuskoye –TBWR :
Oil shale mining …wastes and residues

- Mining wastes, ashes from power plants burn outs, residues from cracking (solvent distillation) are piled up in mega spoil heaps

- Significant quantities of pollutants remain in these wastes (HC from mining and PWP burnouts, phenols from cracking, etc.)

- Close loop waste management systems and aspersion of spoil heaps to help trap/keep pollutants on the site and avoid percolation into groundwater and rivers.

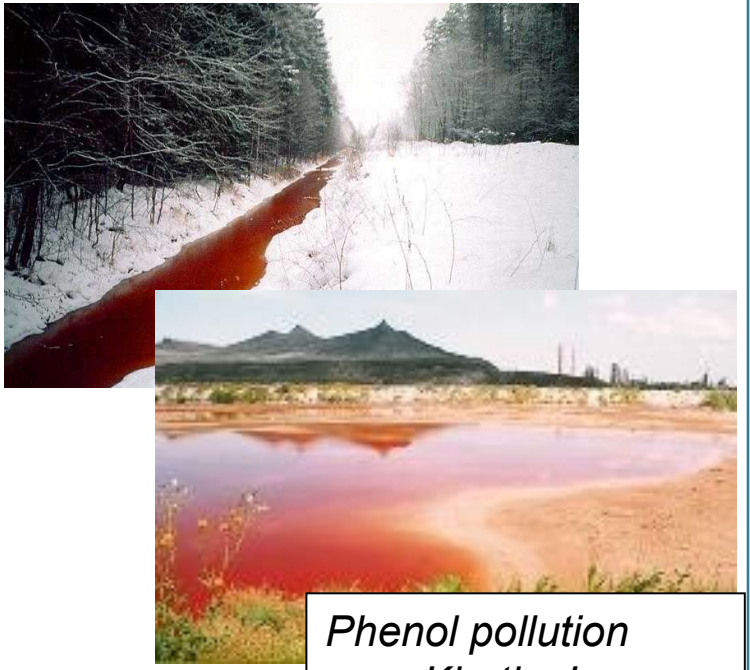
Lake Peipsi/Chuskoye –TBWR :

Oil shale mining ... a pollution threat to water resources in the Lake Peipsi Catchment

Degradation of Surface/groundwater resources

Main problem: chemical contamination of significant portions of the water resources in the mining area by :

- phénols,
- Hydrocarbon products,
- High alcalinity resulting from washing-through ash processes (Blue lagoon!).



Phenol pollution near Khotla Jarve

Blue lagoon phenomena –Eesti thermal/electricity unit

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Lake Peipsi/Chuskoye –TBWR :

Other pollution sources … Other problems …

1-Other pollution sources :

- Fall-out from aerial pollution such as fly-ash,
- Acid rain due to SO2 emissions produced in the mining areas, …
- Phosphorite mines in the Ida-Viru Co. (use : production of fertilizers)
- Large industrial zone in the Slantsy area (Russia)
- Fertilizers residus, nitrate and pesticides which migrate toward surface and groundwater in rural areas (lake eutrophisation, diffuse pollution in groundwater, …)
- Urban wastewater (lack of adequate treatment in some areas)
- Etc.

2-Other problems :

-Water depletion in mining areas prompted deep water overpumping

→Enhanced downward percolation of pollutants in deep aquifers

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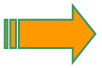
Lake Peipsi/Chuskoye –TBWR :
Programs of measures to reduce pollution / improve WRM

>Estonia under the WFD obligation with the help of EU has taken several corrective steps/measures to:

- Close, reduce and upgrade existing dump sites
- Reduce mining wastes (to 1/10 in december 2008)
- Modernise combustion facilities by 2015 (SO2 < 25000 T/yr in 2012, less after)
- Planning for application of water quality regulation
- Etc.



>Russia also has taken some steps to improve the situation (but no constraints such as WFD)

Not enough to reach WFD objectives - To complement :

>Several EU/UN-funded targeted projects (TACIS, LIFE/FFEM, UNDP/GEF, …) to enhance better water resources management and protection, some of them taking into consideration the transboundary aspects (i.e; Life-FFEM TBGW management project)

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Lake Peipsi/Chuskoye –TBWRM :

The LIFE/FFEM GW project : Key figures

- **Clients:** Estonian Ministry of Environment; Ministry of Natural Resources of the Russian Federation
- **Origin of funding:** EU Life Program, French Global Environment Fund (FFEM), Partner contributions
- **Partners: MoE/Estonia**, Estonian Information Centre, Geological Survey of Estonia, **Saint Petersburg Geological Expedition**, BRGM, GTK
- **Project duration:** May 2002 – December 2007
- **Budget: >3** M€

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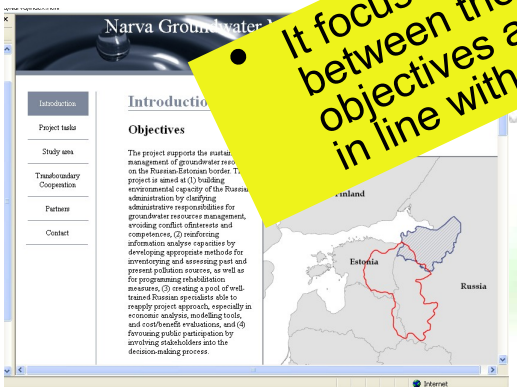
Lake Peipsi/Chuskoye –TBWR :

The LIFE/FFEM GW project : Main Objectives



- This project aims at reinforcing the application of the WFD in Europe in the case of one TBWR extending beyond its frontiers
- It focuses on selected aspects crucial to enhance dialogue between the concerned parties, setting out common objectives and concerted actions … for improved (G)WRM in line with the WFD concepts.

- Reinfo eration … and Estonia … sustainable …gement of their transboundary groundwater resources, particularly via … t technical activities
- Suppor… … pecific tools … ing (institutional …thening)
- Support to the dissemination of information on project activities and results to target groups and to the general public (national and international).

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Lake Peipsi/Chuskoye –TBWR :

The LIFE/FFEM GW project : Major achievements (1)

>The Viru peipsi – Narva project has succeeded in bringing together scientists and engineers from Russia, Estonia, Finland and France around the common objective of preserving the Lake peipsi/Narva Water resources system - thanks to the EU/Life and FFEM fundings.

>Estonian side – providing support to help implement the WFD / capacity building:

- **Water bodies delimitation**
- **Monitoring network**
- **Characterisation of water bodies in terms of water quality**
- **Enhanced water resources data management / concept of meta-data - GIS**
- **Introduction to the economic analysis and to the public participation approach for WRM - application in one case study**
- **WRM modelling**
- **Institutional aspects**
- **GW management plan for a pilot area**

>Russian side – providing support to allow for TBWRM in the sense of the WFD / capacity building :

- **Initiation of a data exchange process between different organizations in charge of data collection**
- **Monitoring network**
- **Enhanced water resources data management / concept of meta data - GIS**
- **Oil-shale mining risk assessment**
- **Remediation measures for oil-shale mining pollution**
- **Introduction to the economic approach, application to the Slantzy industrial/mining area**
- **WRM modelling**

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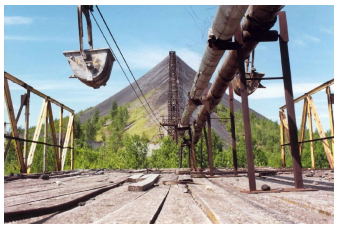
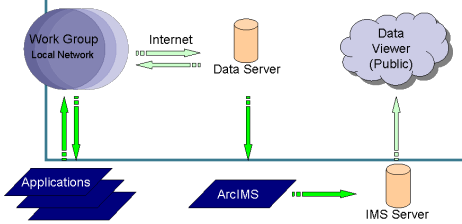
Lake Peipsi/Chuskoye –TBWR :
The LIFE/FFEM GW project : Major achievements (2)

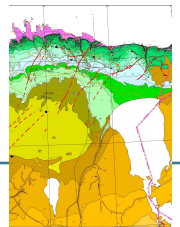
> Achievements WRT Estonian-Russian cooperation:

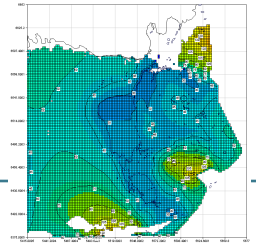
- Enhanced dialogue between scientists/enginneers from both side of the border through
  - joint steering committees meetings in Tallinn, St.Petersbourg and Paris,
  - several joint basin committee meetings in Paris, ST. Petersburg, Tallinn, and
  - several technical/training workshops/conferences (i.e; Orléans, Helsinki), communication plan, press conferences, …

  → raised awareness on the benefit of collaboration to implement Sustainable WRM
- Cross-border data exchange - geology and hydrogeology (common data base/GIS)
- Common preliminary catchment - scale transboundary model for TBWRM
- Pilot areas for hot spot remediation (ie Slantzy) - including impact assessment, Socio- economic studies and rehabilitation program
- Strenghtened Estonian–Russian Joint Commission on Transboundary Waters established in 1998.
  - Working group on integrated water management
  - Working group of monitoring and applied investigations









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The Challenge of Implementing the WFD Concepts at the Frontiers of Europe for Transboundary Water Resources Management – Conclusion (1)

> Implementing the WFD concepts at the frontiers of EU for TBRM is not an easy task …

- WRM requires a common shared vision and concerted effort by all parties involved. But:
  - Different legislation,
  - Different working methods,
  - Different objectives,
  - Different culture on WRM

  on each side of the border … added to
  - A lack of basic funding,
  - The size of the effort that must be achieved to fullfill WFD objectives, and
  - The great inertia of many aquifer systems

  often hampers the process

- Several projects such as those carried out on selected aspects of Lake Peipsi TBWR system bring positive results and allow for significant progress toward the application of the WFD concepts at the frontiers of EU, … but they can only focus on **selected aspects/areas**.

  → Full extent of the process over the entire area takes time

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The Challenge of Implementing the WFD Concepts at the Frontiers of Europe for Trans-boundary Water Resources Management – Conclusion (2)

> **Implementing all the WFD concepts at the frontiers of EU for TBWRM is probably an illusion in the short term … but most probably it will be effective in the long term because:**

- Projects such as the ones carried out on Lake Peipsi
  - **initiate dialogue, discussion and progressive data exchange between the parties being involved,**
  - **raise awareness on environmental matters and on the benefits of sustainable WRM (economic analysis – cost-benefit)**
  - **gather stakeholders around common interest/objectives WRT WRM,**
  - **help building useful common tools which can be replicated eslewhere (ie: for river basin management plans),**
  - **help convey the benefits of WFD concepts outside of EU thereby enhancing their progressive acceptance …**

- Many principles which are the basis of the WFD are strong and are in line with many of todays needs and with the perception that many people have with regard to WRM.

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The Narva River and the Ivangorod fortress … at the outlet of Lake Peipsi

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