

# Monitoring and assessment of waters shared by EU and non-EU countries: lessons-learned from the TRABANT project and from the ecological assessment in the Vuoksi River Basin

**SEMINAR ON MONITORING AND ASSESSMENT OF  
TRANSBOUNDARY WATERS IN THE UNECE REGION**

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# Contents

- Information on the project and approaches of its work
- Studies in the Vuoksi area and nearby
  - lakes
  - rivers
- Conclusions



# Transnational River Basin Districts on the Eastern Side of the Baltic Sea Network – TRABANT

- *Transnational River Basins*
- E.g. methods and tools of river basin management and analyses
- approach in the work is methodological
- compilation, analysis and evaluation of available information
- 16 partners from: BY, EE, FI, LV, LT, RU, SE
- Duration 2005 - 2008
- *Catchments of Vuoksi, Narva, Western Dvina/Daugava, Neman/Nemunas*
- Pilots of Vuoksi and Narva (R. Piusa in Tacis part) still continue
- Final report II on status assessment and monitoring, final report I is a general guidebook for international river basins.

[http:// www.environment.fi/syke/trabant](http://www.environment.fi/syke/trabant)



# Scope of work on river basin analyses

## Methods of status assessment and monitoring

- compilation of information in Eastern Baltic Sea region, incl. in Russia and Belarus, in the EU, review, analysis, comparisons

Lakes, a set of mesohumic and polyhumic lakes in the river basin of Vuoksi and nearby

- typology
- test on classification, chlorophyll *a*

## Rivers

- zoobenthos
- phytobenthos
- physico-chemistry
- also sampling in the river basin of Vuoksi and nearby



# Principles of the EU surface water classification

- water types
- type-specific reference conditions corresponding natural status
- ecological classification – 5 classes based on the degree of human influence
- chemical status based on environmental quality standards of priority substances – 2 classes
- Emerging classification system



## Humic lakes

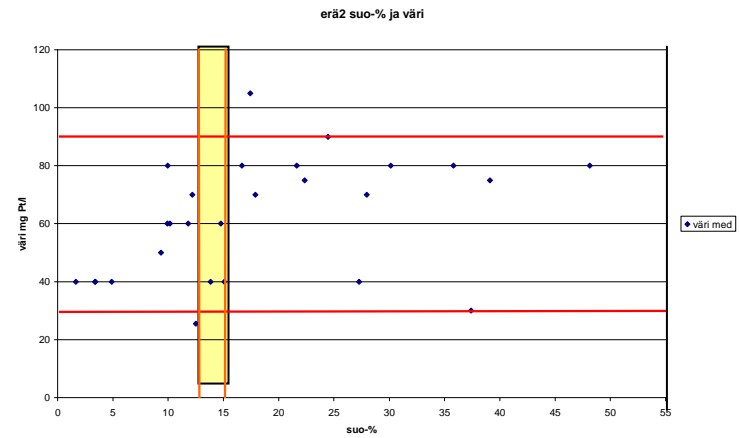
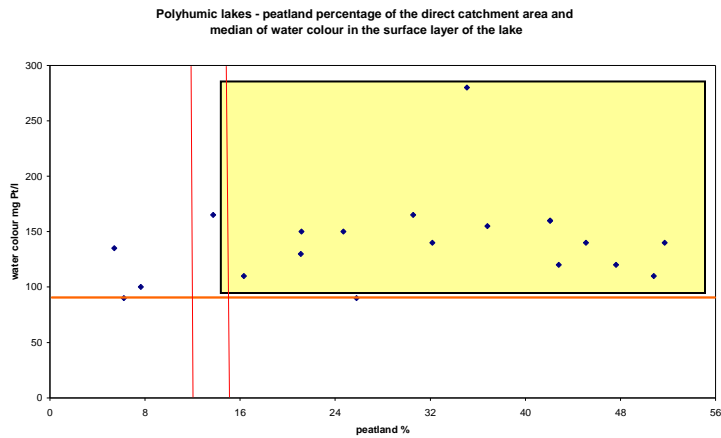
### Tests on typology and classification

- In Vuoksi and nearby areas test on methodologies of lake typology
- Percentage of peatland coverage was determined (GIS) from two groups of lakes mainly with minor human impact – *mesohumic* and *polyhumic*.
- The use of peatland coverage and water colour was compared in lake type definition.
- Finnish type system was used.
- Finnish guidelines for determination of a lake type were evaluated.
- Chlorophyll concentration of these lakes was used as a metric for classification of status, according to the Finnish WFD criteria of chlorophyll.



## TRABANT project work and results

# Typology – polyhumic and mesohumic lakes



19/06/2008



# Typology – preliminary conclusions

Water colour seems to be more robust in type definition than GIS.

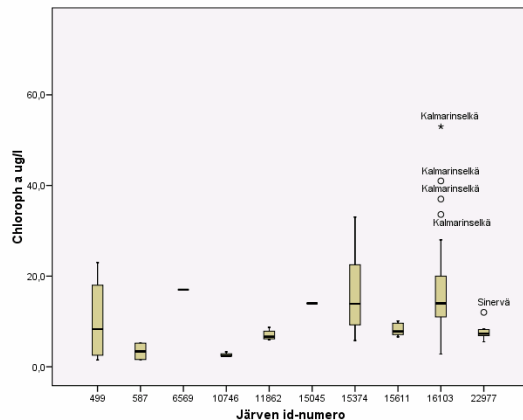
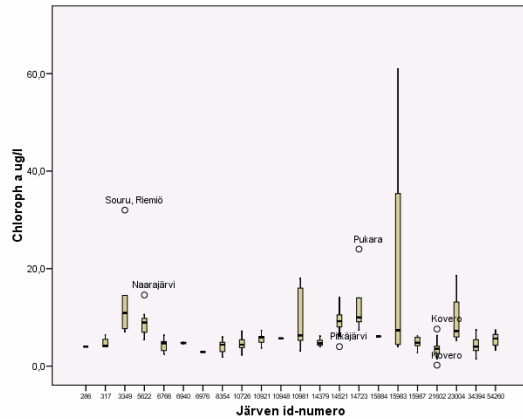
But catchment data are needed and useful in certain conditions:

- for groups of lakes, not necessarily for individual lakes
- if data of water colour are not available, peatland data can be used especially
  - in surveys of types in areas where human pressures on waters are at a low level
  - for smaller lakes, upstream, especially for small polyhumic lakes
  - it would be useful to validate regionally with water colour data.
- polyhumic if percentage > 30 – 40 %
- GIS data have to fulfil adequate requirements.



## TRABANT project work and results

# Classification – chlorophyll of mesohumic and polyhumic lakes



- median **5.3** µg/l for this group of mesohumic lakes
  - (P05 - P95 3.9 – **10.1** µg/l)
- median **7.6** µg/l for this group of polyhumic lakes
  - (P05 - P95 2,8 – **14,0** µg/l)
- boundaries e.g. for mesohumic lakes and high status < 7 µg/l and good status 7 – 12 µg/l and > 12 µg/l moderate status or poorer; for polyhumic high status < 12 µg/l, good 12 – 20 and > 20 moderate or poorer
- according to the Finnish classification system and based on median values these lakes are generally in high status, or partly in good status

TRABANT project work and results

# River zoobenthos

Zoobenthos, objectives

(Antti Haapala, KAS)

- to evaluate the ecological status of stream stretches based on biota & water chemistry, and qualify effect of the hydro-morphological pressures
- to test to establish reference conditions for the large clearwater river type



# River zoobenthos

- For reference conditions more sites would be needed and criteria further developed. But the results were promising.
- According to EPT-index and other tested indicators for benthic quality the impacts of hydro-morphological changes could be detected.

*Photos: Arto Hämäläinen and Antti Haapala*



TRABANT project work and results

# River phytobenthos: Diatom sampling

## Sampling area and samples

Sample stones:

- Diameter 10-15 cm
- Permanently submerged
- Preferably with no macroalgae or moss
- Moderate flow (0,2-0,5 m/s)

Sampling area:

~ 20-50 m flow/rapid area

Characteristics to be described to the field survey form

Direction of flow

Sampling proceeds upstream (1, 2 ... 5)

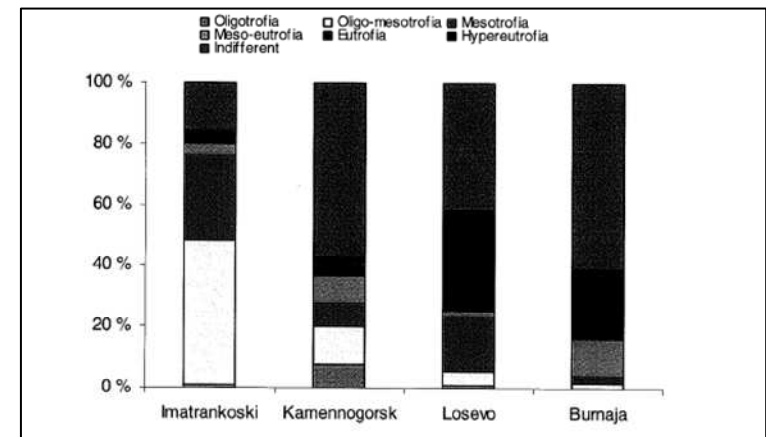
Jouni Törrönen, KAS



## TRABANT project work and results

# River phytobenthos

- Phytobenthos was gathered (brushed) from the upper surface of the sample stones (5-8 pcs)
- Suspension was fixed/stored in small bottles in ~70 % ethanol
- A cost-effective biological monitoring method
- Results in good compliance with phosphorus data



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The ecological classification of composition of diatom communities based on nutrient level



## Physico-chemical status of rivers

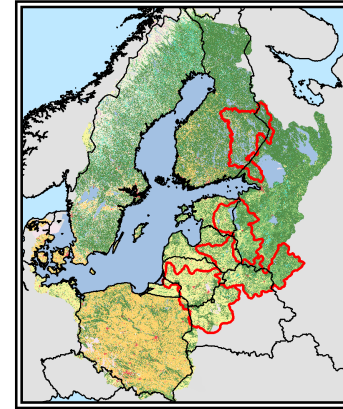
- In a test in the Vuoksi area Russian integrated system with maximum permissible concentrations seemed to produce poorer status class at least for small humic river than type-specific physico-chemical criteria of the Finnish WFD classification system.
- This is probably influenced by the situation that the concentrations that exceed the maximum permissible limits for fishery and household water use are considered similarly to pollution, even when they are of natural origin (e.g. organic or humic content, iron, manganese).



# Conclusions

- For definition of types, use of GIS data of catchment might be useful also in many transboundary river basins.
- Zoobenthos and phytobenthos of rivers seem to be promising, also for areas where data is lacking. These methods could be cost-effective used alone, or in combination of physico-chemical analyses.
- Type-specific criteria and reference conditions would be needed for transboundary waters in order to make the monitoring and status assessment well targeted and effective.
- Among physico-chemical criteria nutrients are important elements in monitoring. Hazardous substances or other anthropogenic constituents of water also there, where they are relevant.





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Thank you

