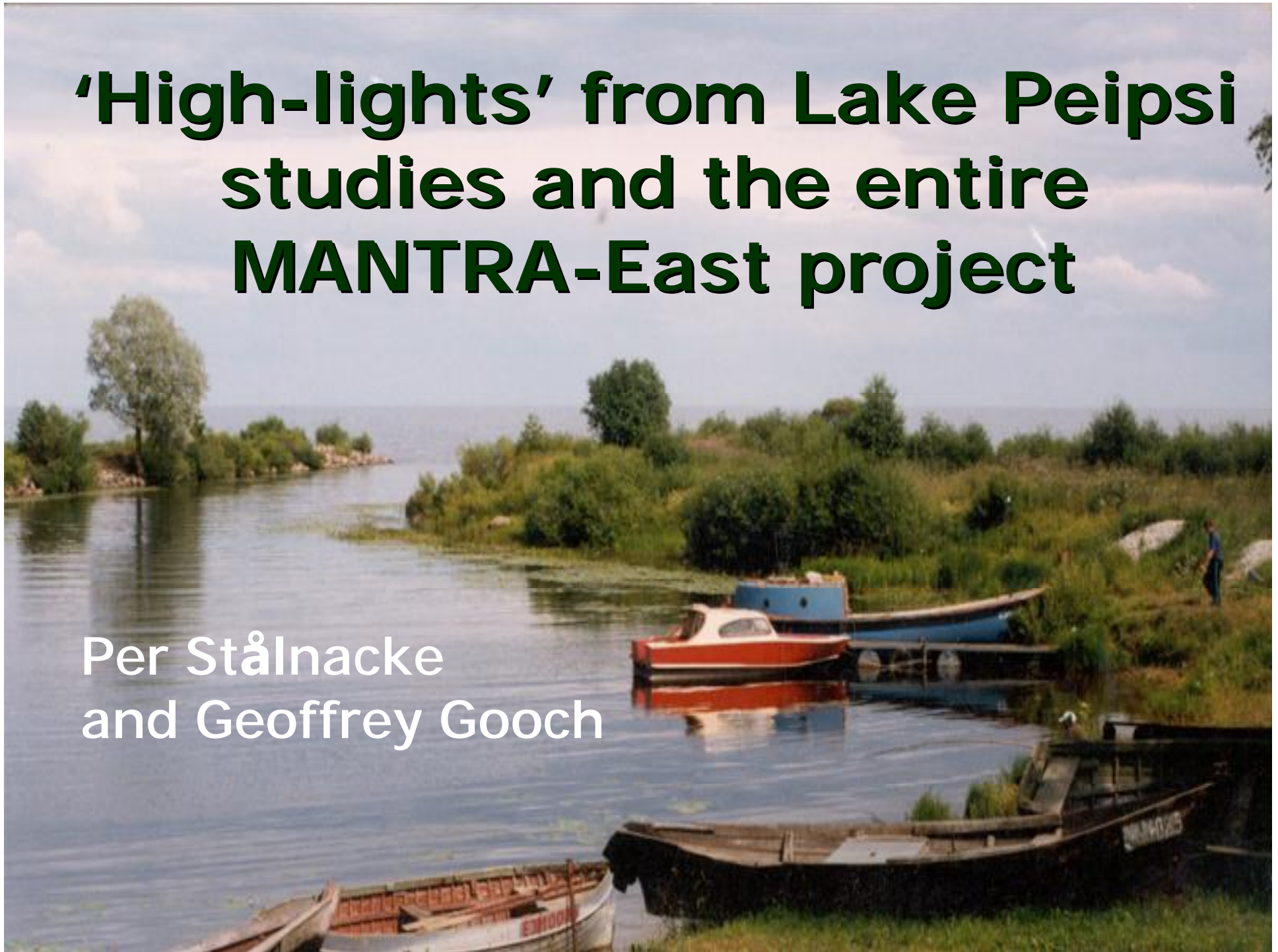



# 'High-lights' from Lake Peipsi studies and the entire MANTRA-East project

Per Stålnacke  
and Geoffrey Gooch





**Integrated strategies  
for the management of  
transboundary waters on the Eastern  
European fringe - the pilot study of  
Lake Peipsi basin**

**MANTRA-East**

a project within  
EU 5th Framework Programme



**MANTRA-East**  
started in February 2001 and  
will end in January 2004

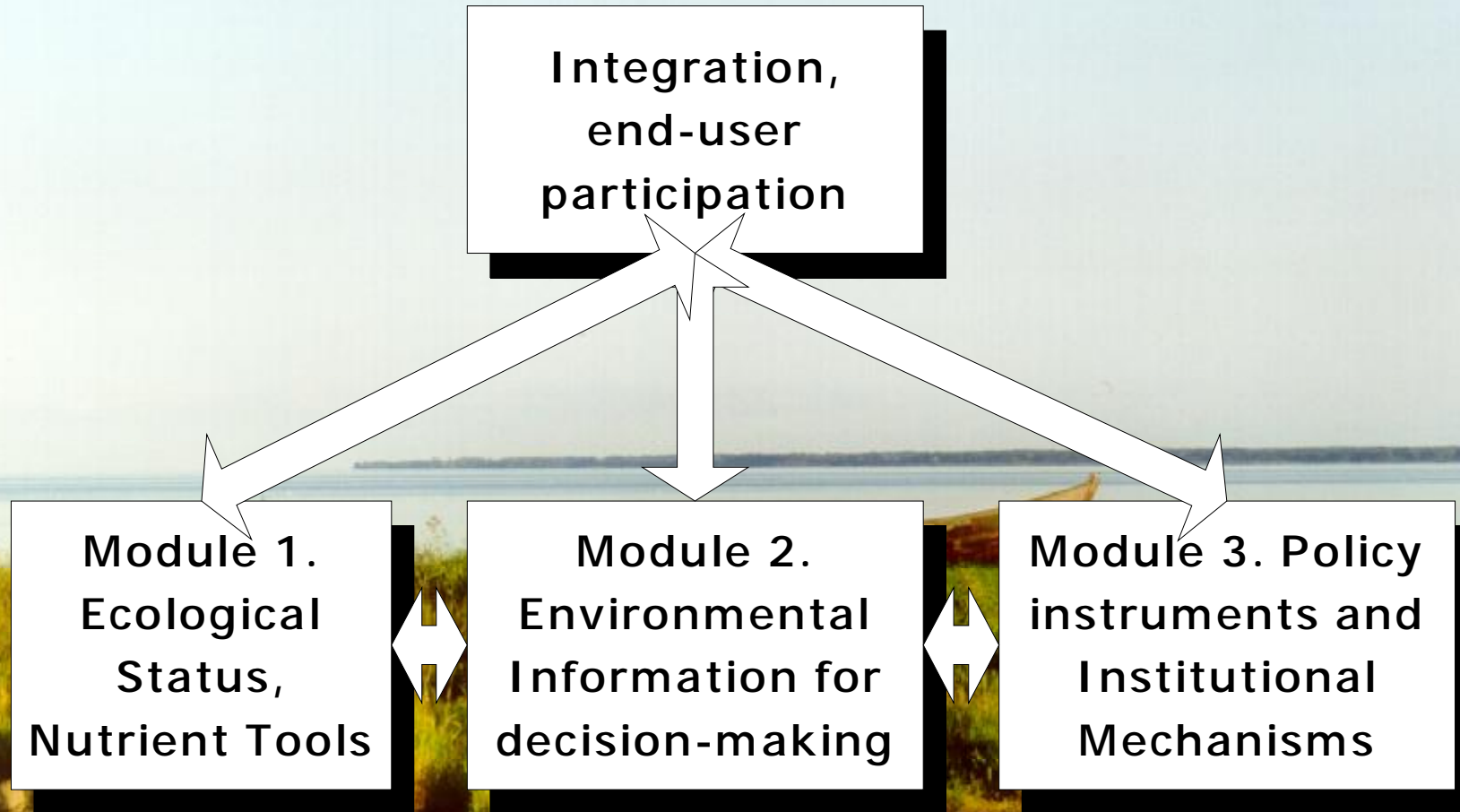


- » Йордфорск - Центр почвенных и экологических исследований (JF)
- » Центр трансграничного сотрудничества (СТС)
- » Таллиннский технический университет (TTU)
- » Тартуский университет (TU)
- » Эстонский сельскохозяйственный институт (EAI)
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## **ADVISORY COMMITTEE**

Originally 13 persons, e.g. representatives of The Estonian-Russian Water Commission, other lake commissions, UNDP, The World Bank, UN ECE, HELCOM but since autumn 2002 also representatives from Vistula Lagoon Region

# Project Organisation





# Project Organisation

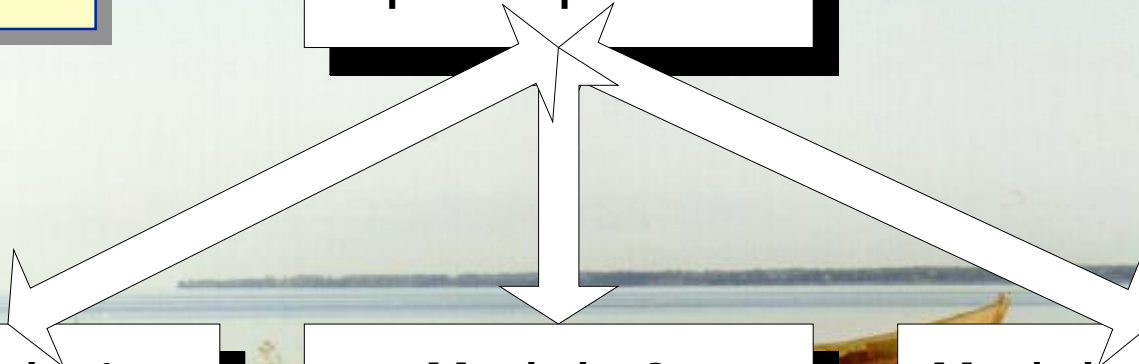
Today I will focus on **SELECTED PARTS** of:

Integration,  
end-user  
participation

Module 1.  
Ecological  
Status,  
Nutrient Tools

Module 2.  
Environmental  
Information for  
decision-making

Module 3. Policy  
instruments and  
Institutional  
Mechanisms

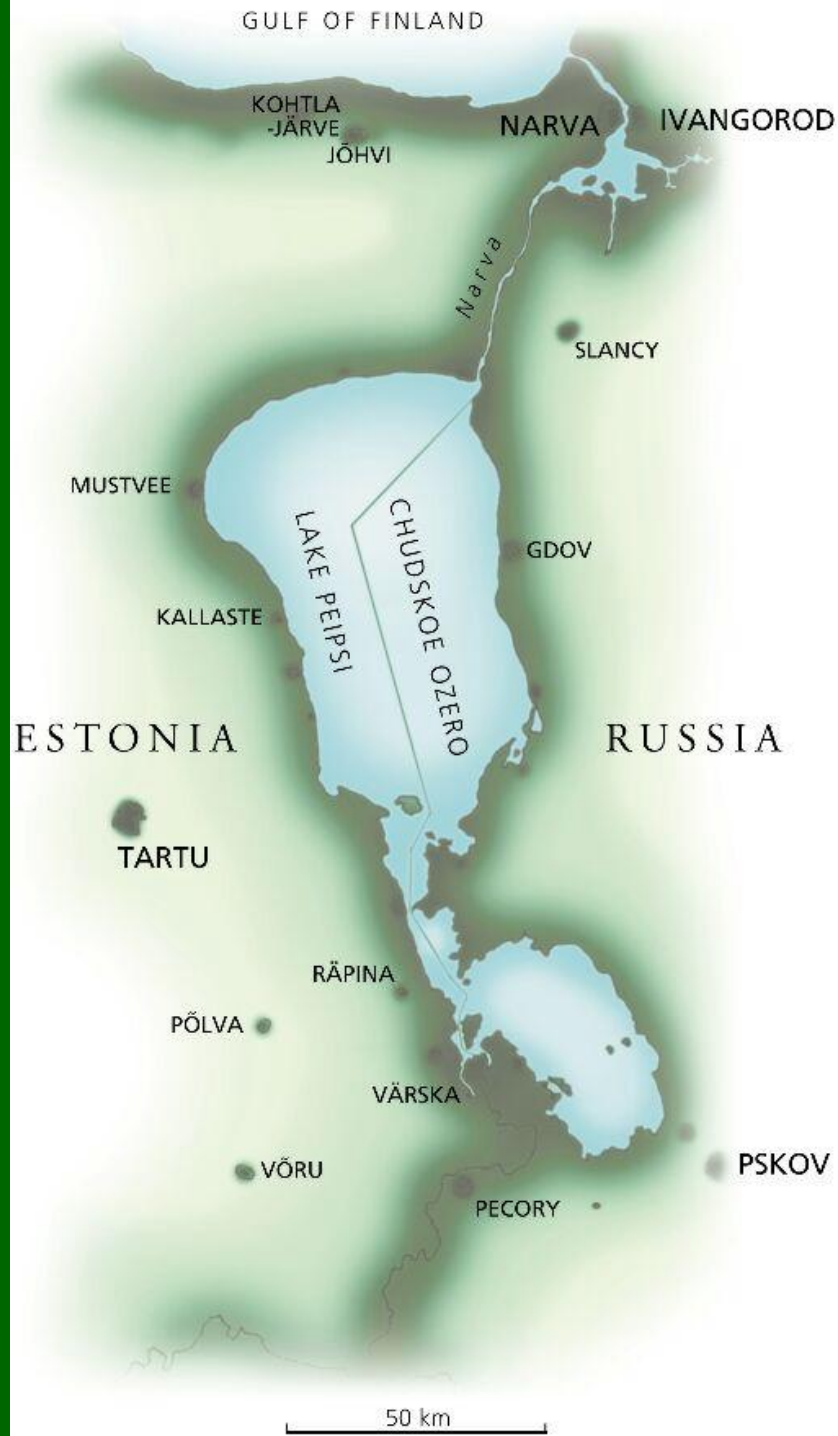


# Module 1. "Ecological Status and Strategic Nutrient Tools"

To evaluate the applicability of the EU WFD to the future EU border regions, with regard to

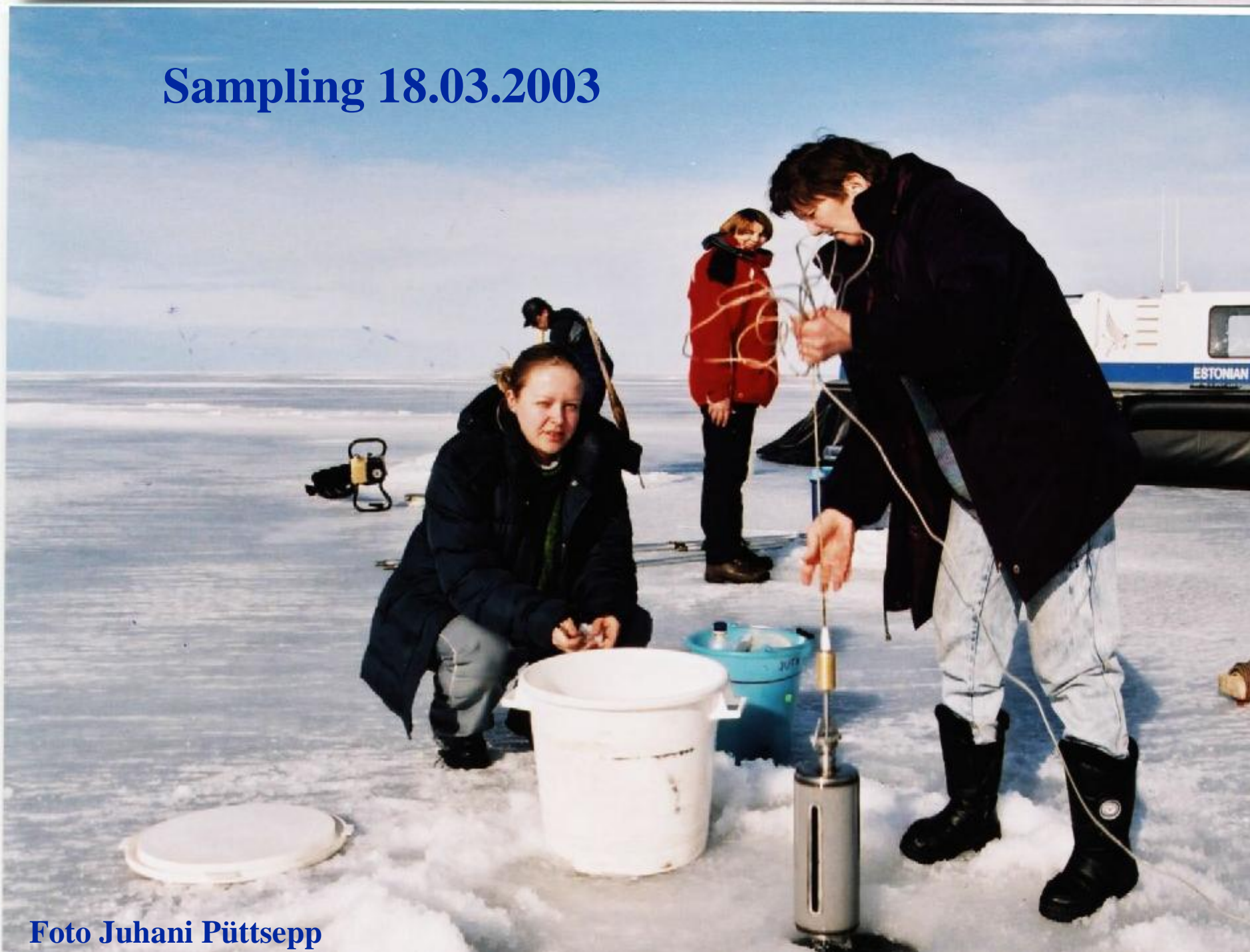
(i) Assessment of the state of eutrophication, ecological classification of Lake Peipsi / Vistula Lagoon and its rivers according to WFD

(ii) Development of strategic lake/lagoon and river basins tools for source apportionment, retention, and time-trends in nutrient loads;





**Sampling 18.03.2003**



**Foto Juhani Püttsepp**







# Algal bloom in L. Peipsi, 9 August 2002



•Photo Peeter Unt



## Fish kill in L. Peipsi, August 2002



•Photo Peeter Unt

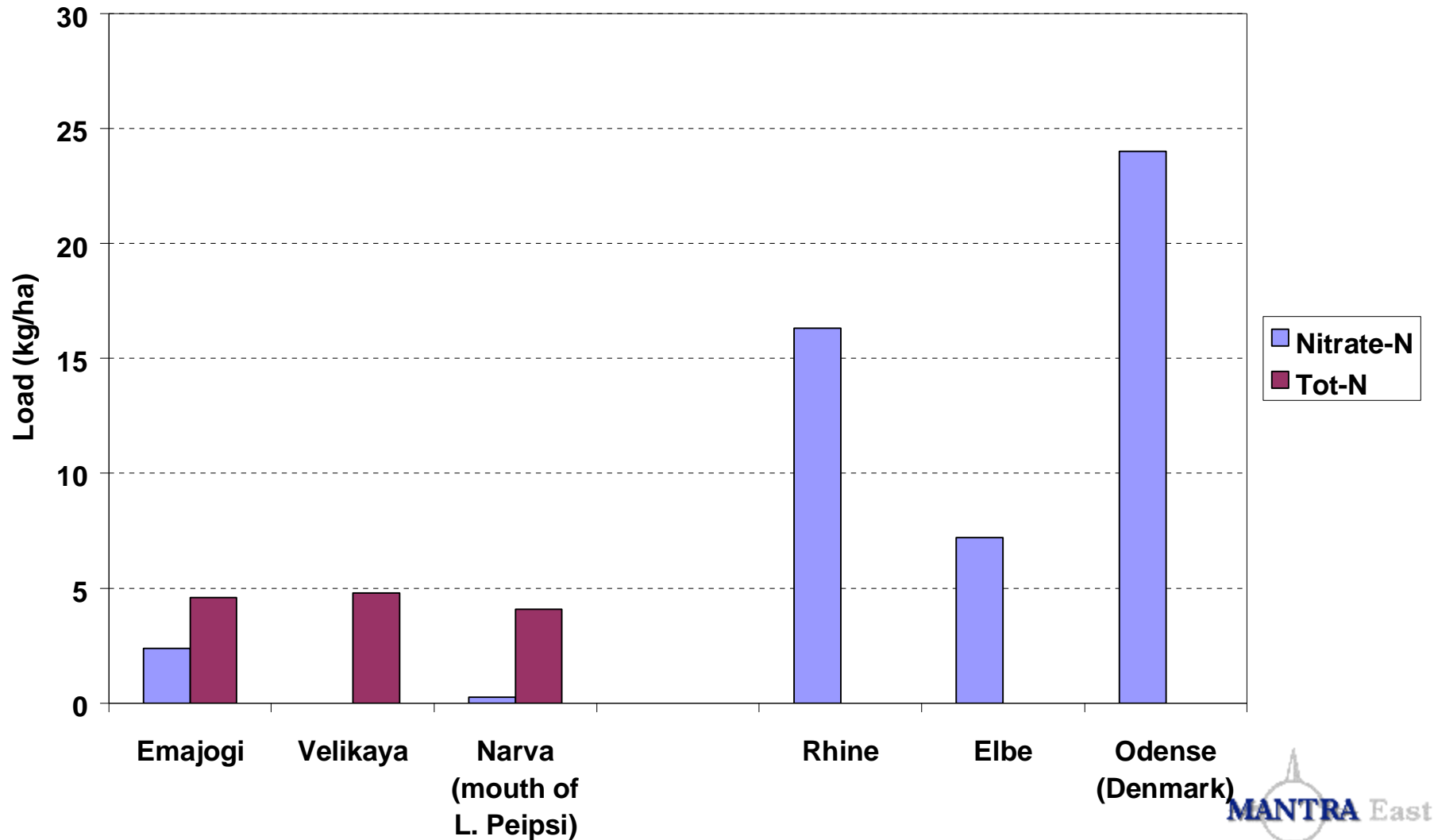


A photograph of a small boat with two people on a vast, deep blue ocean. The boat is in the middle ground, and the horizon is visible in the distance under a clear sky. The text is overlaid on the lower half of the image.

**Some selected  
results from module  
1....**

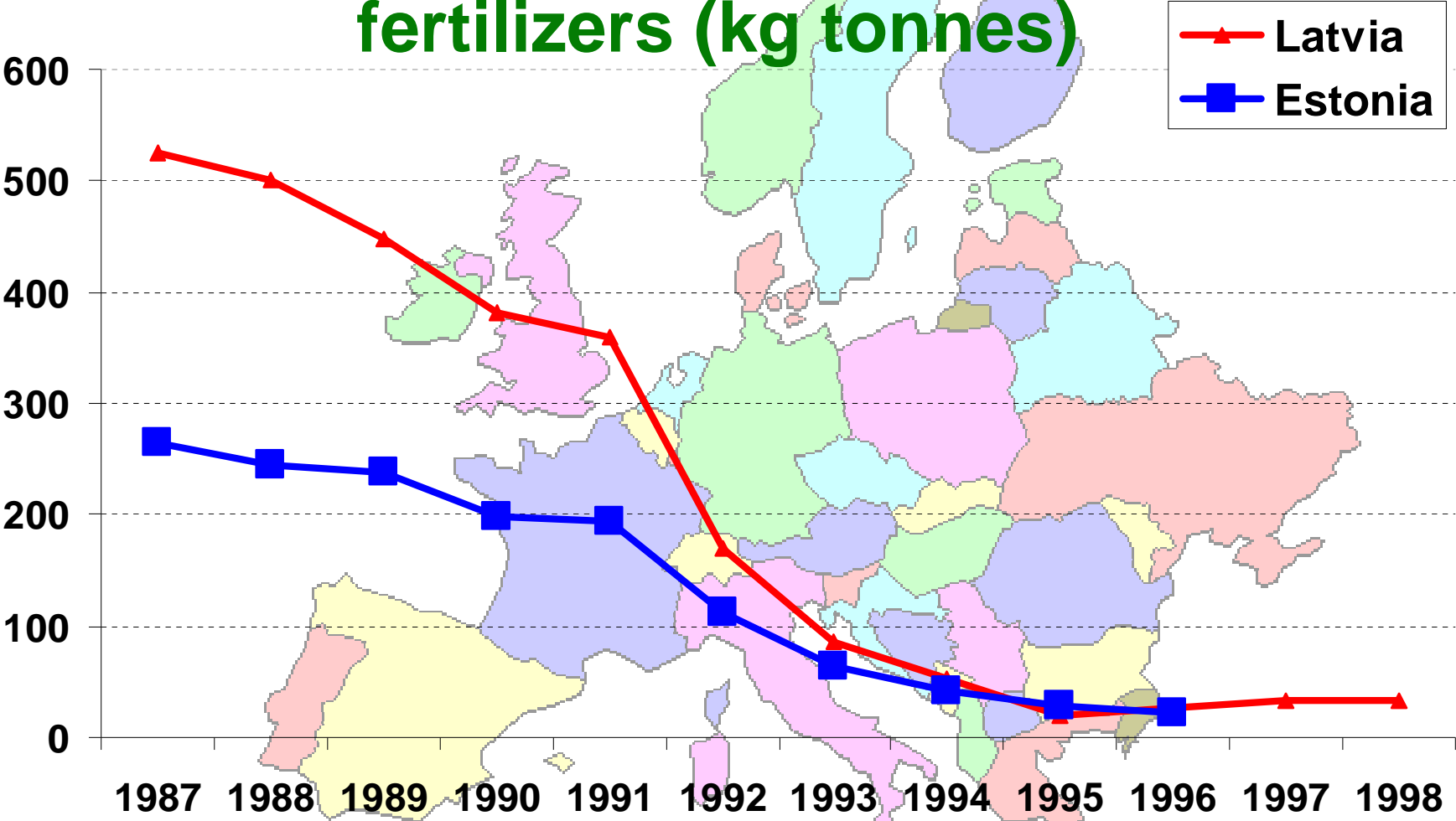
# Low nitrogen loads in Eastern Europe

Stålnacke & Roll 2002

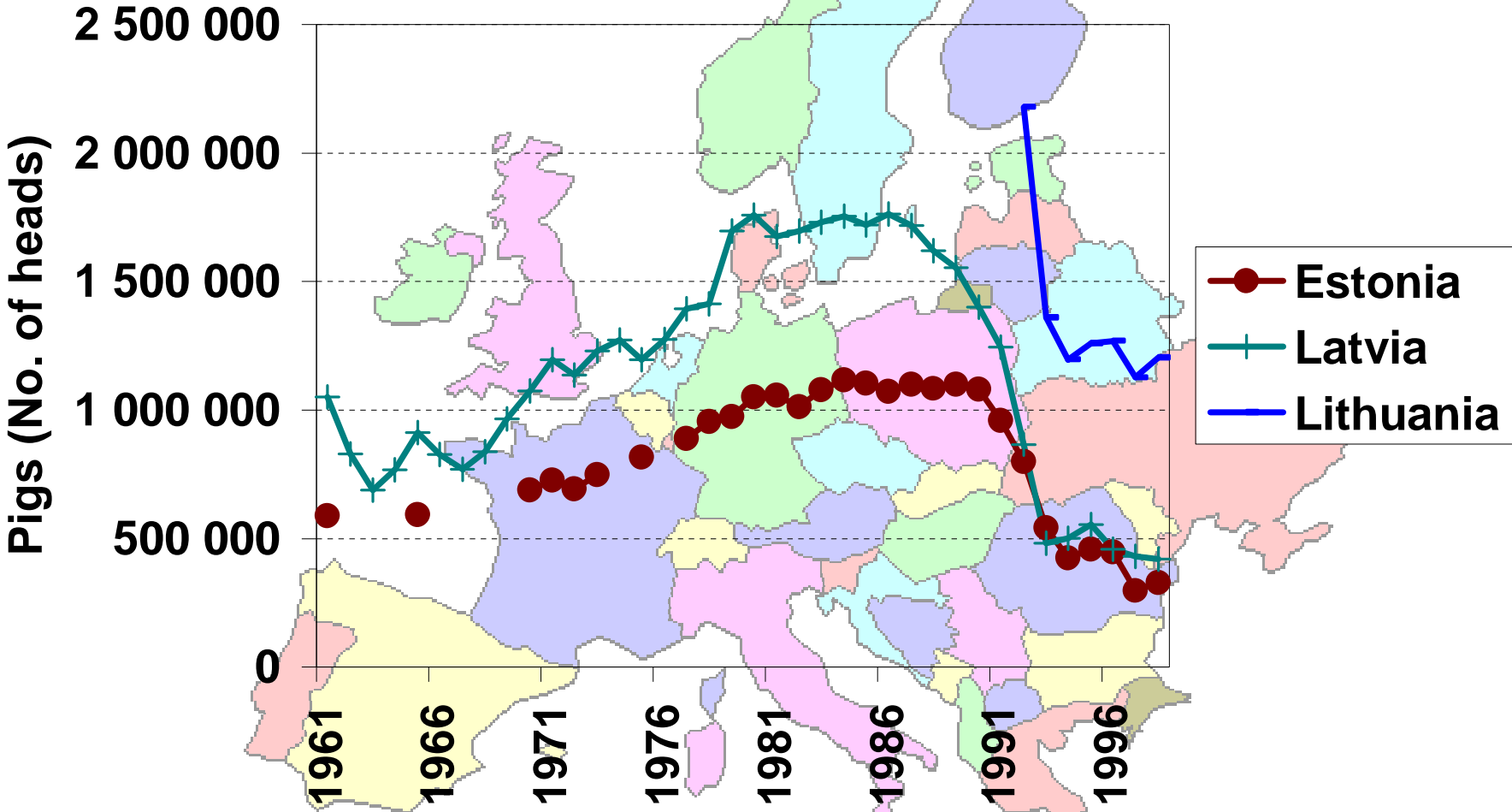




# Total consumptions of commercial fertilizers (kg tonnes)

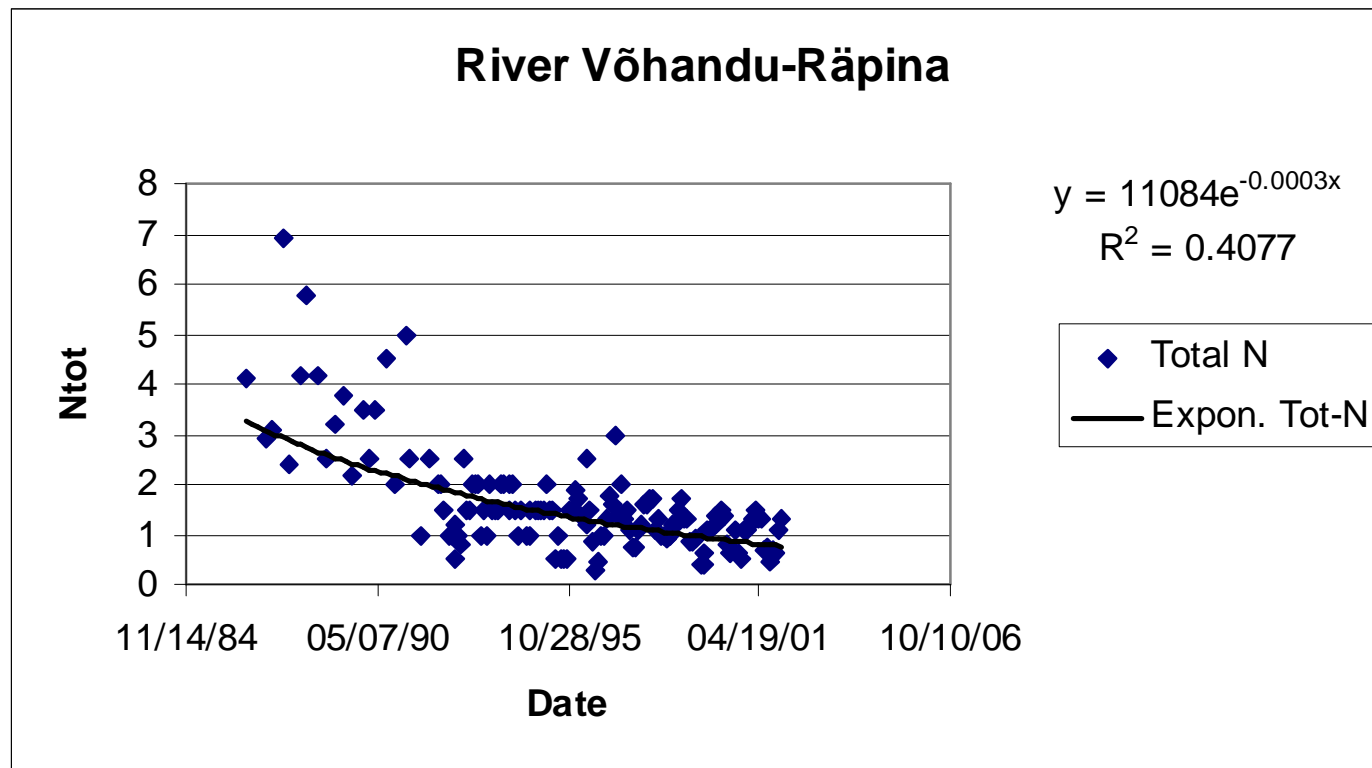


# Dramatic decline in livestock (50-75%)



# Nitrogen -results

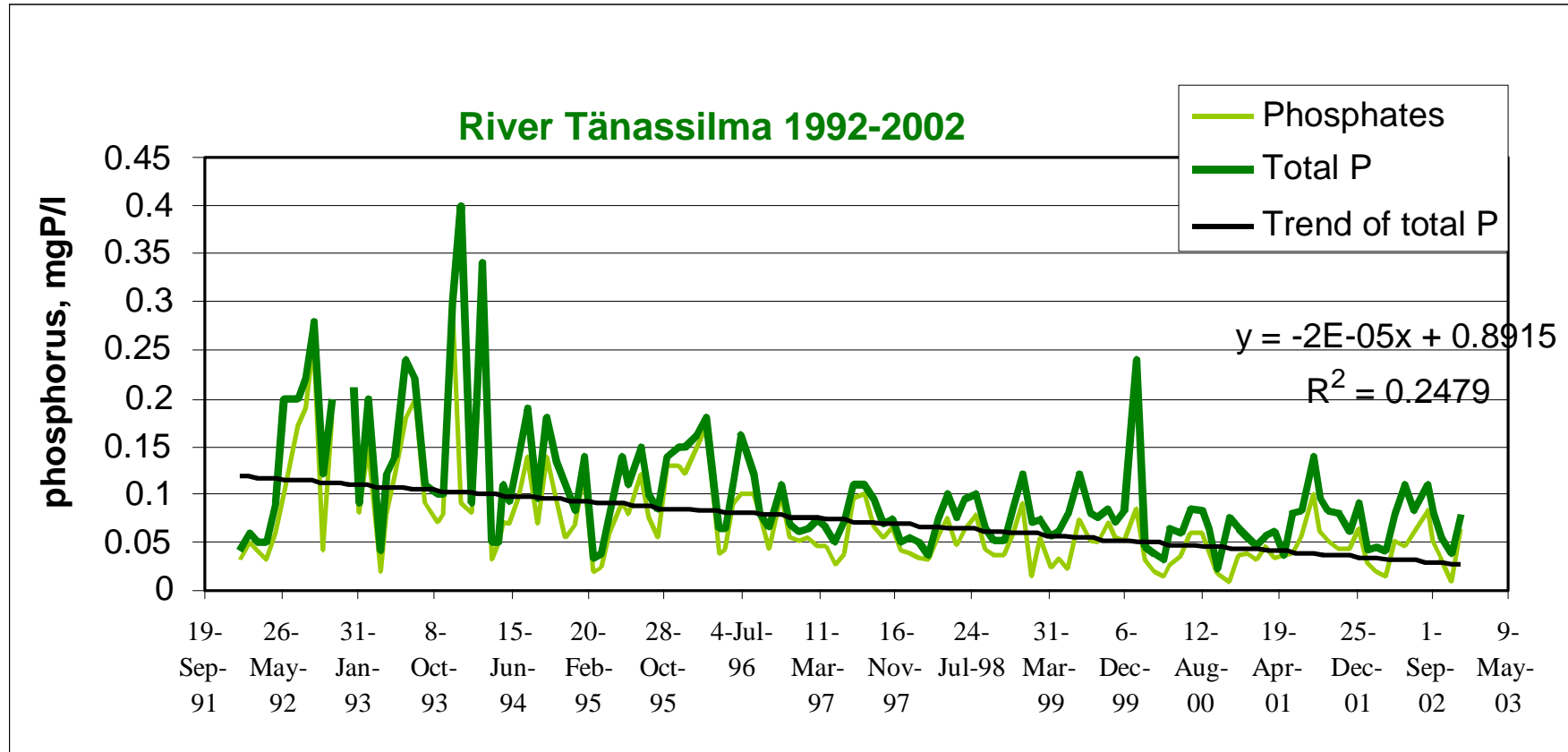
- m Overall statistically significant downward trend for nitrogen in 20 stations in Estonian rivers
- m Probably the decrease in nitrogen concentrations is mainly a result of low fertilisation level during the last decade and better farm management practices.





# Phosphorus -results

- m No clear trends for phosphorus, except in four rivers



# The classical Rothamsted experiment (UK)

(Addiscott, 1988)



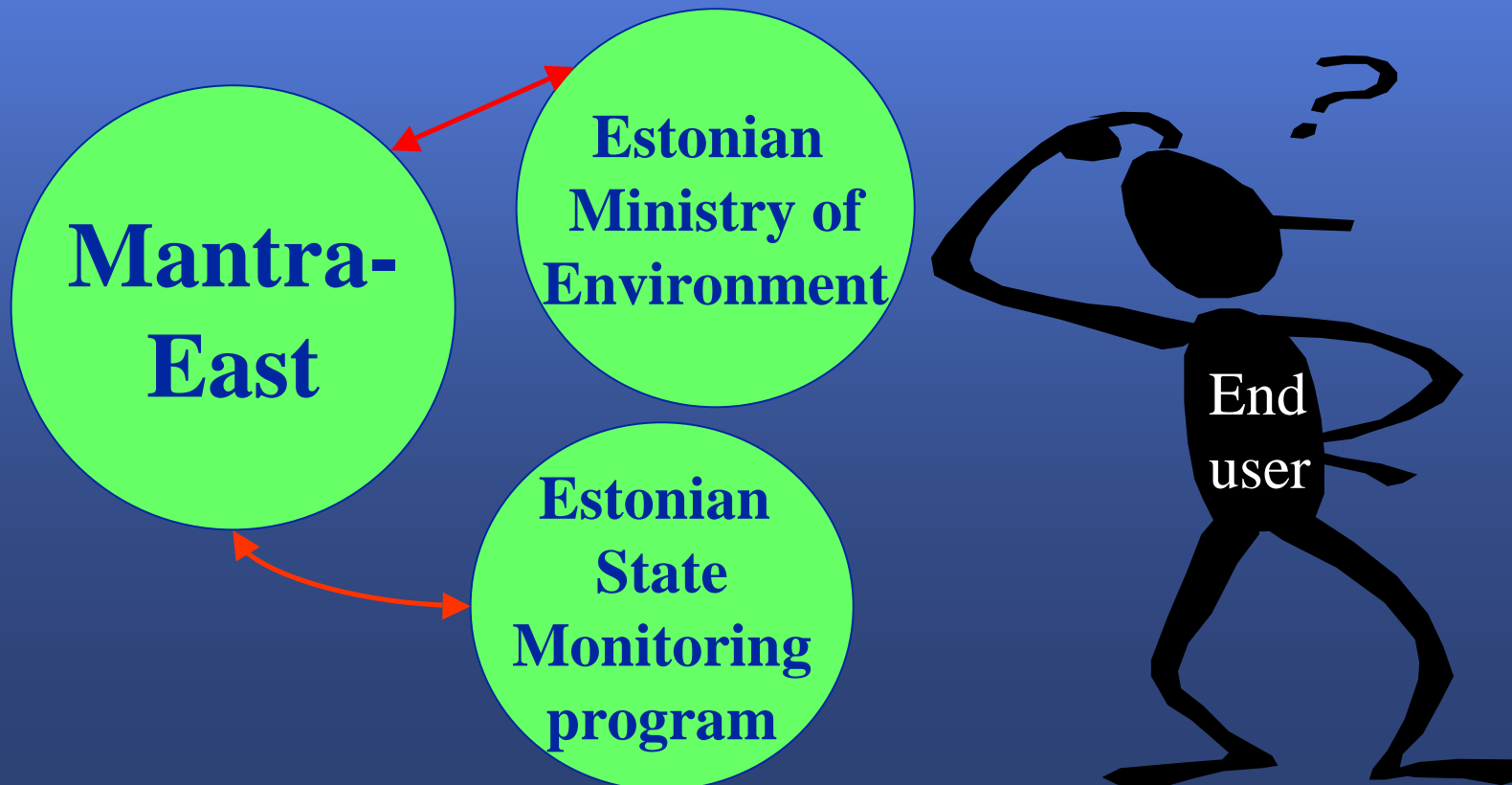
# Results: Trend analysis

- m Results from analysis of data and literature indicate that nutrient levels in rivers have in some cases responded and in others not responded to the large-scale changes in agriculture
- The findings, imply that extensive cuts in nutrient inputs do not necessarily cause an immediate response, particularly in medium-sized and large catchment areas
- m Hydrological conditions and hydrological pathways are important for the understanding of the retention of nutrient and thus for riverine response to changes in agricultural emissions
- m Large pool of decomposable organic matter in soil can be a larger source than direct losses from chemical fertilisers



# RESPONSE OF LAKE PEIPSI TO CHANGED NUTRIENT LOADS

## Why MANTRA-East?

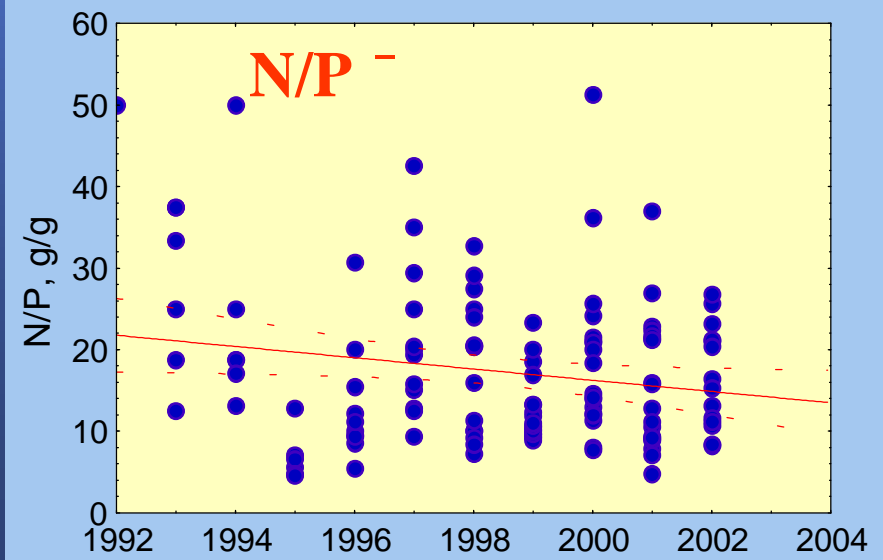
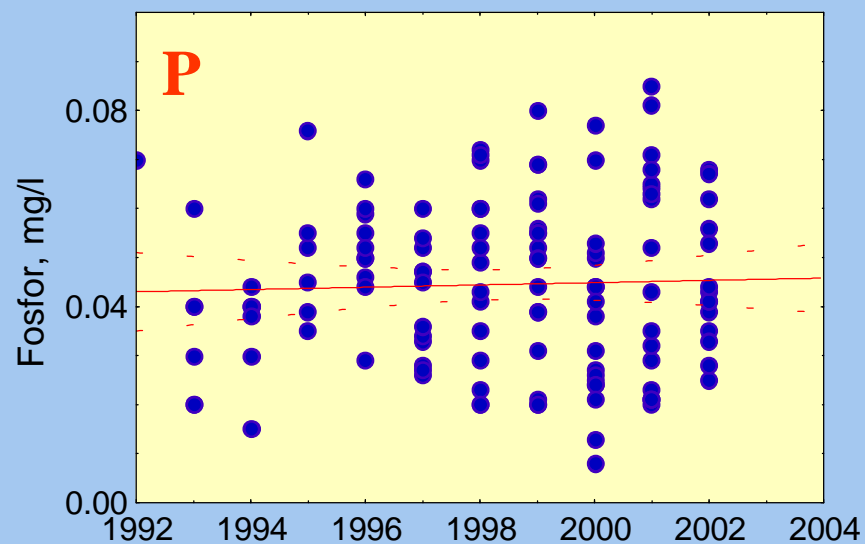
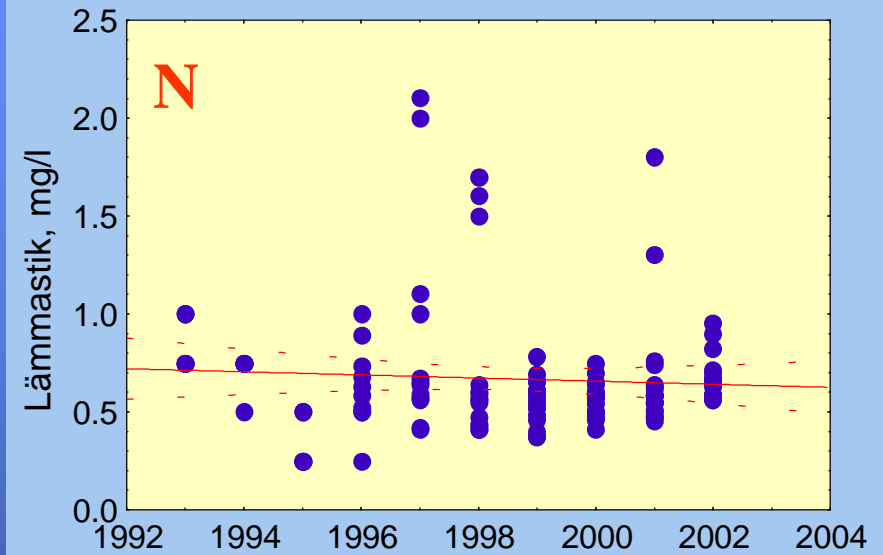
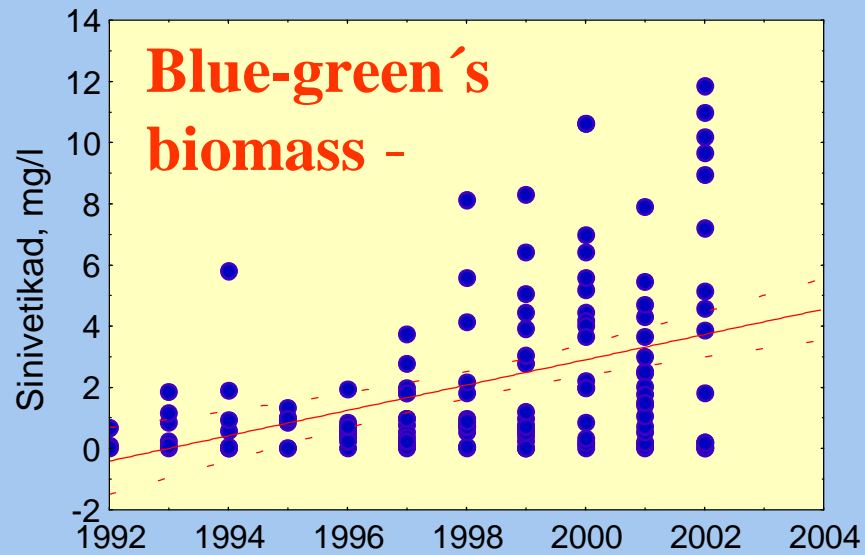


Let's look  
monitoring data !





# L. Peipsi, central and northern part





Loadings to the lakes  
are not calculated in  
national monitoring  
programme!



HELP !!!



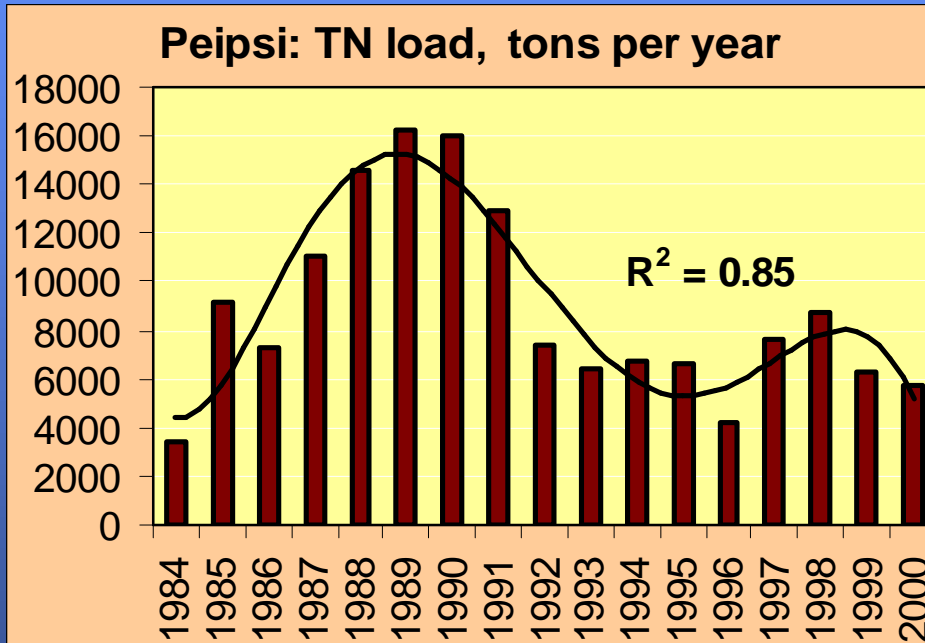
Mantra-  
East

Personal  
contacts

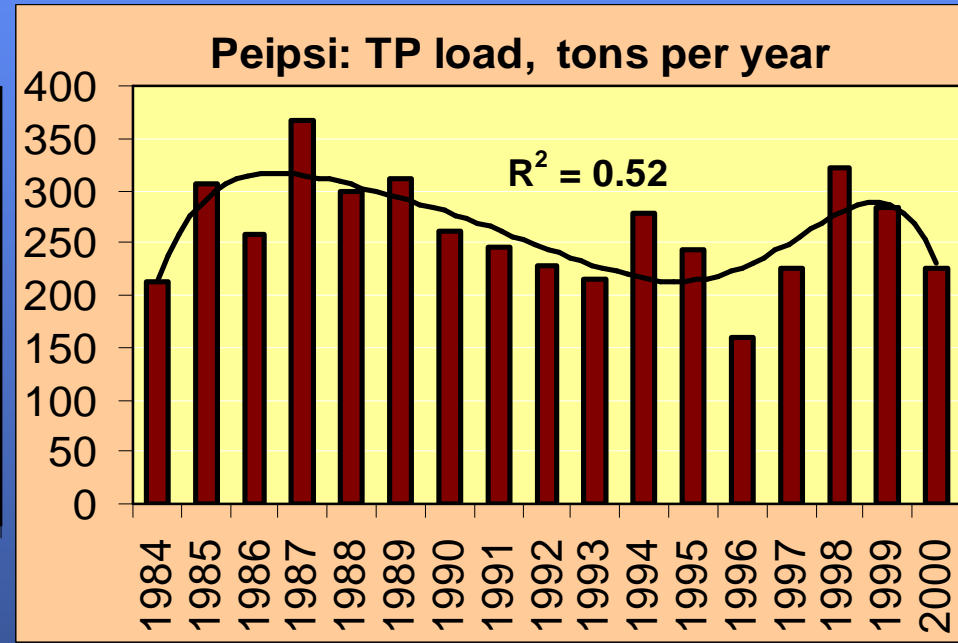


# N & P loadings from Estonian catchment decreased in 1990s

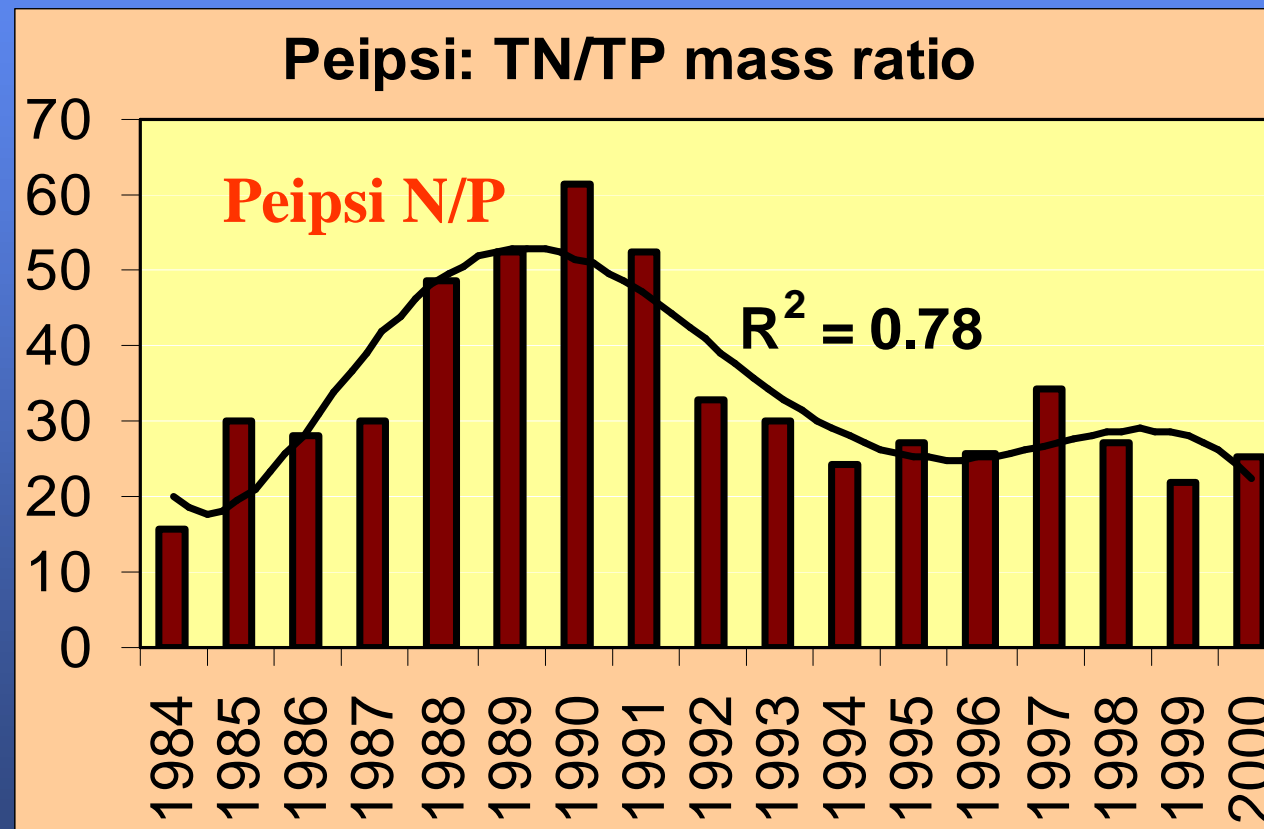
## Peipsi N



## Peipsi P



# N / P ratio in the loadings from Estonian catchment decreased in 1990s







**m** P concentration in L. Peipsi seems to have increased



**m** Increased P loading or leakage from sediments?



- Last available Russian loadings from 1980s

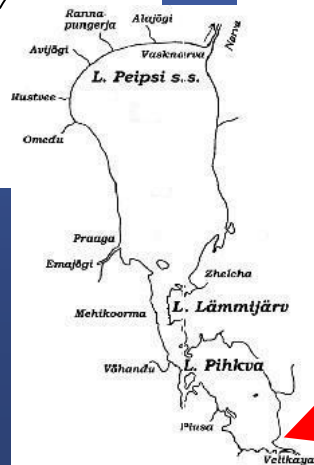
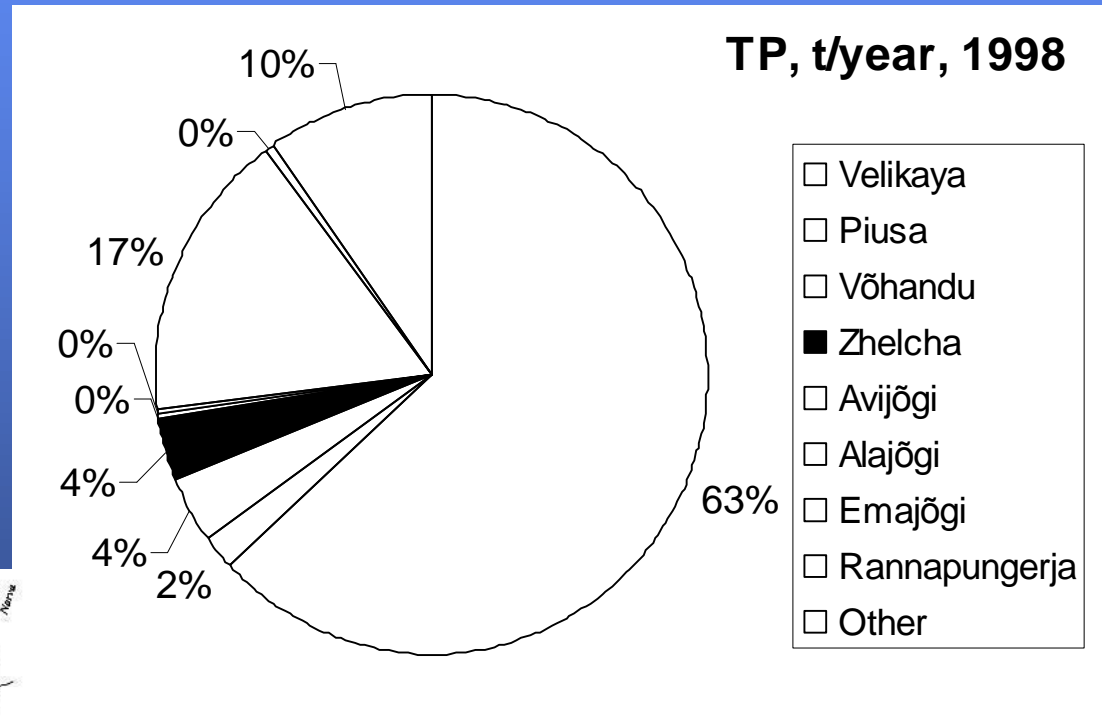
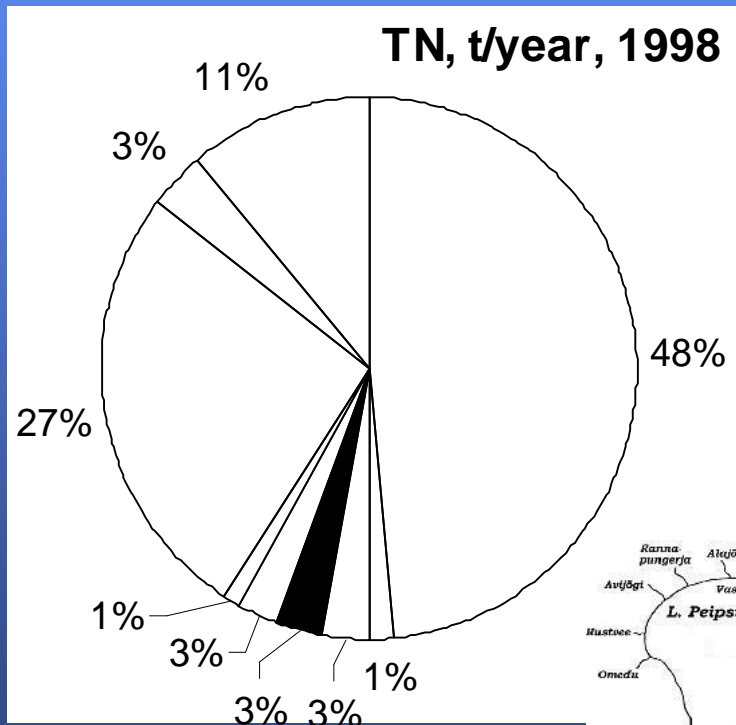
HELP !!!



Mantra-East

Personal contacts

Nõges, P., Leisk, Ü., Loigu, E., Reihan, A., Skakalski, B., Nõges, T. 2003.  
 Nutrient budget of Lake Peipsi in 1998. Proc. Acad. Sci. Estonia. Ser.  
 Ecology (in press).



**63% of P comes from the R. Velikaya (Russia)**



**m** What is the reaction of the ecosystem to changed nutrient loading?



# The impact of changed nutrient loading since 1980s on cyanobacteria in Lake Peipsi

*Nõges, T.<sup>1,2</sup>, Tõnno, I.<sup>1,2</sup>, Laugaste, R.<sup>1</sup>, Loigu, E.<sup>3</sup>, Skakalski, B.<sup>4</sup>*

<sup>1</sup>Institute of Zoology and Botany, Estonian Agricultural University, Võrtsjärv Limnological Station, 61101 Rannu, Tartumaa, Estonia, [tnoges@zbi.ee](mailto:tnoges@zbi.ee), [pnoges@zbi.ee](mailto:pnoges@zbi.ee), [reet@zbi.ee](mailto:reet@zbi.ee)

<sup>2</sup>Institute of Zoology and Hydrobiology, University of Tartu, Estonia

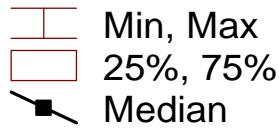
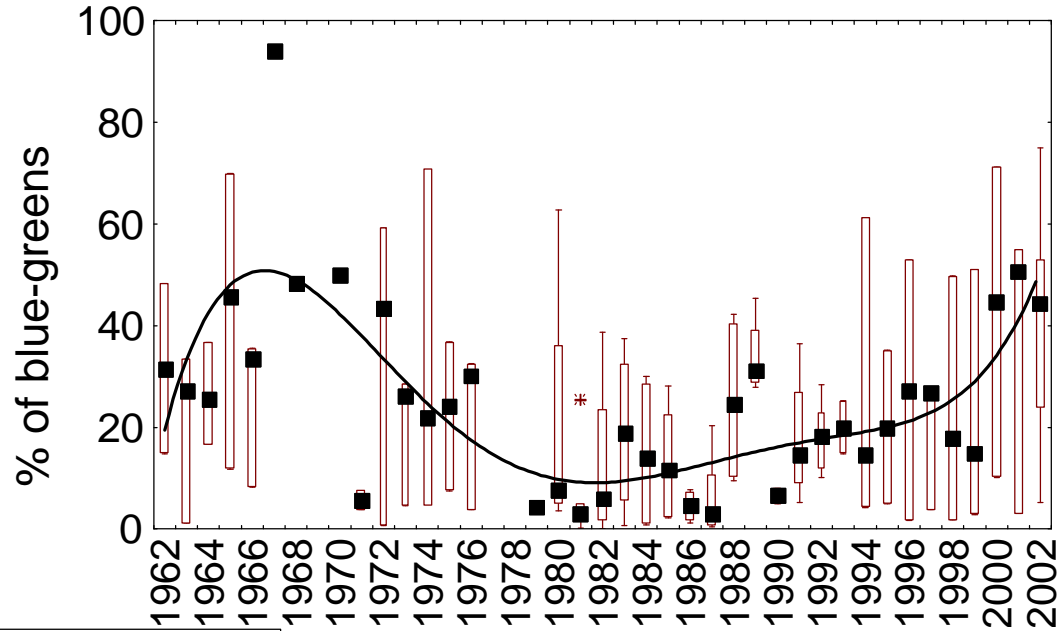
<sup>3</sup> Department of Environmental Engineering, Tallinn Technical University, Estonia, [ennloigu@edu.ttu.ee](mailto:ennloigu@edu.ttu.ee)

<sup>4</sup> Russian Hydrometeorological University, St.-Petersburg, Russia, [root@ce.spb.org](mailto:root@ce.spb.org)

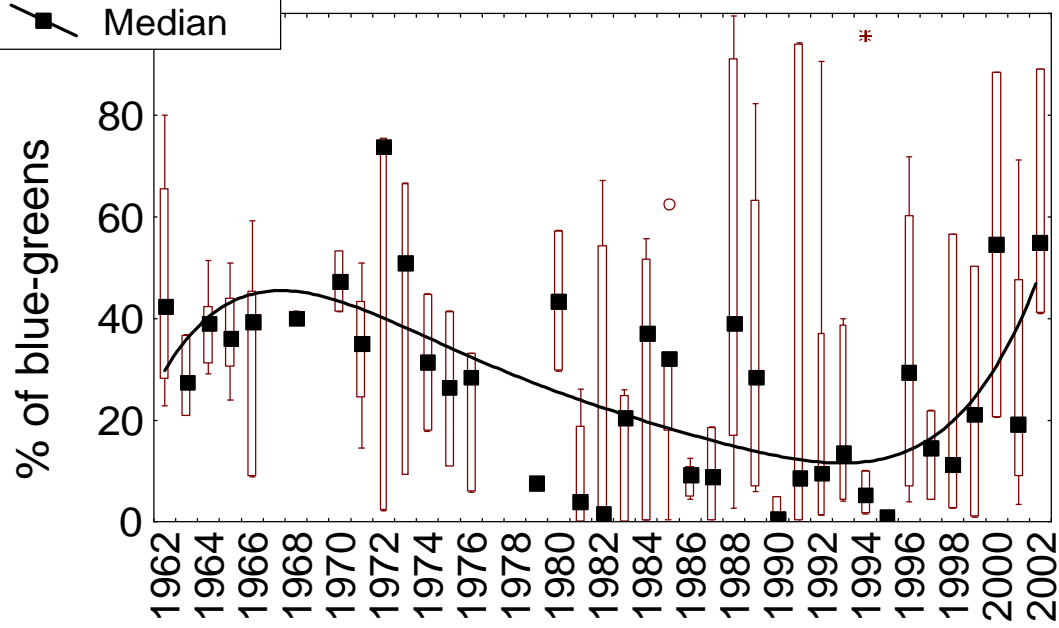
Submitted to Archiv für Hydrobiologie



L. Peipsi s.s.



L. Pihkva and L. Lämmijärv



Share of blue-greens is increasing

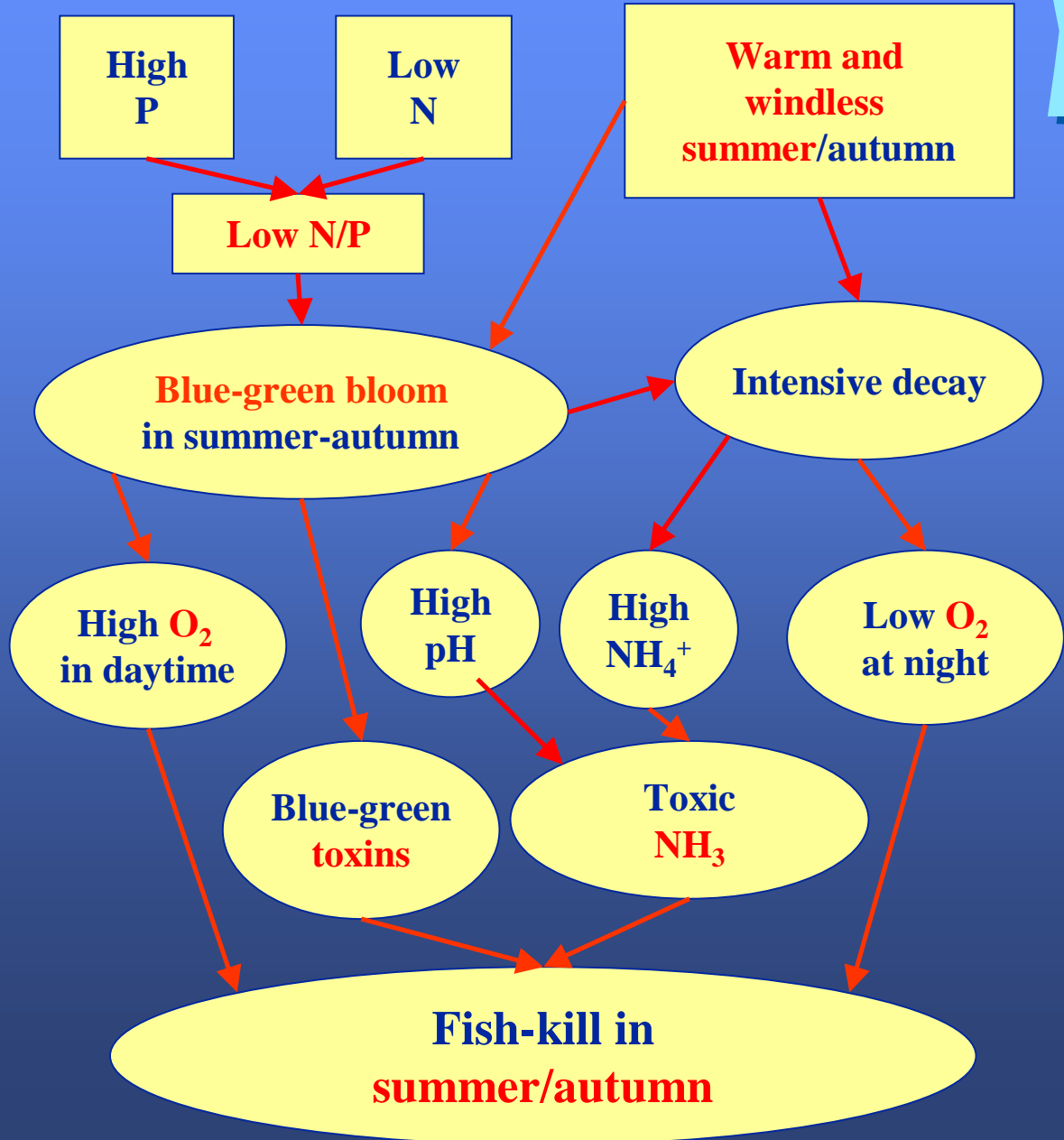
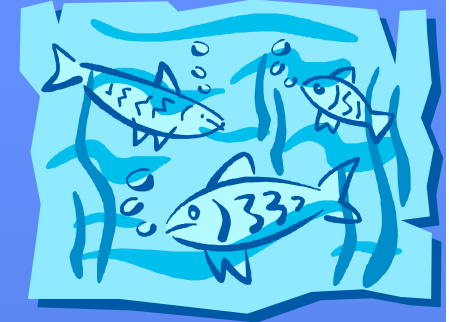


Nõges, P., Leisk, Ü., Loigu, E., Reihan, A., Skakalski, B., Nõges, T.  
2003. Nutrient budget of Lake Peipsi in 1998. Proc Acad. Sci. Estonia  
Ser. Ecology

	<b>Tot N</b>	<b>Tot P</b>
<b>Input</b> <b>t/year</b>	<b>23786</b>	<b>1286</b>
<b>Output</b> <b>t/year</b>	<b>13949</b>	<b>683</b>
<b>Retention,</b> <b>%</b>	<b>41</b>	<b>47</b>

**Lake is not 'leaking'**

# Why fish-kills occur in L. Peipsi?



# Recommendation for Lake Peipsi management

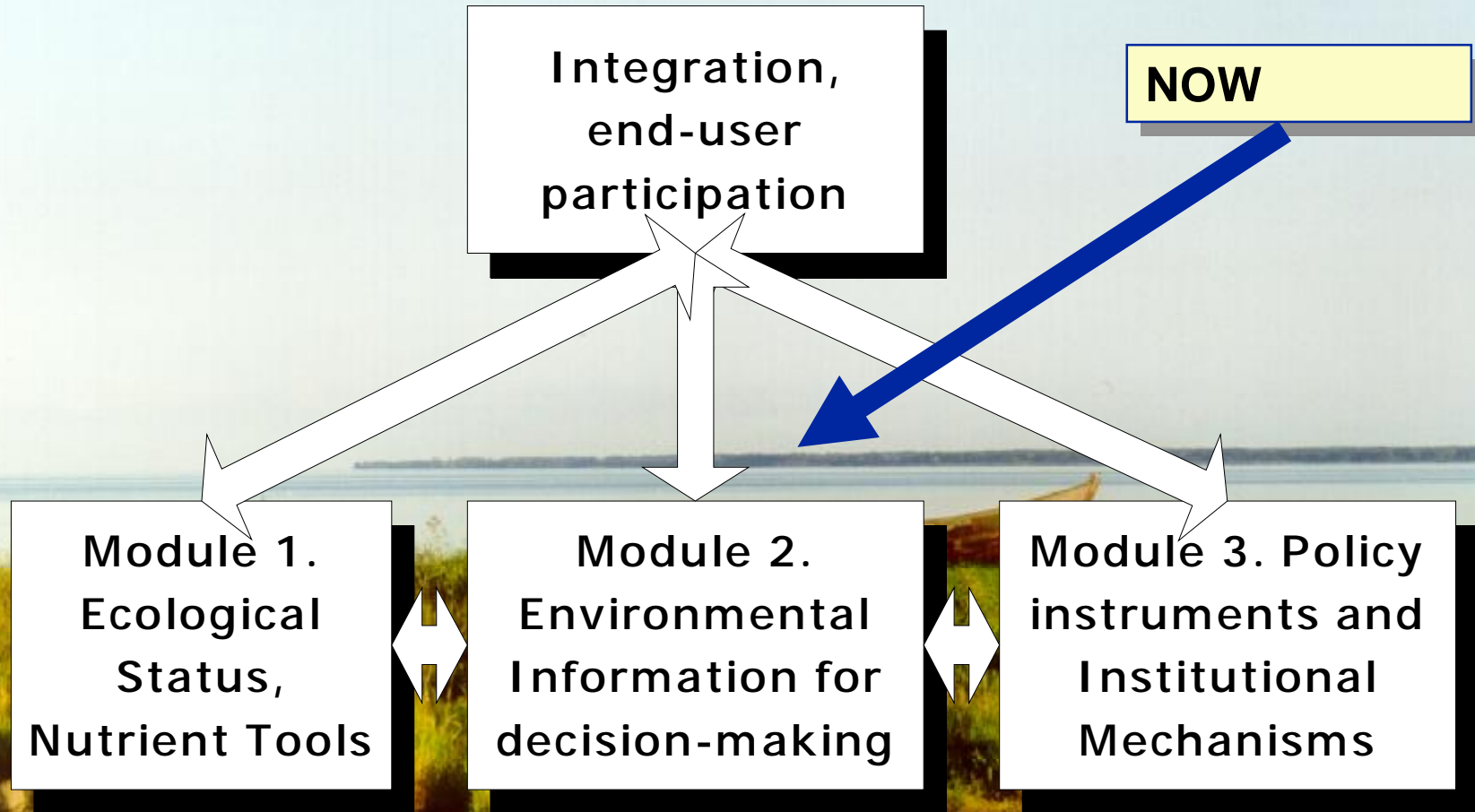
- m reduction of phosphorus loading is inevitable to reduce water blooms and fish-kills**



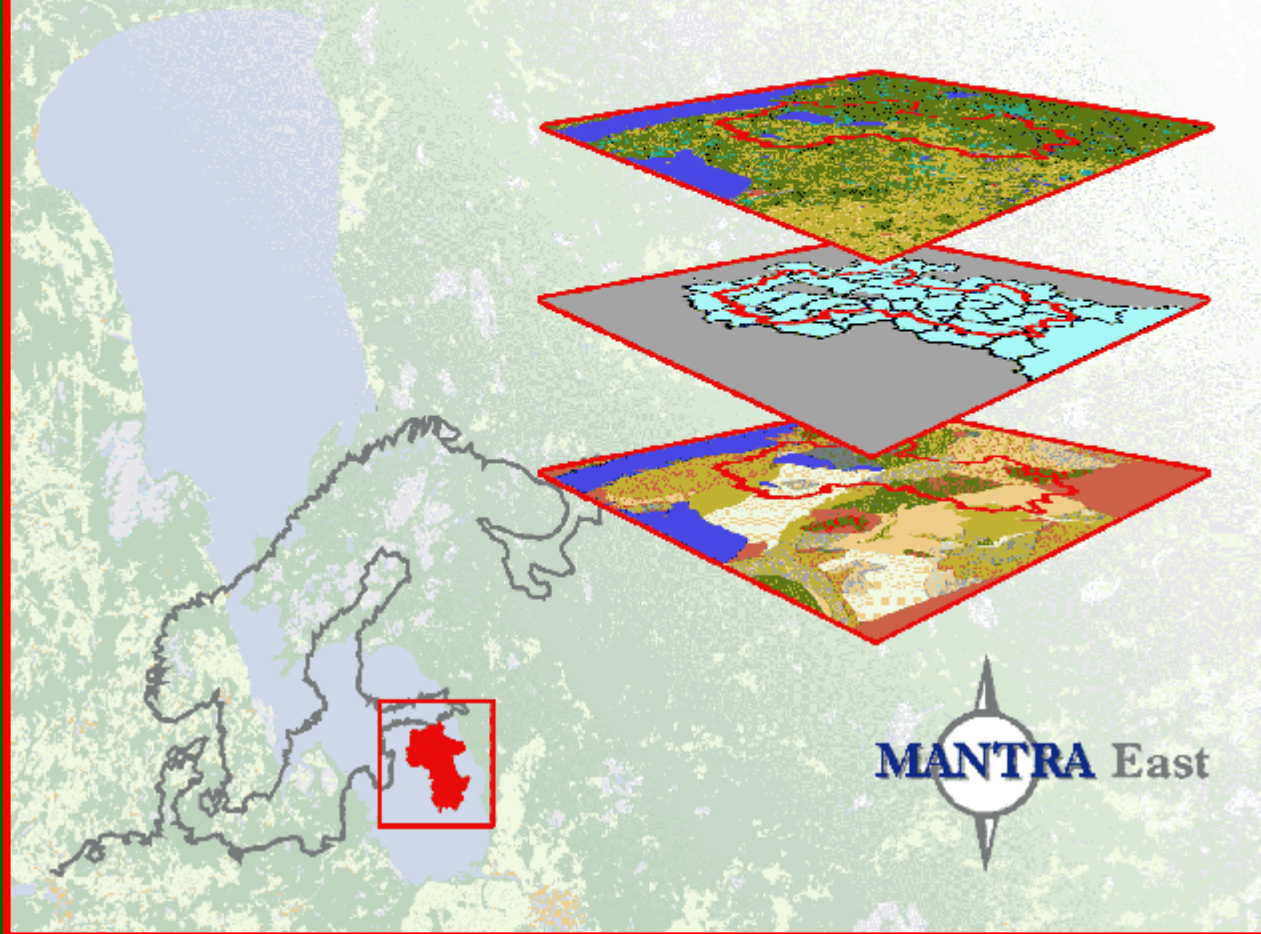
# Rationale

- Lower N/P ratio could support blooming of blue-green algae in water courses
- Significant reduction of N inputs to the lakes can stimulate the growth of blue-green algae or release of phosphorus from sediments

# Project Organisation



# Lake Peipsi Catchment GIS Database



**A GIS  
database  
with 26  
layers.**

**Distributed  
on CD and  
via web  
([www.mantraeast.org](http://www.mantraeast.org))**

Hannerz et al., 2002







Topics **Map**

Clear Map | Zoom to Object | Show Info

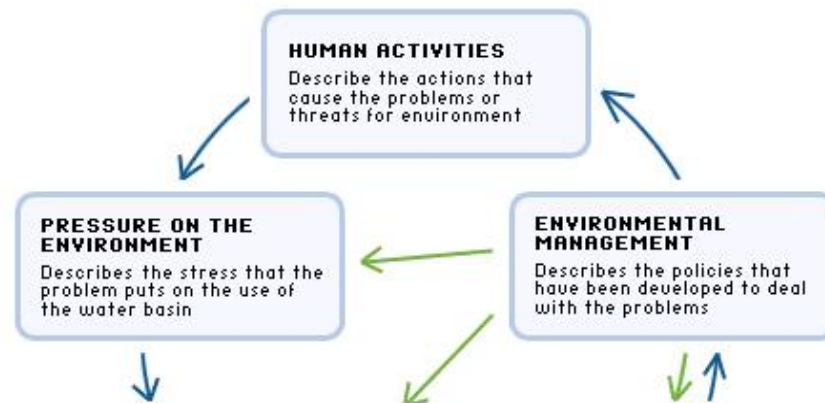


© Inspirit 2008

## Welcome to Peipsi.org

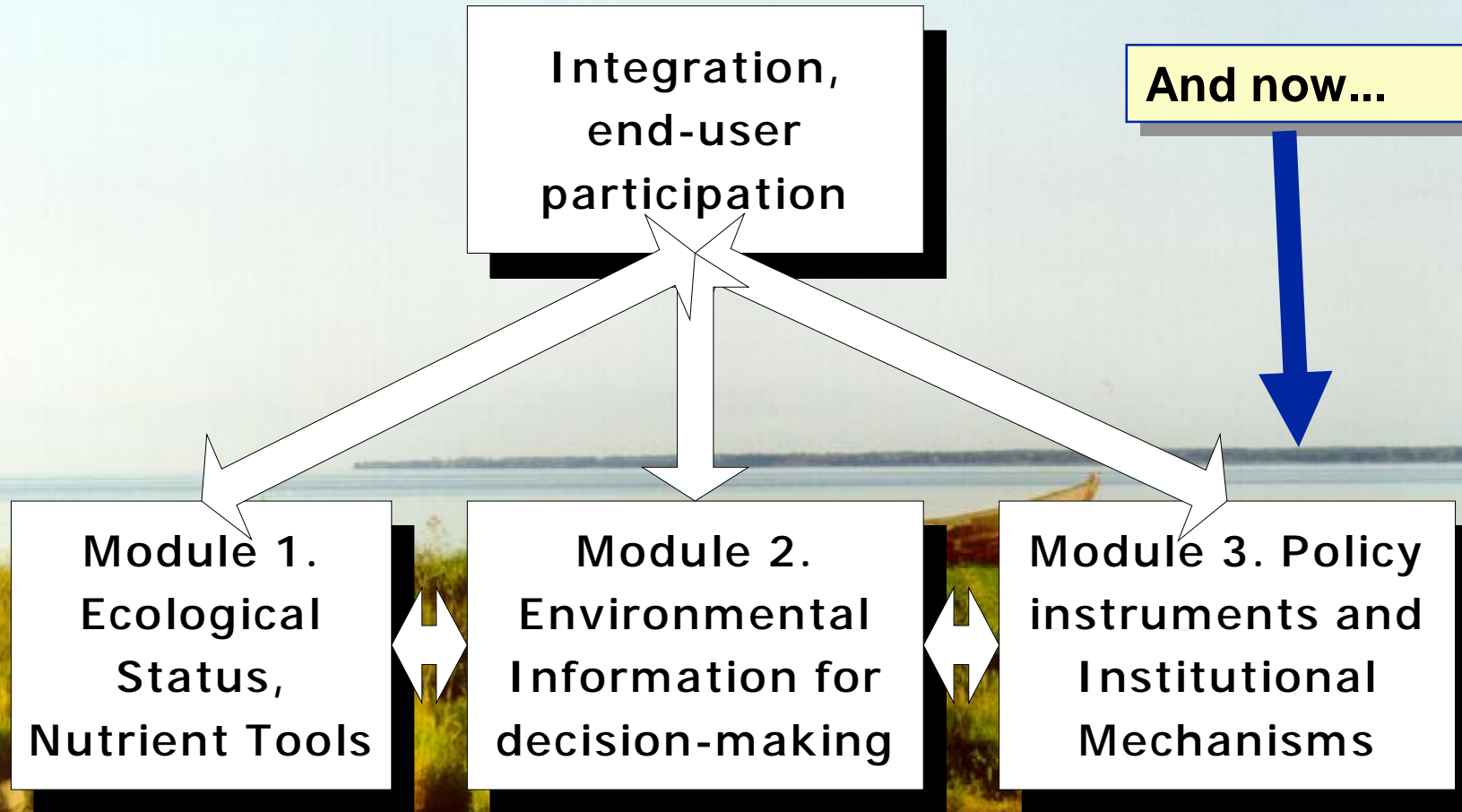
### On this page you can search for

- ✓ Cause-effect related environmental information about Lake Peipsi transboundary water basin.
- ✓ Information relevant to a geographical location of your interest on the Map.



The homepage is managed by Peipsi Center for Transboundary Cooperation

# Project Organisation



[www.mantraeast.org](http://www.mantraeast.org)



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ИНТЕГРИРОВАННЫЕ СТРАТЕГИИ УПРАВЛЕНИЯ ТРАНСГРАНИЧНЫМИ ВОДАМИ НА ГРАНИЦЕ ЕВРОПЕЙСКОГО СОЮЗА – ПИЛОТНОЕ ИССЛЕДОВАНИЕ ЧУДСКОГО ОЗЕРА И ЕГО ВОДОСБОРА (MANTRA-EAST)\*.

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MANTRA-East (МАНТРА-Восток) – это международный научно-исследовательский проект в области охраны окружающей среды, нацеленный на анализ и развитие методов стратегического планирования и исследовательского инструментария для интегрированного управления трансграничными водными бассейнами, расположенными на сегодняшних и будущих внешних границах Европейского Союза.

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Имя:

Пароль:



» Координатор проекта  
Per Stålnacke  
Йордфорск  
NO-1432 Aas,  
Norway  
Тел. +47 64 94 81 00  
Факс +47 64 94 81 10  
[per.stalnacke@jordforsk.no](mailto:per.stalnacke@jordforsk.no)

» Пер. координатор  
Gulnara Roll  
Центр трансграничного сотрудничества  
Aleksandri 9  
51004 Tartu, Estonia  
Тел. +372 7 302 302  
Факс +372 7 302 301  
[gulnara.roll@ctc.ee](mailto:gulnara.roll@ctc.ee)