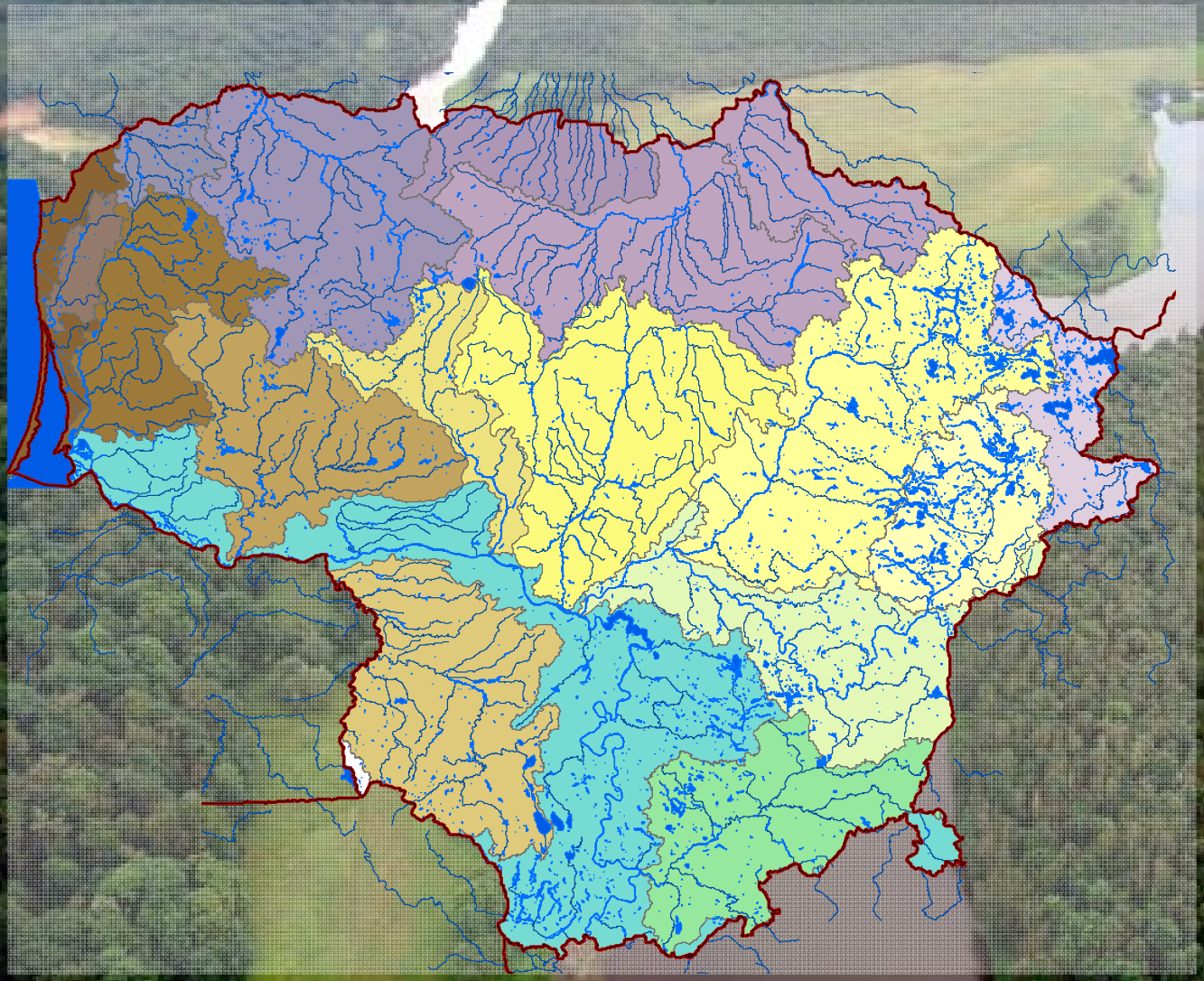
Assessment of the human impact on river water quality

Jurgita Vaitiekūnienė

Lithuanian river basins:



Confluence of the Neris and Sventoji rivers

Water quality monitoring network and monitoring data

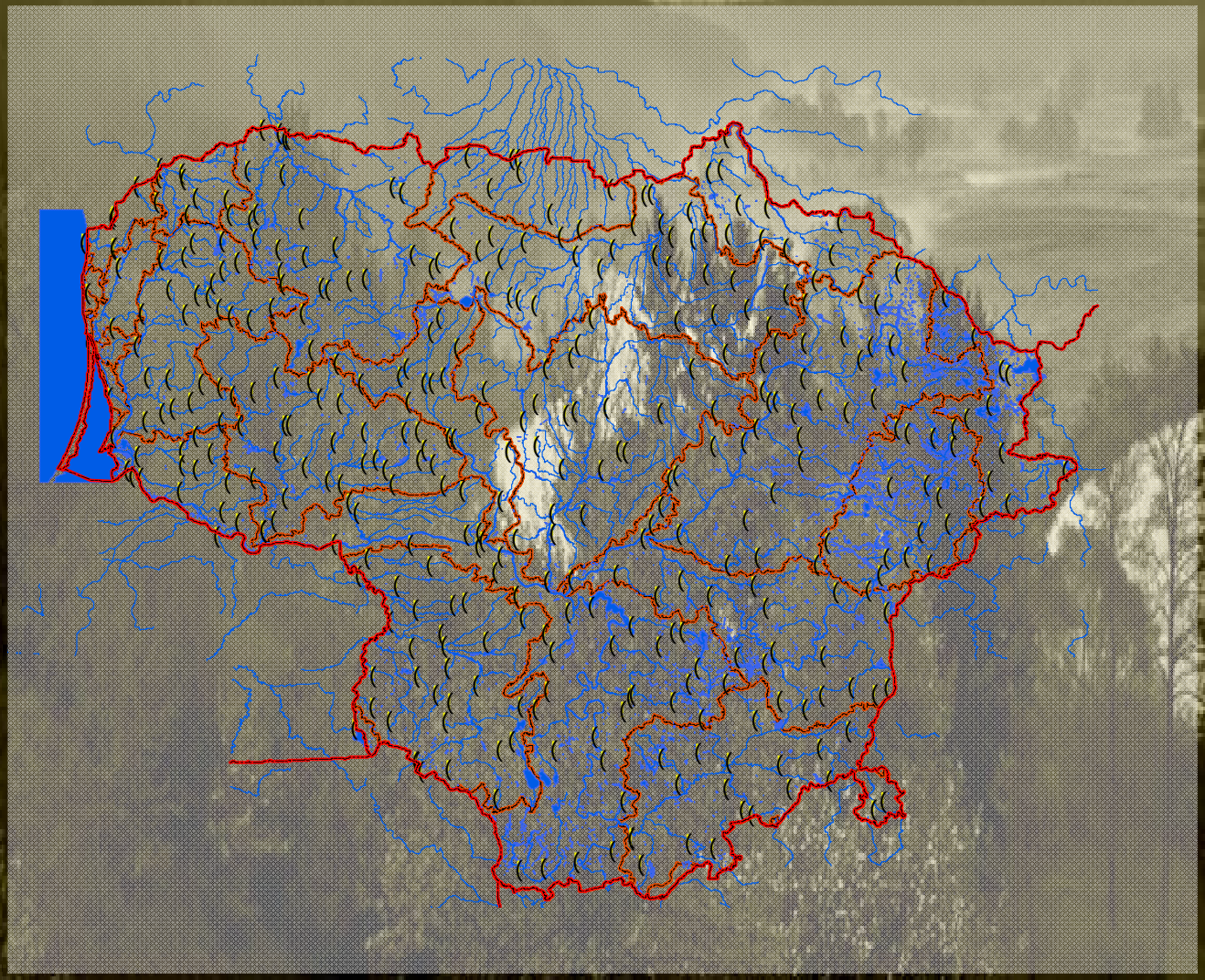
Water quality monitoring data usually is the prime source of information about water bodies status and the level of human impact on water quality.

River water quality was measured in
395 stations in 2006;
380 stations in 2007.

.

Morning on the Zeimena river

Water quality monitoring network, 2007:



Confluence of the Merkys and Nemunas rivers

*Results of river water quality **monitoring:***

To evaluate ecological status of rivers, these parameters are used:

- BOD_7,
- Total nitrogen, NH_4-N, NO_3-N,
- Total phosphorus, PO_4-P.

According to all above mentioned parameters ecological status was good or very good in :

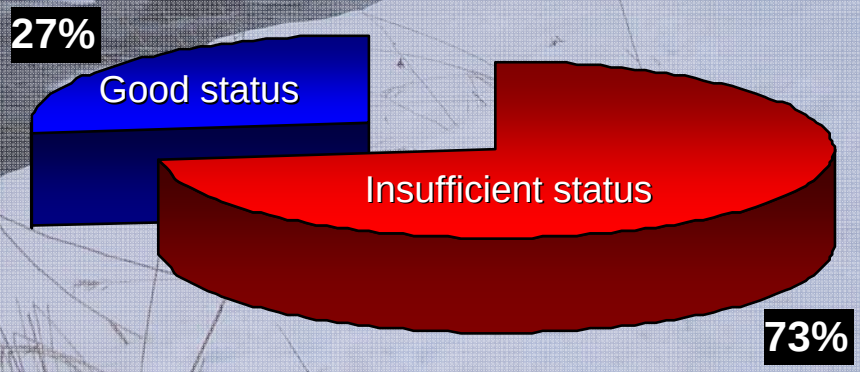
151 station in 2006,

138 stations in 2007.

The Sventoji river

Ecological river status:

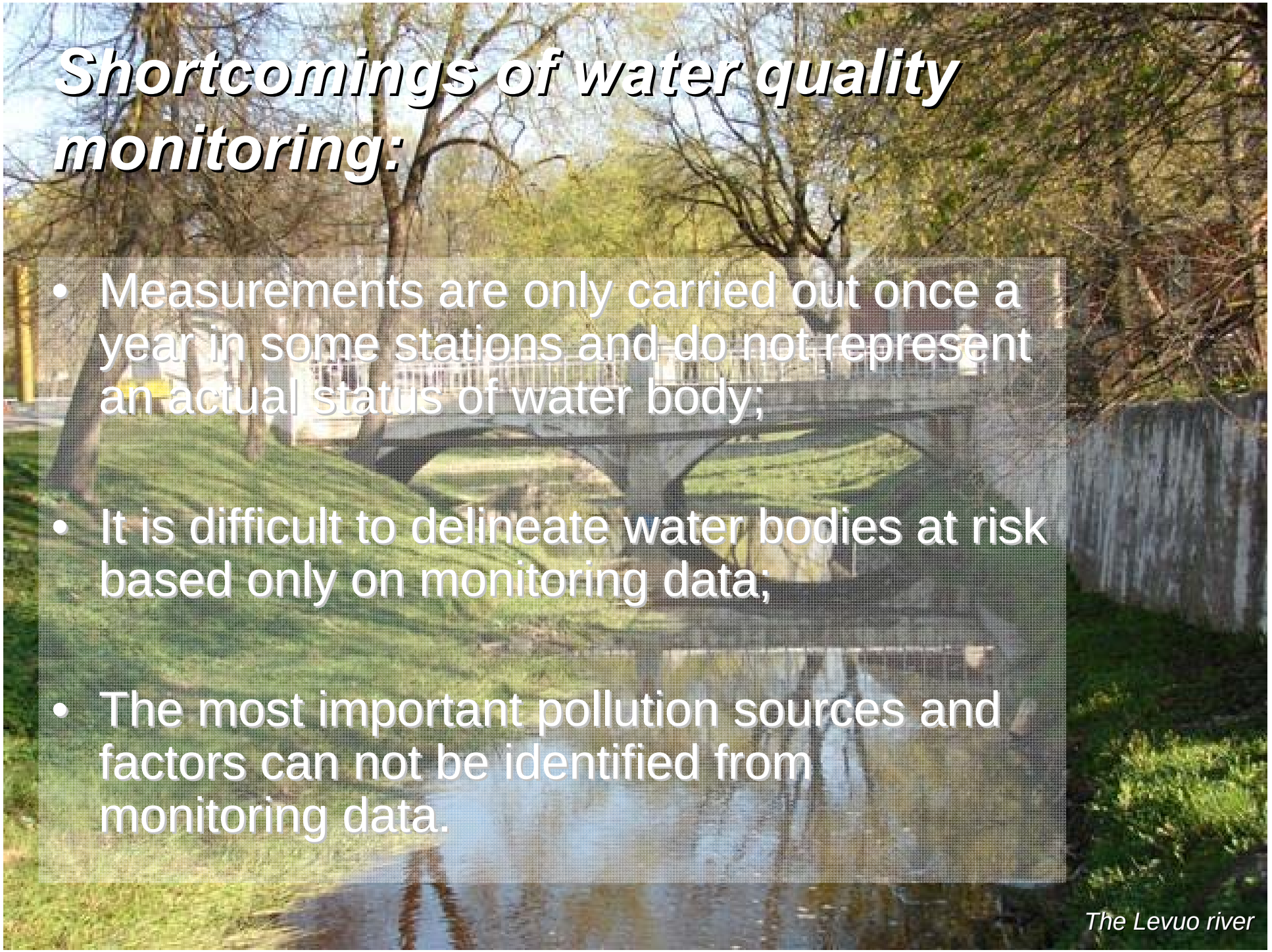
For approx. 73% of monitored rivers some measures are required in order to achieve good ecological status



The Jura river

Shortcomings of water quality monitoring:

- Measurements are only carried out once a year in some stations and do not represent an actual status of water body;
- It is difficult to delineate water bodies at risk based only on monitoring data;
- The most important pollution sources and factors can not be identified from monitoring data.



The Levuo river

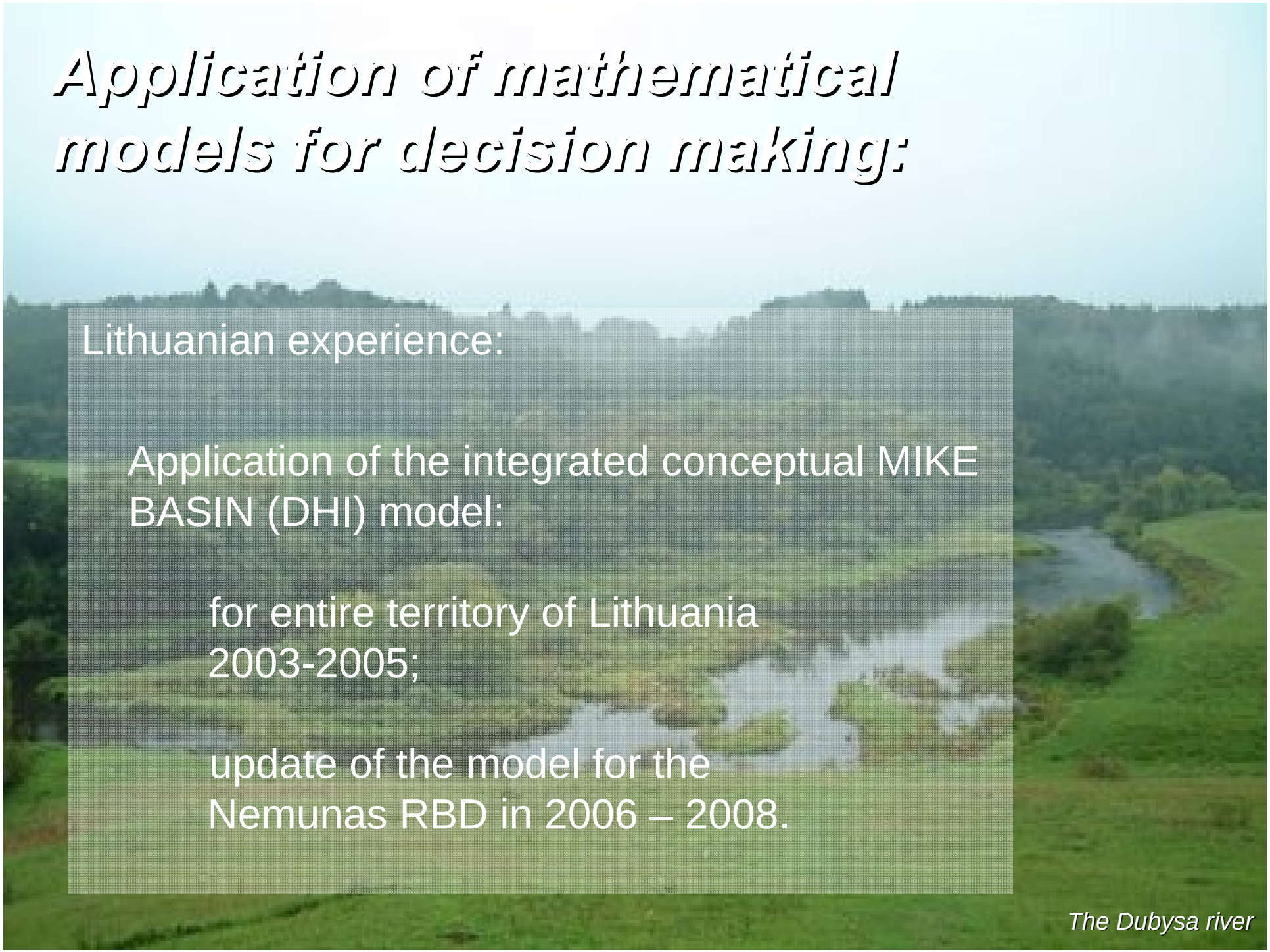
Application of mathematical models for decision making:

Lithuanian experience:

Application of the integrated conceptual MIKE BASIN (DHI) model:

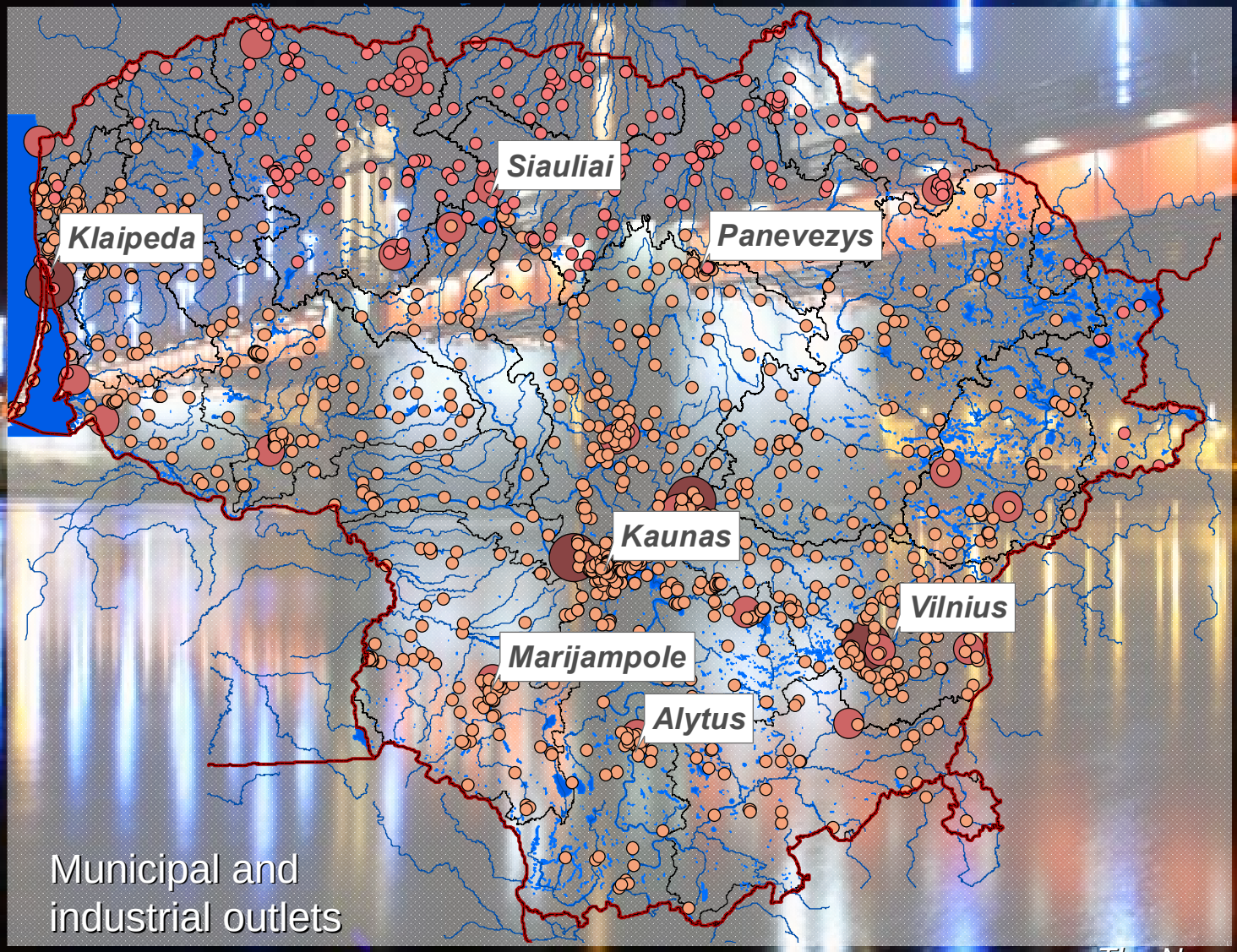
for entire territory of Lithuania 2003-2005;

update of the model for the Nemunas RBD in 2006 – 2008.



The Dubysa river

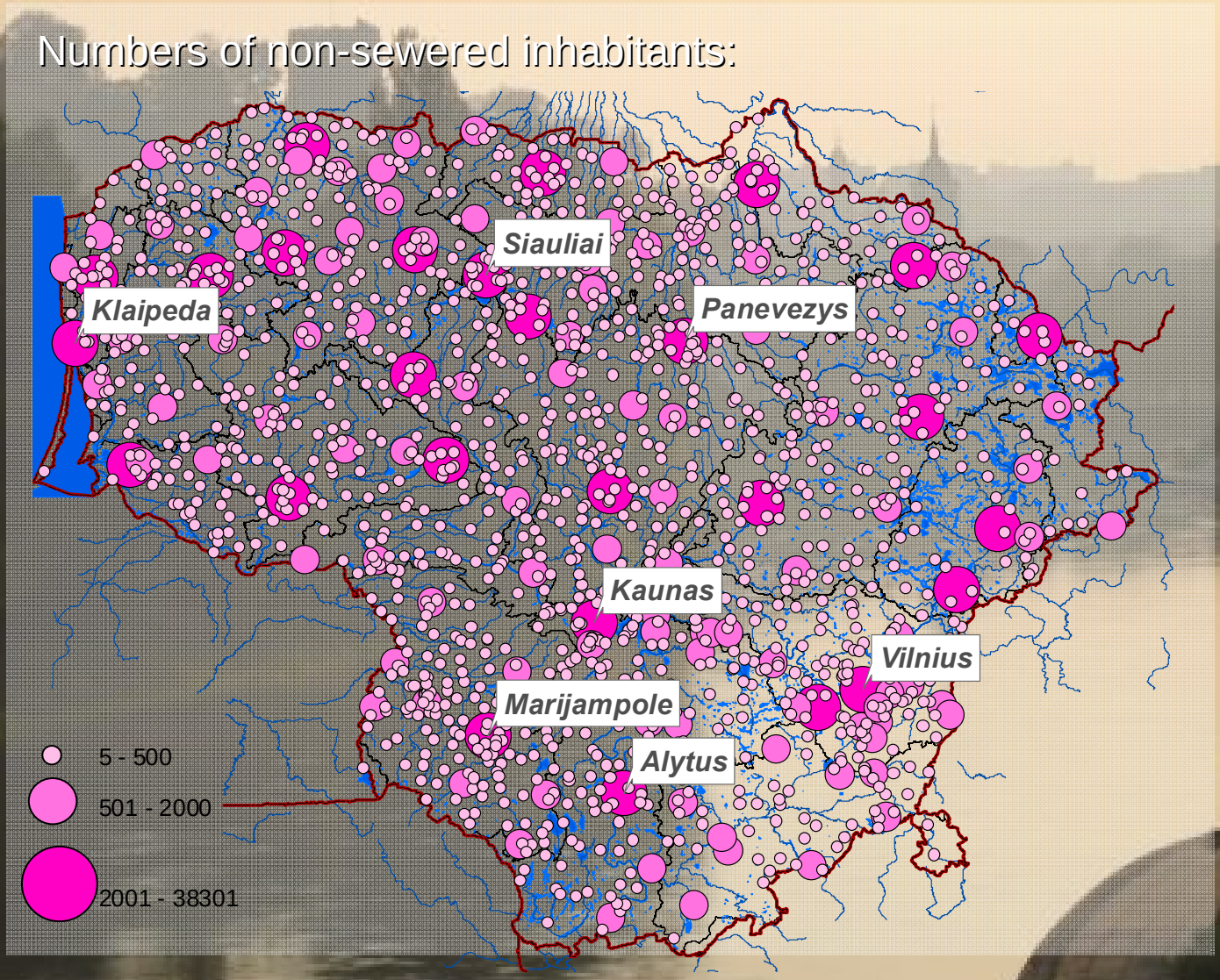
Point source pollution:



Municipal and industrial outlets

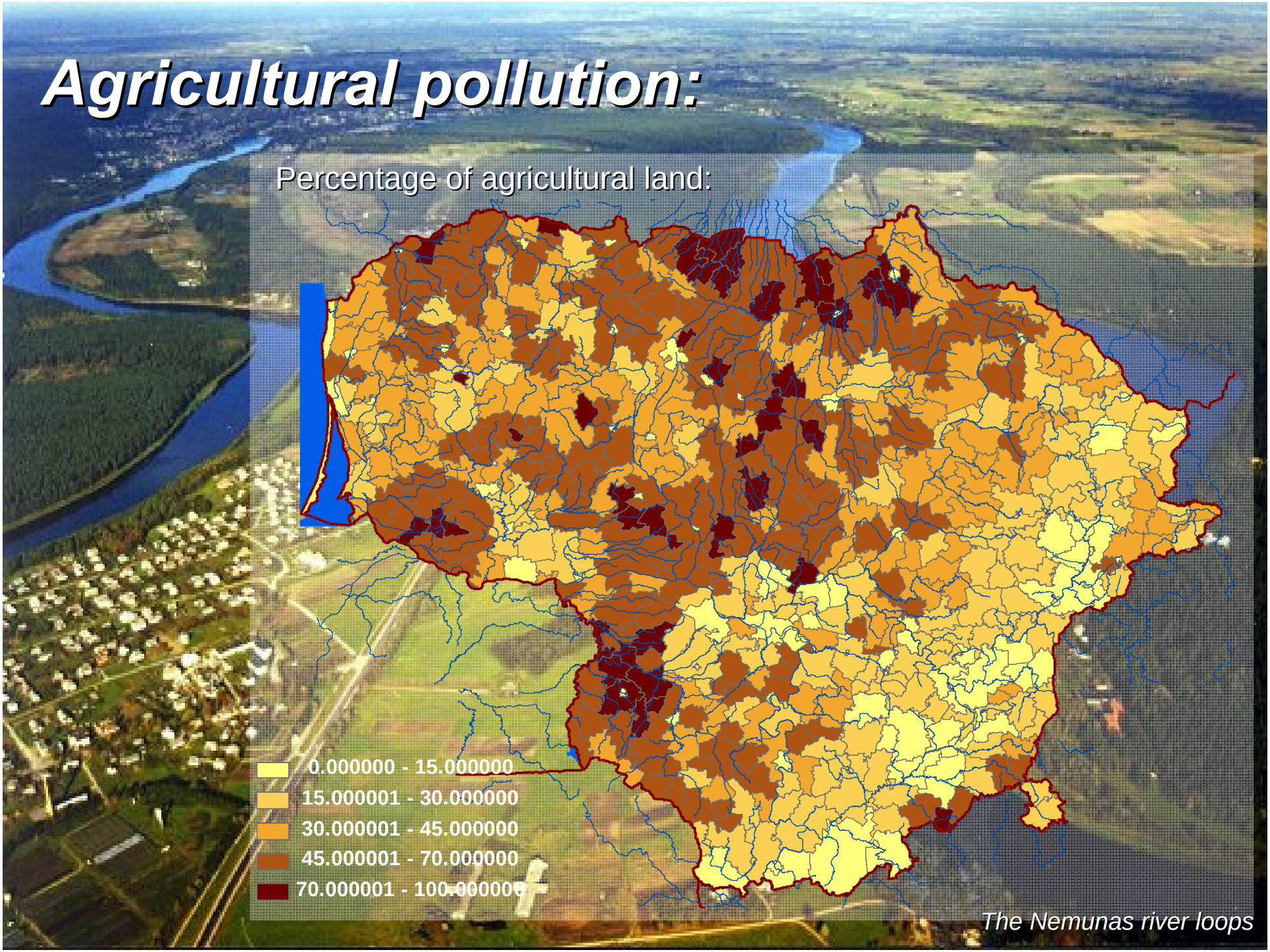
The Nemunas river in Kaunas city

Pollution from non-sewered inhabitants:



The Neris river in Vilnius city

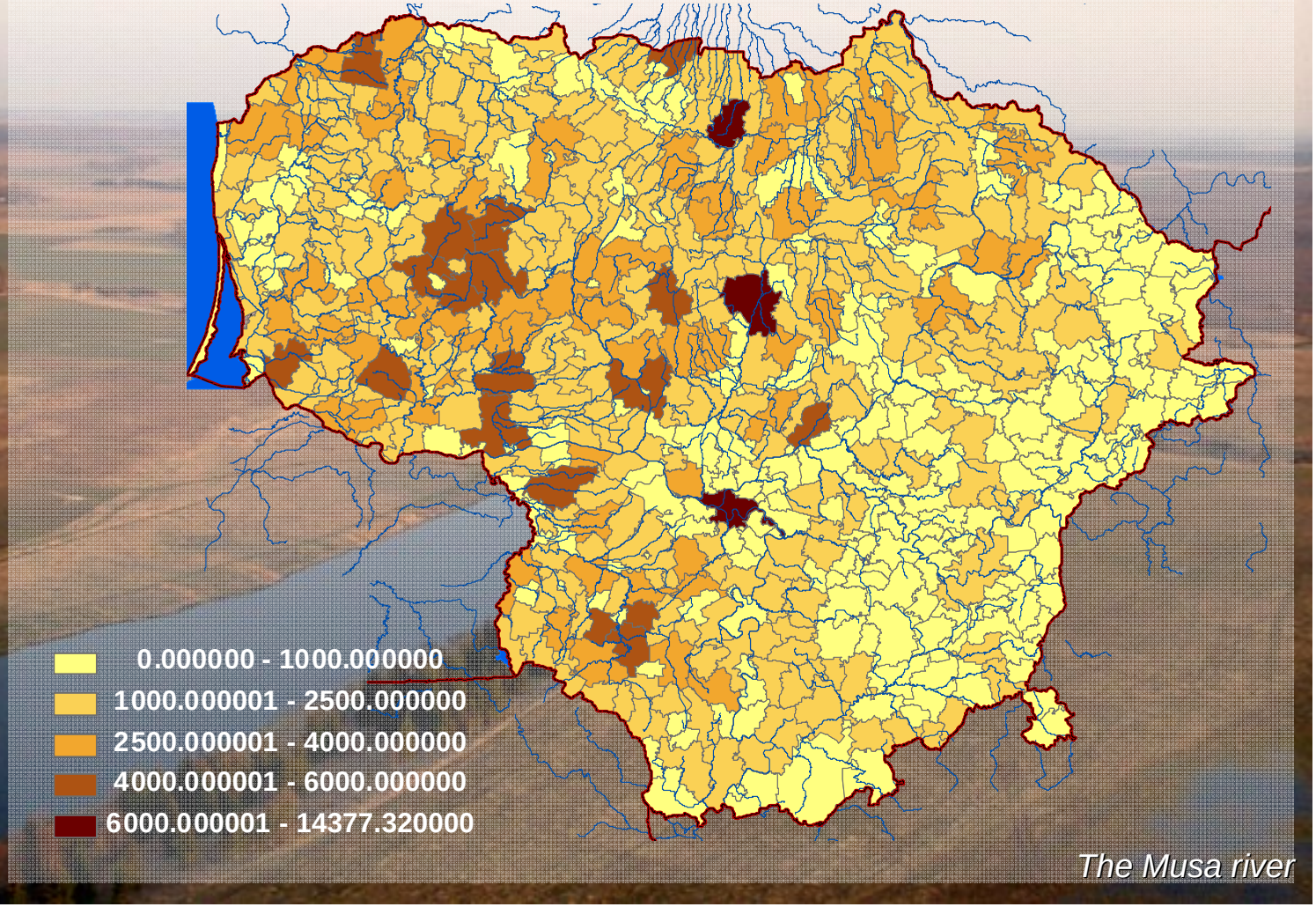
Agricultural pollution:



The Nemunas river loops

Agricultural pollution:

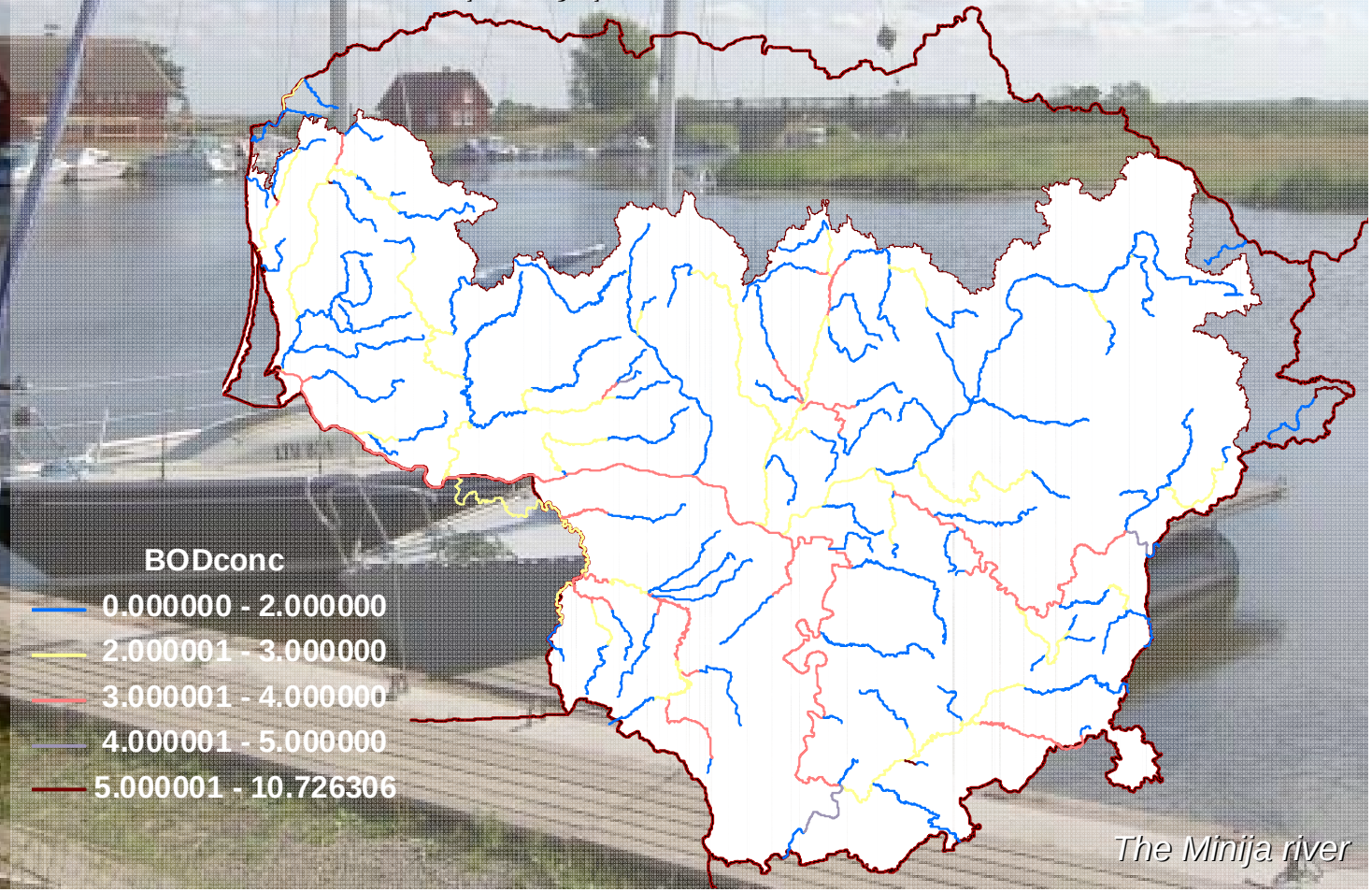
Numbers of livestock units:



The Musa river

Modeling results:

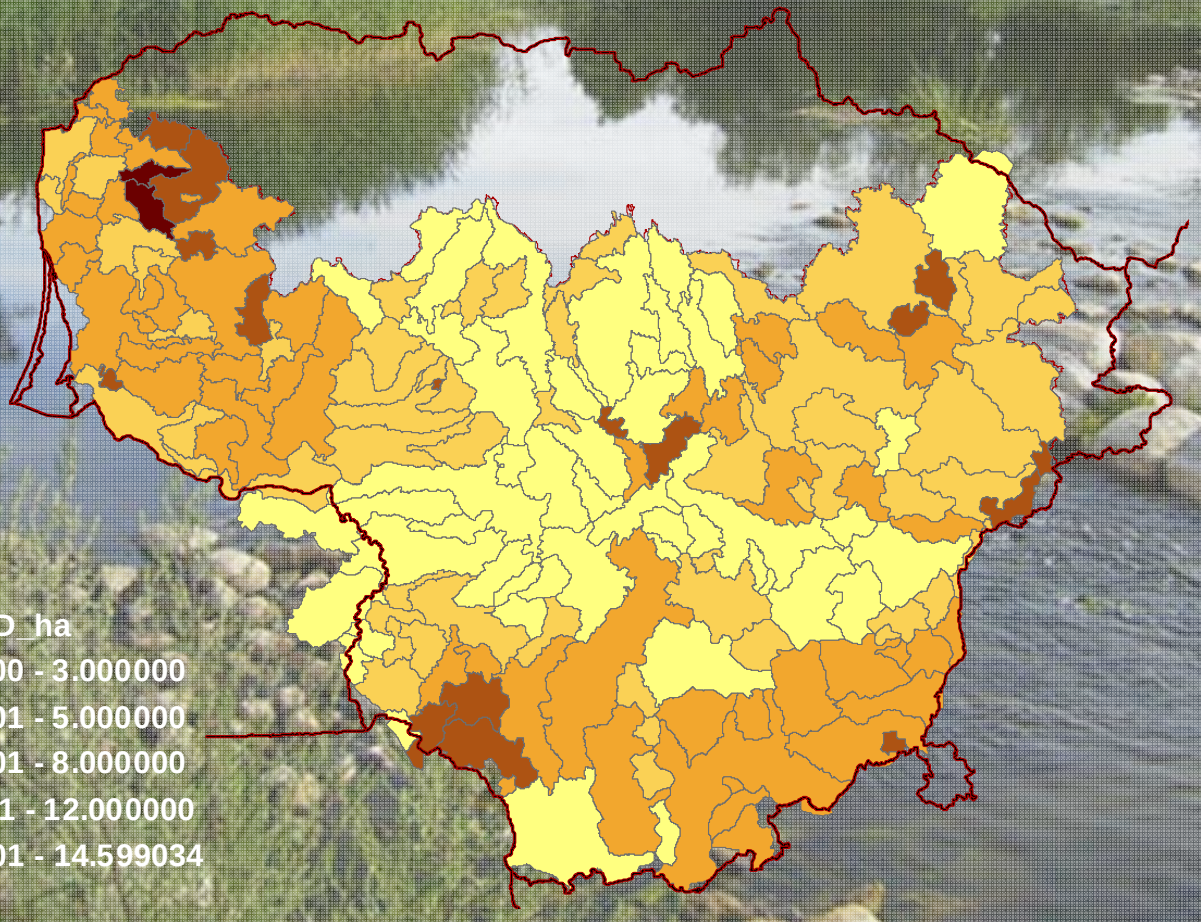
- Estimated pollutant concentrations in delineated river branches;
- Identified water quality problems.



The Minija river

Modeling results:

Estimated non-point loads in the delineated sub-catchments:

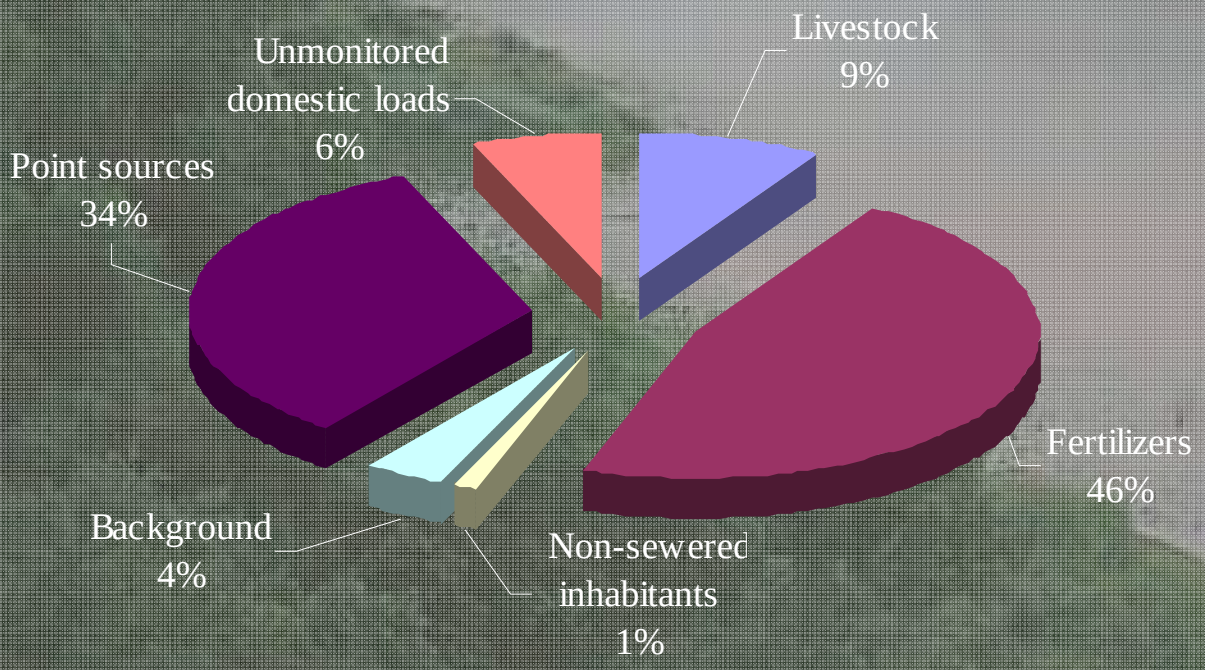


The Venta river

Modeling results:

Loads from different pollution sources and natural background:

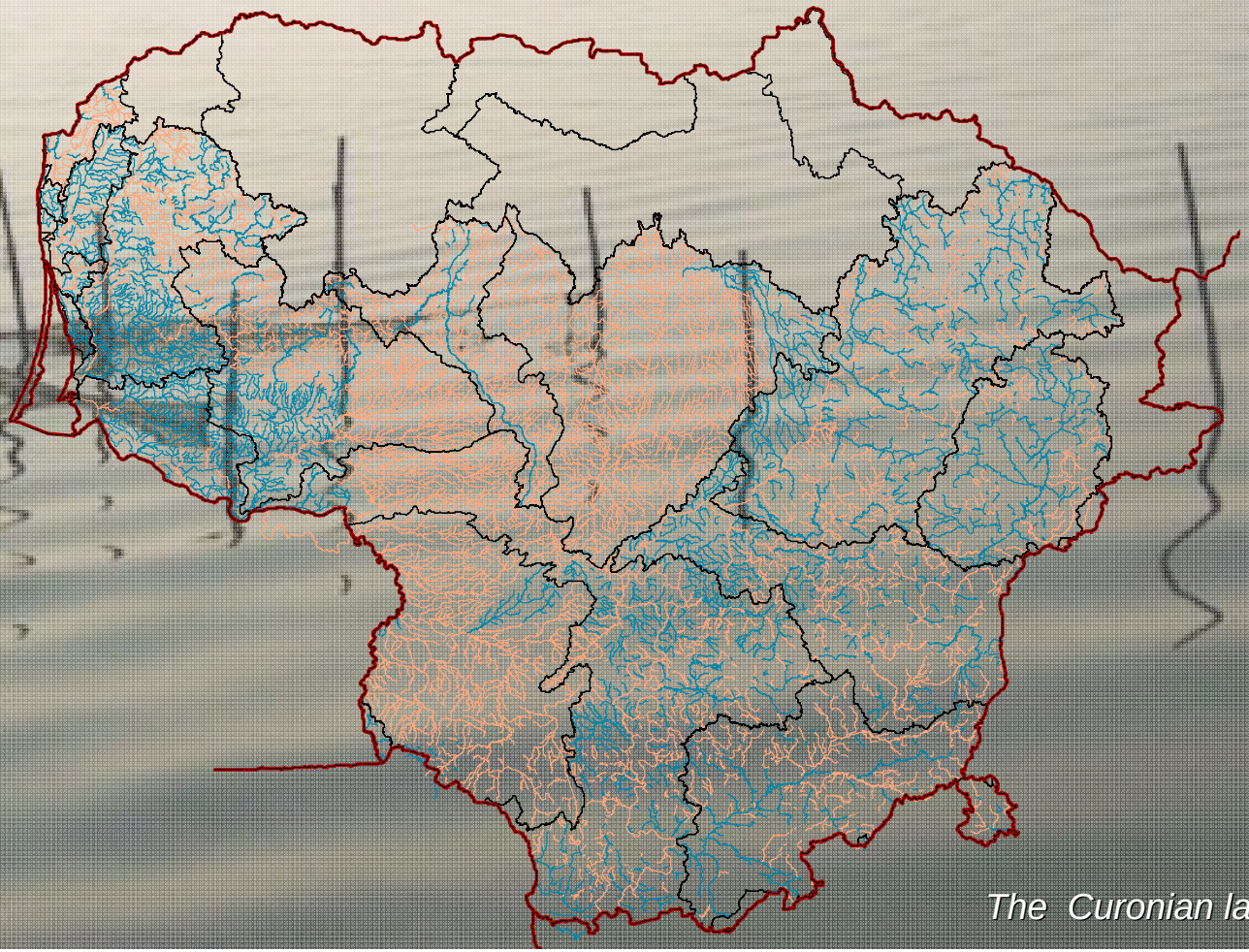
Total phosphorus loads in the Nevezis river



The Nevezis river

Water bodies at risk:

Based on the modeling results, water bodies at risk were delineated:



The Curonian lagoon

Scenario modeling:

Implementation of the baseline measures:

- Requirements of Urban Waste Water Treatment Directive:
  - Improvement of WWTPs in settlements with more than 2000 inhabitant equivalents,
  - Construction of new WWTPs.
- Requirements of the Nitrate directive:
  - Construction of manure storage tanks in the farms having more than 10 AU,
  - Establishment of greenfields in the farms having more than15 ha of agricultural land and more than 10 AU.

The Akmena-Dane river

Water quality after implementation of baseline measures:

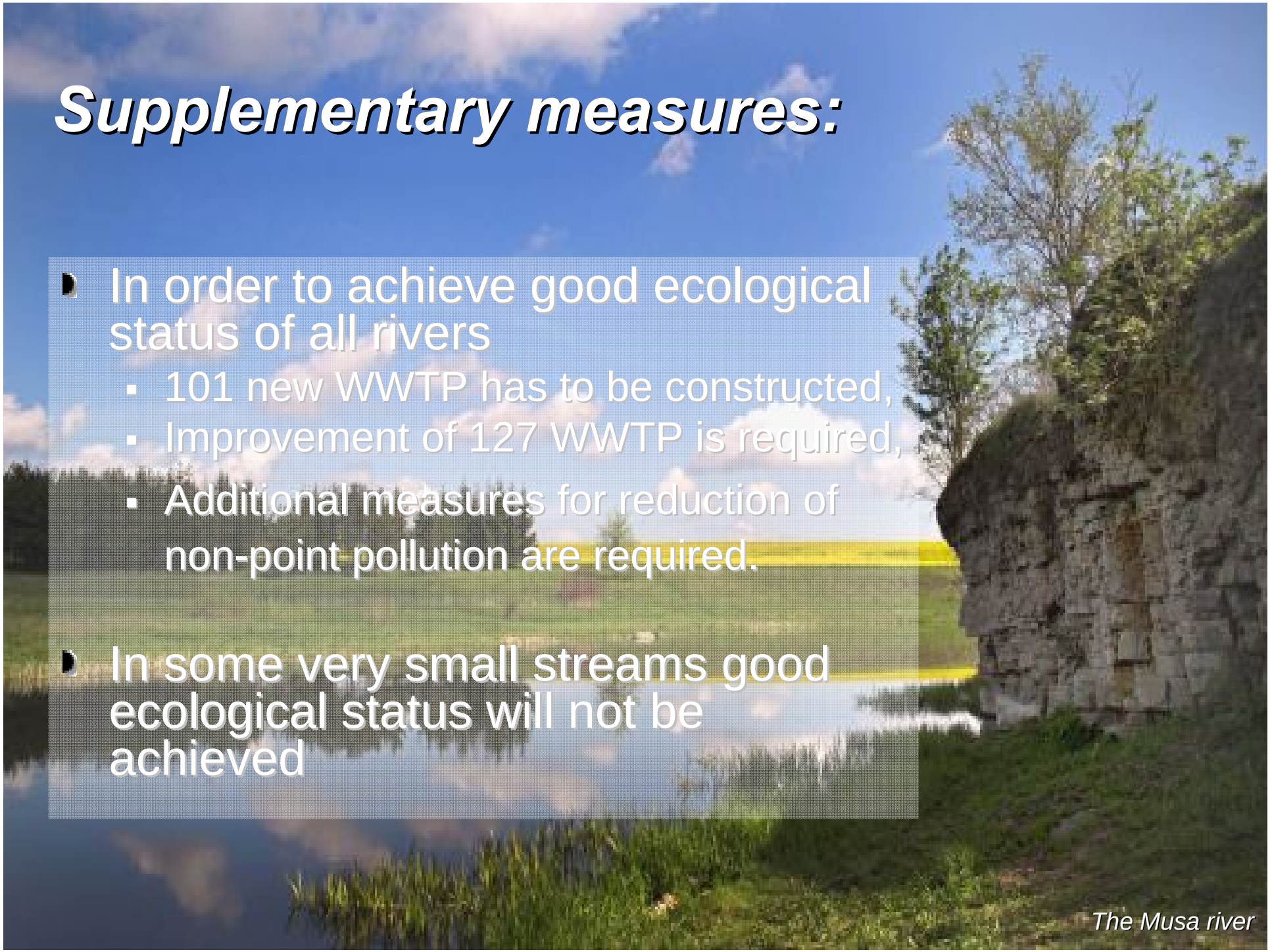
Results:

- Good status of the transboundary Neris and Nemunas rivers will not be achieved;
- Concentrations of BOD7 will change insignificantly and may even increase in some rivers due to increasing livestock numbers;
- After implementation of the Nitrate directive, concentrations of nitrates in rivers may decrease by approx. 15%;
- Expected decrease in total phosphorus concentrations is also approx. 15%;
- After implementation of the baseline measures, in most rivers at risk good ecological status will not be achieved.

Confluence on the Neris and Nemunas rivers

Supplementary measures:

- In order to achieve good ecological status of all rivers
  - 101 new WWTP has to be constructed,
  - Improvement of 127 WWTP is required,
  - Additional measures for reduction of non-point pollution are required.
- In some very small streams good ecological status will not be achieved



The Musa river