



Project Description

Several lakes and rivers cross the boundaries between countries. Management of transboundary waters is complicated since there is not one government to manage international waters and bordering states may have different languages, cultures, as well as different water management legislation and institutional structures. The number of agreements on transboundary waters in Europe is approximately 160 and shows an increasing trend. The special importance of building cooperation on transboundary waters through development of trust, personal contacts, and understanding has been stressed. To effectively manage water resources and protect them against pollution, the governments of the countries concerned must agree upon common rules and actions.

The point of departure of the MANTRA-East project is the fact that the draft EU Water Framework Directive (WFD), when it enters into force, will become the central tool for the future environmental management of transboundary river basins in Europe. Realizing the importance of an early start for preparation of implementation of the WFD, a group of researchers and water management specialists from Estonia, the Netherlands, Norway, Sweden and Russia has prepared a joint research project "*Integrated Strategies for the Management of Transboundary Waters on the European fringe – the pilot study of Lake Peipsi and its drainage basin (MANTRA-East).*"

Objectives

The aim of the project is to analyze and develop strategic planning methodologies and scientific tools for the integrated water management in transboundary watersheds located on the existing and future borders of the European Union. Following the EU Water Framework Directive, the project will develop recommendations for institutional mechanisms and policy instruments for decision making on water management of transboundary watercourses and international lakes located on the fringes of the European Union.

The project consists of four modules: Module 1 "Ecological Status and Strategic Nutrient Tools", Module 2 "Environmental Information for Policy- and Decision makers", Module 3 "Policy Instruments and Institutional Mechanisms" and Module 4 "Integration, synthesis and end-user participation".

The Pilot study area

Lake Peipsi (3,550 km²), the largest international lake in Europe, is selected as a pilot study since it is shared by one EU-accession state (i.e. Estonia) and one non-EU state (i.e. Russia), and thus of high relevance for the future environmental management of transboundary waters on the European fringe. The Lake Peipsi is particularly interesting since:

- it is the fourth largest lake in Europe (after Ladoga, Onega and Vänern), with a large drainage basin (47,800 km²);
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- it is the largest international lake in Europe;
- it is located on the Eastern European fringe;
- it is shared by one EU-state in accession (Estonia) and one non-EU state (Russia);
- the border regime is relatively newly established (i.e. 1992), and the joint bilateral Lake Peipsi Commission was established as late as 1998;
- the lake itself and its drainage basin can be considered as a combination of 'data-rich' and 'data-poor', with respect to environmental information, and the access and availability of data is scattered;
- the lake has been regarded as suffering from eutrophication problems and reduced fish-stocks;
- large land use and industrial changes have taken place and are still ongoing in the drainage basin after the collapse of the Soviet Union;
- the bilateral Lake Peipsi Commission has stressed that management of transboundary waters should be based on the implementation of the draft EU Water Framework Directive.

Some of the proposed activities will be addressed and explored in a concrete context using the Lake Peipsi region as a pilot region. Even though the work focus upon this region, it is still considered to be of pan-European interest, and results will deliberately have a high degree of transferability and general validity. It is thus a deliberate research strategy that the results obtained, tools developed, and strategies evaluated can be transferred to other transboundary lakes and river basins on the Eastern European fringe.

Project Management

Dr. Per Stålnacke (Jordforsk) is responsible for the overall **project coordination**. The project **In-Region Coordinator** Dr. Gulnara Roll will be responsible for the daily project management of the work of the Eastern European participants (in Estonia and Russia).

The MANTRA-East **Advisory Committee** consists of international organisations involved in transboundary water management, representatives of international river basins authorities and national experts from the EU member and EU accession states, and Russia. The active contribution of the Advisory Committee will ensure the inclusion of end-user perspectives in the project.

The Project **Executive Committee** will consist of one representative from each principal contractor. The project consists of four modules and coordination of work under the modules is distributed among three principal contractors. Jordforsk coordinates the modules '*Ecological Status and Strategic Nutrient Tools*' and '*Integration, synthesis and end-user participation*', Linköping University the '*Institutional Mechanisms and Policy Instruments*', and the Royal Institute of Technology '*Environmental Information for Policy- and Decision Makers*'. Leaders of the modules, the coordinator, the in-region coordinator and the Scientific Officer in Brussels will form the project Executive Committee.

The Scientific Steering Committee and Executive Committees will support the Coordinator planning, preparation, and implementation of the project as well as monitor and evaluate the project's course, particularly as regards its management and scientific aspects.

Scientific objectives and approach

The following three scientific objectives are defined:

- To evaluate the applicability of the draft EU WFD to the new future border regions, with regard to (i) assessment the state of eutrophication (e.g. ecological status) in lakes and river basins, and (ii) development of strategic lake and river basin tools for source apportionment, retention, and time-trends in nutrient loads;

- To develop methods to improve communication and utilisation of scientific information in a transboundary context;
- To develop institutional mechanisms and policy instruments for decision making under conditions of transition and uncertainty.

Within this general frame, the following sub-objectives/tasks were identified:

- An examination and evaluation of a set of the most informative monitoring parameters used in ecological status assessments, and calibration of the monitoring parameters in accordance with the water quality classes proposed in the draft EU Water Framework Directive (WFD), tested in the pilot study area of the Lake Peipsi and its drainage basin.
- An analysis of the trends in water nutrient quality and biota in lakes and their tributaries on the Eastern European fringe, with special emphasis on Lake Peipsi and its drainage basin, given the recent dramatic change in land-use and industrial emissions in most of the Eastern European region.
- The further development and application of tools that can simulate the transfer, retention, and losses of nutrients in supra-national and data-poor river basins. The tools developed will be used to estimate the effect of changes in pollution sources (e.g. changes in agricultural land use) on the nutrient inputs to Lake Peipsi.
- The evaluation of the lake response to the recent dramatic and large-scale changes in river pollution loads of nutrients in the drainage basin of the Lake Peipsi, analysis of the in-lake response to different scenarios of future changes in river basin management on the nutrient input to the lake, and estimation of the influence of different activities in the river basin on lake water quality and biota, including fish will also be performed.
- An assessment of the effectiveness of current environmental information management practices including monitoring, database development, information generation and its use for policy- and decision-making and management within 10 European transboundary water regions e.g. Lake Inari (Finland/Russia/Norway), Lake Constance (Germany/Austria/Switzerland/Liechtenstein), Lake Neusiedler See (Austria/Hungary), the Oder River (Poland/Germany), the Bug River (Poland/Belarus/Ukraine), the Daugava River (Latvia/Russia/Belarus), and Lake Dojran, between Greece and Macedonia.
- The creation of a multi-thematic (socio-economic and environmental) GIS database for Lake Peipsi and its drainage basin composed of 10-15 thematic layers relevant for modelling, assessment and strategic decision-making by partners in other work-packages, existing management structures and the general public.
- A comprehensive review of existing management structures, models and practices that have been used, are used, or are planned to be used in transboundary water management in Europe, e.g., Lake Peipsi (Estonia/Latvia/Russia), the Daugava River (Latvia/Belarus/Russia), the Nemunas River (Lithuania/Russia/Belarus), the Bug River (Poland/Belarus/Ukraine), the Oder River (Germany/Poland), Lake Inari (Norway/Finland/Russia), Lake Constance (Germany/Austria/Switzerland), and Spanish – Portuguese transboundary waters.
- An examination of models of policy formulation and policy implementation concerning transboundary water management, an evaluation and formulation of policy alternatives for management strategies in transboundary contexts, and an investigation of public and stakeholder support for these policies and ways of increasing this support.
- Evaluation of incentive-based tools for environmental management which will provide knowledge of the policy making and implementation processes together with the applicability of incentives and control mechanisms, will also be performed.
- An integrative approach and synthesis of the results, promoting the introduction of an operational framework for strategies and tools for the management of transboundary waters on the Eastern European fringe.

Description of Modules

MANTRA-East will combine knowledge and expertise from a number of different disciplines in order to create synergy and to provide methodologies to tackle transboundary water issues on the Eastern European fringe. The research program is structured according to four

different modules. The following methodologies and approaches will be used under each module:

Module 1 "Ecological Status and Strategic Nutrient Tools"

This module is involved with the development of criteria and tools for assessing eutrophication in transboundary river basins in Europe. The research include:

- An examination and evaluation of a set of the most informative monitoring parameters used in ecological status assessments, and calibration of the monitoring parameters in accordance with the water quality classes proposed in the draft EU Water Framework Directive (WFD), tested in the pilot study area of the Lake Peipsi and its drainage basin.
- An analysis of the trends in water nutrient quality and biota in lakes and their tributaries on the Eastern European fringe, with special emphasis on Lake Peipsi and its drainage basin, given the recent dramatic change in land-use and industrial emissions in most of the Eastern European region.
- The further development and application of tools that can simulate the transfer, retention, and losses of nutrients in supra-national and data-poor river basins. The tools developed will be used to estimate the effect of changes in pollution sources (e.g. changes in agricultural land use) on the nutrient inputs to Lake Peipsi.
- The evaluation of the lake response to the recent dramatic and large-scale changes in river pollution loads of nutrients in the drainage basin of the Lake Peipsi, analysis of the in-lake response to different scenarios of future changes in river basin management on the nutrient input to the lake, and estimation of the influence of different activities in the river basin on lake water quality and biota, including fish will also be performed.

Module 2 " Environmental Information for Policy- and Decision makers"

This module will focus upon aspects related to the development, use and role of environmental information for policy- and decision-making and management in transboundary waters. The research include:

- An assessment of the effectiveness of current environmental information management practices including monitoring, database development, information generation and its use for policy- and decision-making and management within several European transboundary water regions.
- The creation of a multi-thematic (socio-economic and environmental) GIS database for Lake Peipsi and its drainage basin composed of 10-15 thematic layers relevant for modeling, assessment and strategic decision-making by partners in other work-packages, existing management structures and the general public.

Module 3 "Policy Instruments and Institutional Mechanisms"

This module will be comprised of studies of institutional mechanisms and policy instruments for decision-making under conditions of transition and uncertainty. The research includes:

- A comprehensive review of existing management structures, models and practices that have been used, are used, or are planned to be used in transboundary water management in Europe;
- An examination of models of policy formulation and policy implementation concerning transboundary water management, an evaluation and formulation of policy alternatives for management strategies in transboundary contexts, and an investigation of public and stakeholder support for these policies and ways of increasing this support. Evaluation of incentive-based tools for environmental management, which will provide knowledge of the policy making and implementation processes together with the applicability of incentives and control mechanisms, will also be performed.

Module 4 "Integration, synthesis and end-user participation"

The fourth module will produce decision support appropriate to end-users through integration and synthesis of the work under modules 1-3 and end-user participation. The work include:

- An integrative approach and synthesis of the results, promoting the introduction of an operational framework for strategies and tools for the management of transboundary waters on the Eastern European fringe;
- Project Management, including the dissemination of results to stakeholders, the public and end-users, including the involvement of an Advisory Committee throughout the entire project.

Overview of activities

The overall and general objectives will be achieved by performing a number of activities, some of which will be applied and evaluated for the pilot area:

- A comprehensive review of existing management structures, models and practices that have been used, are used, or are planned to be used in transboundary water management in Europe.
- An examination of models of policy formulation and policy implementation concerning transboundary water management, an evaluation and formulation of policy alternatives for management strategies in transboundary contexts, and an investigation of public and stakeholder support for these policies and ways of increasing this support. Evaluate incentive-based tools for environmental management and provide knowledge of the policy making and implementation processes together with the applicability of incentives and control mechanisms.
- An examination and evaluation of a set of the most informative monitoring parameters used in ecological status assessments, and calibration of the monitoring parameters in accordance with the water quality classes proposed in the draft EU Water Framework Directive (WFD), tested in the pilot study area of the Lake Peipsi and its drainage basin.
- An analysis of the trends in water nutrient quality and biota in lakes and their tributaries on the Eastern European fringe, with special emphasis on Lake Peipsi and its drainage basin, given the recent dramatic change in land-use and industrial emissions in most of the Eastern European regions.
- The further development and application of tools that can simulate the transfer, retention, and losses of nutrients in supra-national and data-poor river basins. We will distinguish between the nutrient loads originated from point sources and various diffuse sources, mainly agricultural land and forested land. The tools developed will be used to estimate the effect of changes in pollution sources (e.g. changes in agricultural land use) on the nutrient inputs to Lake Peipsi.
- The evaluation of the lake response to the recent dramatic and large-scale changes in river pollution loads of nutrients in the drainage basin of the Lake Peipsi, analysis of the in-lake response to different scenarios of future changes in river basin management on the nutrient input to the lake, and estimation of the influence of different activities in the river basin on lake water quality and biota, including fish.
- An assessment of the effectiveness of current environmental information management practises including monitoring, database development, information generation and its use for policy- and decision-making and management within several European transboundary water regions.
- The creation of a multi-thematic (socio-economic and environmental) GIS database for Lake Peipsi and its drainage basin composed of 10-15 thematic layers relevant for modelling, assessment and strategic decision-making, existing management structures and the general public.
- An integrative approach and synthesis of the results, promoting the introduction of an operational framework for strategies and tools for the management of transboundary waters on the Eastern European fringe. The combination of environmental information and information on the socio-economic situation in the various work-packages will

support the integrated water management strategies that are needed for a sustainable use of resources in decision-making.

- Project Management, including the dissemination of results to stakeholders, the public and end-users, including the involvement of an Advisory Committee throughout the entire project.

Expected impacts

The MANTRA-East project will:

- Improve the scientific approaches and strategies for the integration of ecological, socio-economic, information and policy aspects of water management, particularly emphasised on eutrophication and nutrient-related environmental problems;
- Scientifically evaluate and improve upon approaches and strategies for the management of transboundary lake and river basins on the Eastern European fringe;
- Produce new innovative strategies for strengthening institutions for management of transboundary waters located on the Eastern European fringe by development of strategies for effective transboundary water management under conditions of transition and uncertainty. It will thus be a vital study of the management of environmental issues in border regions of the enlarged EU;
- With the use of the respect to Lake Peipsi and its drainage basin, evaluate the draft WFD criteria and work out a set of informative parameters, which could be used in ecological status assessment of lake and river basins located on the Eastern European fringe;
- With Lake Peipsi and its drainage basin as a pilot study, evaluate and assess the riverine and lake response of nutrient loads, to large-scale decreases in anthropogenic activity, as well as the future consequences of such changes;
- Improve upon and stimulate the development of models that are suitable for the analysis of nutrient fluxes at the river basin scale. Such large-scale models are needed to evaluate the effect of European policies on nutrient levels in European rivers and coastal seas;
- Perform the first comprehensive pan-European study of the role and use of environmental information within transboundary water region, and thus provide an insight into the bottlenecks and opportunities for the development of cost-efficient transboundary environmental information management models. This may lead to guidelines, on both the principle and the more practical levels.