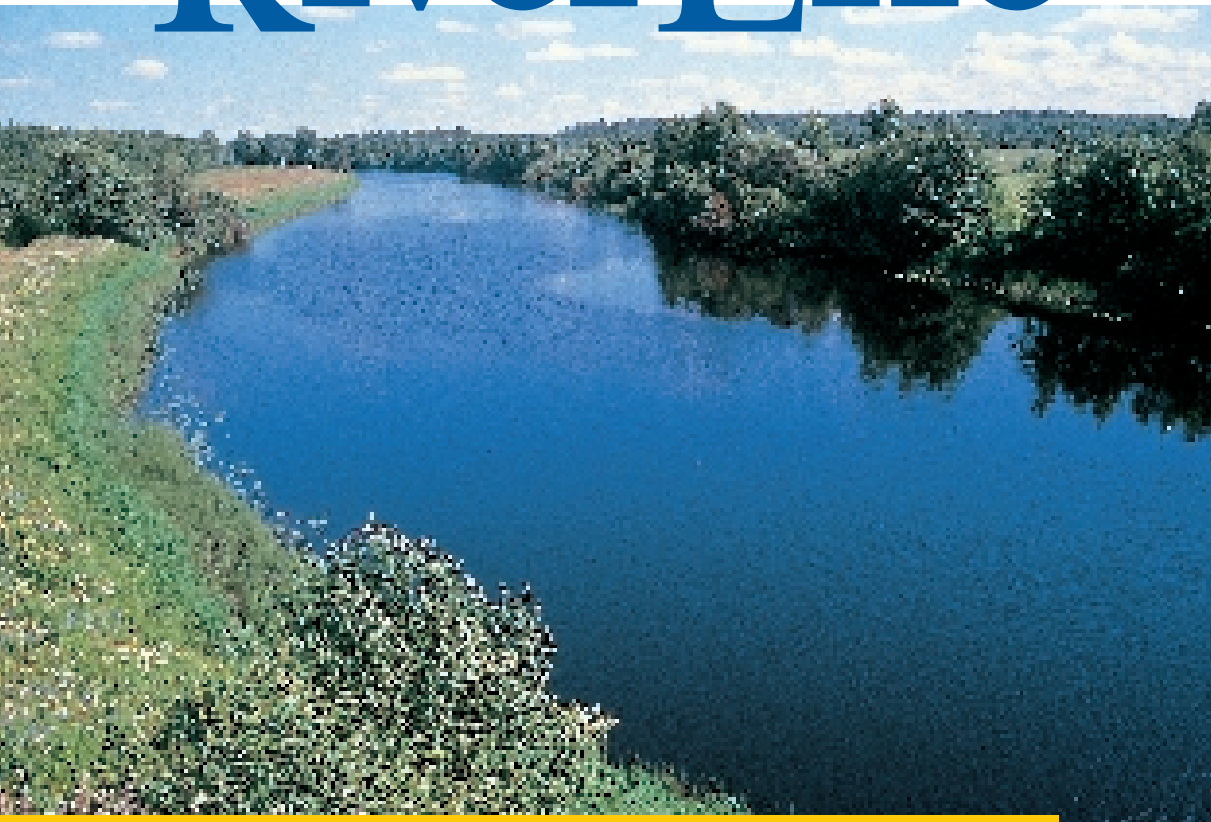
A graphic element consisting of a blue and yellow wavy line arching over the text.

RiverLife



**New methods for
water pollution control
in river basins**

<http://www.vyh.fi/eng/research/euproj/riverl/index.htm>



Improving your river status with new tools

Different land use forms (e.g. forestry, agriculture and peat production) affect all levels of river ecosystems through loading of suspended solids, nutrients, metals and acidifying substances. These environmental impacts can, however, be diminished in many ways. In land use planning the river basin should be taken as a whole and the existing water pollution control methods (e.g. sedimentation basins, buffer zones and wetlands) should be taken into more effective use.

To realise the aims of maintaining and improving the aquatic environments in the Community according to the EU Water Policy Framework Directive (WFD), knowledge of a wide area of river ecology and water pollution control methods is needed. In addition practical tools are needed for the cost-effective integrated management and monitoring of river basins.

The RiverLife project supported by the LIFE Environment programme of the European Union and by many Finnish ministries, regional public funds and private companies, was aimed to develop a new, practical tool for sustainable river basin management - available to anyone through the Internet. This interactive computer-based Decision Support System, RiverLifeDSS, helps local and regional authorities, private companies and consultants to integrate environmental considerations into land use planning and management practices in river basins.

The other objectives of the RiverLife project were

- To help all interested parties from decision makers to school pupils to find information on rivers in one place on the Internet
- To intensify water pollution control by informing about the existing water pollution control measures for different land use forms
- To promote ecologically sustainable land use in river basins
- To formulate guidelines for cost-effective and adequate river status assessment and monitoring in Finland according to the EU Water Policy Framework Directive
- To improve environmental awareness on biology and water pollution control in different target groups from decision makers to school pupils
- To mark the gaps in the existing knowledge on water pollution control of rivers and river status assessment.

To reach these objectives a consortium of researchers from the Finnish environmental administration, universities, research institutes and private companies was gathered.





Suomen Ilmakuva Oy

Use the Internet to know more about rivers

Information for sustainable water pollution control and management in river basins has been gathered in information packages to the RiverLife web site <http://www.vyh.fi/eng/research/euproj/river/index.htm>. These packages can be found in Finnish, English and partly also in Swedish.

The information packages tell you for example about

- How the river ecosystem is structured and how it functions

- The fishes in rivers and the animals and algae living in the river bottom

- The effects of land use and harmful substances on river environment

- What monitoring a river requires

- The different measures to reduce loading from different land use forms



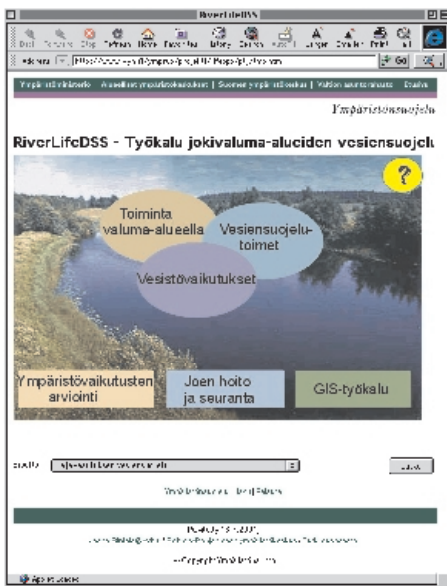
Sirkka Heinimaa

In the RiverLife toolbox there is lots to discover!

In the RiverLife toolbox on the Internet everything was collected for you into one place. These tools and methods can be found in English and in Finnish.

RiverLifeDSS assists you in land use planning and environmental impact assessment in the river basin. It contains the following tools:

- **GIS-tool** gives comprehensible graphic presentations of information on the river basin.
- **Hydrological model** assists in estimating the effects of land use actions and other types of loading on the flow and quality of water.
- With the **River Basin Analysis** you can form an overall view of the ecological state in the drainage area and in the river beds, the factors affecting the ecological state and the need for water pollution control in the river basin.
- **Ecological risk analysis** you can use for environmental impact assessment in rivers



Different **monitoring** and status assessment methods are needed to evaluate river condition:

- Division of the river network for the examination of the river basin
- Monitoring silting of river bottom
- Assessment of water quality by diatom and zoobenthos methods
- Methods suitable for managing fish stocks and studying the state of the stocks
- Automated monitoring and control system in a river
- Biotests and other methods for monitoring harmful substances
- Different water parameter analyses and what they tell about the river
- Water pollution control methods to reduce the effects of land use in agriculture, forestry and peat production. Information on the effectiveness of different methods and points to consider when planning to construct one were gathered to the RiverLife web pages.



Tasks for school pupils to learn more about the life and management of rivers - also in English!

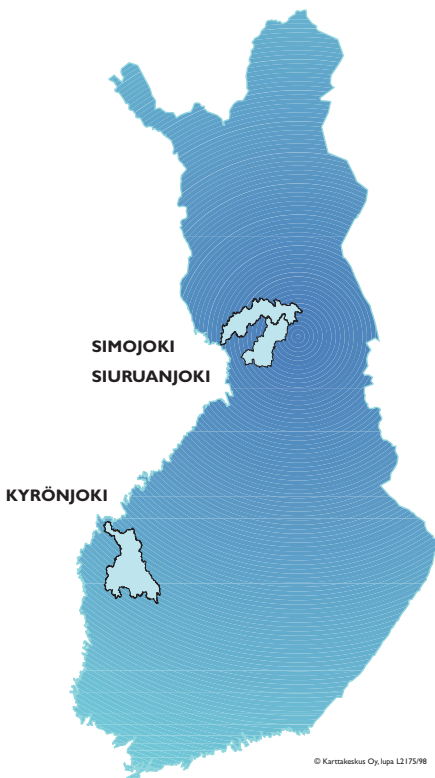
The nature and management of rivers are now introduced in a web-based learning environment. This environment is designed mainly for pupils of upper level comprehensive school, upper secondary school and polytechnic schools. The tasks on the Internet provide a possibility for independent and group work. Even co-operational learning between schools becomes easier through these networks.

This web site includes:

- ➔ **EXERCISES** that can be done in a web environment or downloaded and printed out on paper.
- ➔ **A PHOTO GALLERY** with a wide selection of photos of different rivers, river habitats, aquatic flora and fauna, as well as of water pollution control methods for agriculture, forestry and peat production.
- ➔ **A TEACHER'S INFORMATION PACKAGE** on web-based teaching.



Demonstrations in the three target river basins

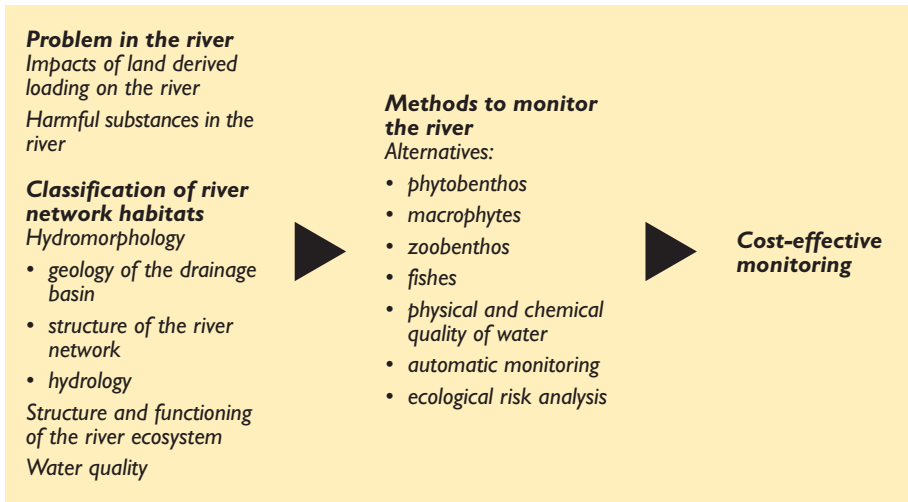


The project included three target rivers in Finland. The applicability of the tools developed in the project has been tested and demonstrated in these rivers. The requirements of the EU Water Policy Framework Directive on the management plans were taken into account when making proposals for the monitoring programmes and how to place water pollution control measures in the target river basins.

THE RIVER SIMOJOKI in Lapland is one of the last salmon rivers in Finland. The silting of the river bottom threatens the salmon in the river. A general level management plan has been completed using the River Basin Analysis and proposals for monitoring programme and where to direct the water pollution control measures in the river basin were completed. The proposals will be used in another project to develop water pollution control in the river basin.

In **THE RIVER SIURUANJOKI** a general level management plan has been completed using River Basin Analysis and RiverLifeDSS. This humic river suffers from eutrophication and silting. The management plan has been completed together with a project financed by structural funds from the European Union. The proposals made in the management plan will be realised in the river basin by this new project.

THE RIVER KYRÖNJOKI is one of the national pilot river basins testing the implementation of the WFD in Finland. This humic river has problems deriving from strong water level regulation and soil originated acidity. A plan for its ecological monitoring and management was drawn up. An automated river monitoring and controlling system has been constructed and tested in the River Kyrönjoki. With the automatic stations the quality of river water can be monitored in real time to catch up any acute changes in water quality. The stations can also be used for performing tests on river biota with qualitatively variable river water.



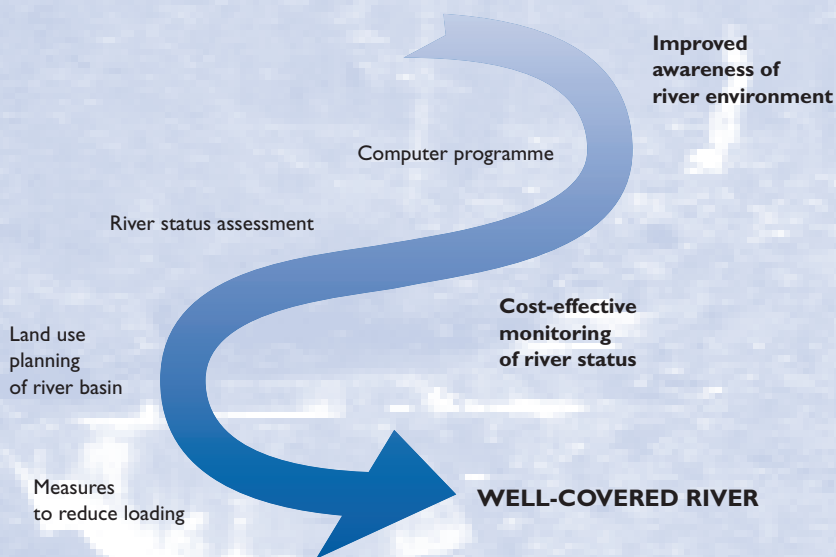
The results of the RiverLife project benefit the environment and economy in many ways

- It is now easy to find information on river water pollution control methods and monitoring on the Internet: by using adequate methods in water pollution control the water quality and ecological state of rivers can be improved. In addition by using adequate monitoring methods changes in river state can be observed in time. Both of these factors create cost-effectiveness.
- The tools developed will benefit private companies, whose activities in land use (in peat production, agriculture and forestry) are based on a better knowledge on loading assessment and effects of loading on water ecology. This will improve not only the water quality and ecological state of rivers, but will also increase cost-effectiveness in land use planning.
- The work of authorities, when implementing e.g. the EU Water Policy Framework Directive, and the work of private companies in water pollution control of rivers will be made easier with the tools which help to consider the whole river basin. This also creates cost-effectiveness.
- An automated river monitoring and controlling system has been tested in Finland in the River Kyrönjoki. This system gives continuous and detailed information about water chemistry and hydrology. Thus a deterioration in water quality can quickly be responded to by changing the river flow.
- People participating in the organised dissemination occasions have obtained information on the river and its management. By increasing the awareness on these matters that influence the well-being of rivers people become more involved and concerned about their river. With the tasks for schools also the young people can learn more about life in rivers and how to control water pollution.
- In the long term the results will benefit private companies whose activity depends on the good state of rivers (drinking water supply, aquaculture, fishery, fishing and nature tourism).
- New projects (e.g. in the Kola river in Russia) have initiated to improve water pollution control in river basins using the tools and methods gathered in RiverLifeDSS and to fulfill the gaps in the existing knowledge on water pollution control of rivers and on river status assessment.

The logo for RiverLife features a stylized blue and yellow wave above the text "RiverLife" in a blue serif font.

RiverLife

THE RIVERLIFE TOOLBOX



Cover pictures

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